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UNITED STATES COMMISSION OF FISH AND FISHERIES.

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PART XXI.

REPORT

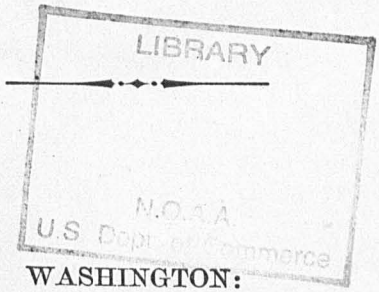
OF

THE COMMISSIONER

FOR

THE YEAR ENDING JUNE 30, 1895.

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Report of the United States Commissioner of Fisheries

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REPORT

OF THE

UNITED STATES COMMISSIONER OF FISH AND FISHERIES

FOR THE

FISCAL YEAR ENDING JUNE 30, 1895.

During the period covered by this report, owing to the ill health of Commissioner Marshall McDonald, who died September 1, 1895, the work was for a portion of the time under the direction of the chief clerk, Mr. Herbert A. Gill. The late Commissioner was unable to prepare a report for the year under consideration, and the work of the Commission is shown in the following reports of the several assistants in charge of divisions.

The money available for the work of the Commission during this period was as follows:

Salaries	$168,020.00
Miscellaneous expenses:	
Administration	9,000.00
Propagation of food-fishes	92,181.94
Maintenance of vessels	30,500.00
Inquiry respecting food-fishes	13,800.00
Statistical inquiry	3,500.00
For completion of fish-hatcheries:	
Vermont	12,554.15
New York	11,509.60
Colorado	7,159.25
Texas	17,526.53
Iowa	15,000.00
Montana	11,731.95
Tennessee	12,000.00

The expenditures under the above appropriations, a detailed report of which, in accordance with the law, was made to Congress December 13, 1895 (House Doc. 69, Fifty-fourth Congress, first session), were as follows:

Salaries	$163,381.51
Miscellaneous expenses:	
Administration	8,885.78
Propagation of food-fishes	92,814.79
Maintenance of vessels	29,990.65
Inquiry respecting food-fishes	13,559.91
Statistical inquiry	3,610.02
Fish-hatcheries:	
Vermont	9,580.95
New York	234.91
Colorado	539.43
Texas	9,596.25
Iowa	793.15
Montana	1,264.16

On February 15, 1895, the Senate passed the following:

Resolved, That the Commissioner of Fisheries is hereby directed to make inquiry in reference to the extent, methods, and present condition of the coast fisheries of Florida, more particularly the sponge and oyster fisheries, and to report as to the desirability of establishing a station for investigation, experiment, and fish-culture at some suitable point on the coast.

Some preliminary investigations were begun by the Commissioner shortly after the passage of the resolution, but his declining health preventing their completion, Dr. Hugh M. Smith, the assistant in charge of the Division of Statistics, was detailed to make further investigations, and examined several localities on the east coast of Florida with a view to their suitability for a fish cultural station. His report on Biscayne Bay, found hereafter, embodies the results of this partial investigation.

Under direction of the architect and engineer of the Commission, work of constructing new stations was carried on at San Marcos, Tex., Bozeman, Mont., and Manchester, Iowa.

At San Marcos it was deemed advisable, on account of the delay in building the dam across the San Marcos River, which was by agreement to be erected by the San Marcos Water Company and the citizens of San Marcos, to sink an artesian well for the purpose of supplying some of the ponds intended to be built on the higher ground. A contract was entered into with Judson Bros., of San Antonio, Tex., who were the lowest bidders, and work was promptly begun. A depth of about 1,300 feet was reached by the end of the fiscal year, with a light flow of water at a temperature of 80 degrees. The plan for laying out the ponds was completed and excavations were begun.

There remained on July 1, 1894, an available balance of $11,731.95 of the money appropriated for the construction of a fish-hatchery at Bozeman, Mont., after paying for the land and incidental expenses. Plans and specifications were prepared for the construction of a fish-hatchery, outbuildings, and ice-house, and after due advertisement bids were received and a contract entered into on December 24, 1894, with Peter T. Morris, the lowest bidder. Owing to the severe climate and the lateness of the season the work was not begun until the latter part of April, 1895. Mr. Juan J. Jiminez was employed to superintend the laying out of the ponds, as well as the construction of the hatchery and other buildings. This work was nearly completed at the close of the fiscal year.

In January, 1894, the Commissioner recommended to Congress the establishment of a station at either Manchester or Decorah, Iowa, and Congress, by act approved August 18, 1894, appropriated $15,000 for the establishment of such a station. Accordingly, in October, the Commissioner directed the architect and engineer to make a further examination of these two places. After a careful consideration of the advantages of each place a site at Manchester, comprising 25 acres, and which was donated by the citizens, was selected and surveyed, and the deed of this property from Charles Thorpe and others was transmitted

to the United States Attorney-General for examination and certification as to its sufficiency to vest a valid title in the United States.

The hatchery at St. Johnsbury, Vt., being sufficiently complete to begin work of propagation, was turned over to the superintendent of the station.

Under the supervision of the mechanical engineer, the pumps, boilers and other machinery located at the various stations of the Fish Commission and on board the steam launches attached to those stations have been kept in condition for use, and such repairs and alterations made as would tend to greater economy and efficiency, or provide for an expansion of the work at the various stations. In addition to the other duties of the office, plans, specifications, and estimates for equipping a hatchery located at Cape Vincent, N. Y., were prepared.

The following papers were published during the year:

Fish nets: some accounts of their construction and the application of the various forms in American fisheries, by C. H. Augur. Bulletin 1893, pp. 381 to 388.

Statistics of the fisheries of the United States, by Hugh M. Smith. Bulletin 1893, pp. 389 to 417.

The fisheries of Japan, by the Bureau of Agriculture of Japan. Compiled by Hugh M. Smith. Bulletin 1893, pp. 418 to 438.

The exhibit of pearls at the World's Columbian Exposition, by George F. Kunz. Bulletin 1893, pp. 439 to 457.

Results of explorations in western Canada and Northwestern United States, by Carl H. Eigenmann. Bulletin 1894, pp. 101 to 132.

Report of the Commissioner for the year ending June 30, 1892, Marshall McDonald, Commissioner; pp. VII to CCIV.

Report upon the investigations of the U. S. Fish Commission steamer *Albatross* for year ending June 30, 1892, by Z. L. Tanner, U. S. N. Report 1891-92, pp. 1 to 64.

The myxosporidia or psorosperms of fishes, and the epidemics produced by them, by R. R. Gurley. Report 1891-92, pp. 65 to 304.

A bibliography of the publications in the English language relative to oysters and the oyster industries, by C. H. Stevenson. Report 1891-92, pp. 305 to 359.

The fisheries of the Great Lakes, by Hugh M. Smith. Report 1891-92, pp. 361 to 462.

Notes on the fishes of western Iowa and eastern Nebraska, by Seth E. Meek. Bulletin 1894, pp. 133 to 138.

List of the fishes inhabiting Clear Lake, California, by D. S. Jordan and C. H. Gilbert. Bulletin 1894, pp. 139, 140.

Notes on the fresh-water species of San Luis Obispo County, California, by David Starr Jordan. Bulletin 1894, pp. 133 to 142.

On the appliances for collecting pelagic organisms, with special reference to those employed by the U. S. Fish Commission, by Z. L. Tanner. Bulletin 1894, pp. 143 to 151.

The salmon fisheries of the Columbia River basin, by Marshall McDonald, together with a report upon physical and natural-history investigations in the region, by C. H. Gilbert and B. W. Evermann. Bulletin 1894, pp. 153 to 207. Also issued as Senate Miscellaneous Document 200, 53rd Congress, second session.

Notes on the oyster industry of New Jersey, by Ansley Hall. Report 1892, pp. 463 to 528.

Notes on fishes collected in Florida in 1892, by James A. Henshall. Bulletin 1894, pp. 209 to 221.

Notes on a reconnoissance of the fisheries of the Pacific Coast of the United States, by Hugh M. Smith. Bulletin 1894, pp. 223 to 288.

Feeding and rearing fishes, particularly trout, under domestication, by W. F. Page. Bulletin 1894, pp. 289 to 314.

Report upon investigations in the Maumee River Basin during the summer of 1893, by Philip H. Kirsch. Bulletin 1894, pp. 315 to 338.

A statistical report upon the fisheries of the Middle Atlantic States, by Hugh M. Smith. Bulletin 1894, pp. 339 to 466.

A list of the species of fishes known from the vicinity of Neosho, Mo., by B. W. Evermann and W. C. Kendall. Bulletin 1894, pp. 467 to 472.

The fishes of the Colorado Basin, by B. W. Evermann and Cloud. Rutter. Bulletin 1894, pp. 473 to 490.

There were also issued the completed annual report for 1892 and Bulletins for 1892 and 1893, the latter of which was made up of papers presented at the Fisheries Congress of the World's Columbian Exposition of 1893.

During the year there were distributed over 3,400 bound volumes of the annual reports and bulletins, and over 8,800 pamphlet extracts therefrom.

The following papers were published by the Museum of Comparative Zoology, at Cambridge, Mass., on the results of the explorations off the west coast of Mexico, Central and South America, and off the Galapagos Islands, carried on in charge of Prof. Alexander Agassiz, by the United States Fish Commission steamer *Albatross* during 1891:

The Pelagic Schizopoda, by Arnold Ortmann.
Die Opisthobranchien, by Rudolph Bergh.
Die Pelagischen Copepoden, by Wilhelm Giesbrecht.
The Holothurioidea, by Herbert Ludwig.
The Stalk-eyed Crustacea, by Walter Faxon.

There have been added to the library of the Commission 1,205 volumes and reports.

Acknowledgments are due to the United States Coast and Geodetic Survey for the charts of that Bureau furnished the Commission as issued, as well as for meeting special requests for such additional copies of charts as were needed for use in the inquiries conducted by the Commission.

The health officer of the District of Columbia continued to furnish monthly returns of the receipts of fishery products at the Washington fish-markets.

The Commission is again indebted to Gen. Albert Ordway, commanding the District of Columbia militia, for the loan of tents and accessories for use at Bryan Point Station during the shad-hatching season.

The commercial department, Board of Trade, London, England, furnished monthly statements of the fisheries of the coasts of England and Wales, and the Fishery Board of Scotland, Edinburgh, furnished similar information for the coast of Scotland.

To the courtesy of the managers of many railroad companies, mentioned in the report of the Division of Fish Culture, the Commission is indebted for the gratuitous transportation of its cars over 65,000 miles of road, as well as for permission to carry fish and eggs in the baggage cars of their roads.

During the year the policy of extending to the various State and Territorial Fish Commissions all possible aid in stocking the waters of their respective States was continued, and over 40,800,000 eggs, 6,900,000 fry, and 3,868,000 yearling or adult fish were furnished to the fish commissioners of twenty-one States and Territories.

Several consignments of eggs were sent to foreign countries—eggs of the quinnat salmon to Mr. A. Geoffroy St. Hilaire, president of the

Société d'Acclimatation, Paris, France, and rainbow trout eggs to Mr. Raveret-Wattel, Fécamp, France; Mr. William Burgess, of the Midland Counties Fish-cultural Establishment, England; Rev. H. B. Wolryche-Whitmore, of Bridgenorth, England, and Maj. W. Turner, of Bertrix, Belgium. Whitefish eggs were also sent to Mr. William Burgess, of the Midland Counties Fish-cultural Establishment. Details of these distributions appear in the following report of the Division of Fish-culture.

The Swiss Government sent to this Commission in March, 1895, 80,000 eggs of the Lake Geneva trout, but owing to delay in delivery in New York, the majority of the eggs were lost.

The steam launch *Petrel*, with her crew, was loaned to the State of Virginia, at the request of the governor of that State, for the purpose of completing the survey of the natural oyster beds, and to the Commissioners of the District of Columbia while the municipal harbor boat was being repaired.

During the encampment of the District National Guard at Fort Washington, on the Potomac, the steam launch *Blue Wing*, with crew, was placed at the disposal of Gen. Albert Ordway, commander in chief of the militia of the District of Columbia.

By direction of the President, the United States Fish Commission steamer *Albatross* was designated to take part in enforcing "regulations governing vessels employed in fur-seal fishery," but was directed to act independently of the Bering Sea fleet.

Changes in the personnel have been few. Lieut. Robert Platt, U. S. N., at his own request, was relieved of the command of the United States Fish Commission steamer *Fish Hawk* and ordered to special duty with the Commission. Lieut. Franklin Swift, U. S. N., was detailed to succeed him, and took command of the vessel on June 27, 1895.

Dr. Tarleton H. Bean, who had long been connected with the Commission as ichthyologist and editor, and later as assistant in charge of the Division of Fish-culture, tendered his resignation of the latter position to accept that of director of the New York Aquarium. Mr. W. de C. Ravenel, who had been acting as assistant in charge of the Division of Fish-culture was appointed to fill the vacancy May 23, 1895.

REPORT ON THE PROPAGATION AND DISTRIBUTION OF FOOD-FISHES.

By W. de C. Ravenel, *Assistant in Charge.*

INTRODUCTION.

The work of the division was under the direction of Dr. T. H. Bean until May 23, when he resigned to accept the superintendency of the Aquarium in Battery Park, New York. The vacancy was filled by the appointment of W. de C. Ravenel, who had been in charge from October to May, while Dr. Bean was engaged in inspecting the various stations and in preparing plans for the exhibit at the Cotton States International Exposition, he having been appointed representative of the Commission on the Government board of management.

In addition to the usual work of the division, which consists of the general direction of fish-cultural work, including the propagation and distribution of fish from the various stations, arrangements were perfected for the purchase of a carload of eastern oysters in New York and the shipment of same by express to South Bend, Wash., for planting in Willapa (Shoalwater) Bay. They were delivered in excellent condition and transplanted on suitable grounds, under direction of Mr. C. H. Townsend, assisted by Hon. James Crawford, fish commissioner of Washington. Efforts were also made to increase the salmon output by operating the hatchery on Siuslaw River, and rainbow-trout eggs were collected at Mammoth Spring, Ark. The Exposition work, which devolved on Mr. Ravenel at the resignation of Dr. Bean, included the construction of an aquarium larger and more elaborate than any ever before undertaken by the Commission, besides the selection and preparation of various forms of apparatus to be used in illustrating the work of the Commission.

INSPECTION OF STATIONS.

During the month of October Green Lake Station, Maine, was inspected by Dr. Bean. He afterwards visited Leadville, Colo.; Neosho, Mo.; Quincy, Ill., and Put-in-Bay, Ohio, and submitted reports on the work of the stations at those places, with recommendations as to improvements. The results at the Gloucester Station, Massachusetts,

were so poor—only about 17 per cent of the eggs delivered having been hatched—that in March the assistant, accompanied by Mr. I. S. K. Reeves, proceeded to Woods Hole and Gloucester to obtain data for the comparison of methods and facilities at the two stations. The conditions existing at the two were found to be entirely unlike in the most important essentials. At Woods Hole the eggs are taken from penned fish, whereas at Gloucester they are collected from fish caught by the regular fishing vessels on the banks and transported by rail from Kittery to Gloucester.

The Gloucester Station is at a serious disadvantage with regard to water—the next most important element in fish-cultural operations—as it is not only likely to be roiled after storms, occurring at frequent intervals during the hatching season, but is also heavily charged with sediment and contains much animal life (chiefly crustaceans) which interfere seriously with the working of the hatching-boxes. The hatchery is also poorly lighted. After careful consideration the assistant recommended that steps be taken to provide storage for brood fish, as at Woods Hole, and that the hatchery be improved and arrangements made to filter the water by means of sand and gravel, so as to eliminate the trouble arising from the presence of sediment, crustaceans, etc.

The importance of regular inspections of the fish-cultural stations can not be too strongly urged. They should be made at least once a year by the Commissioner or the assistant in charge of the Division of Fish-culture.

STATION OPERATIONS.

The total number of fish and eggs distributed by the Commission during this fiscal year was 619,915,852, which far exceeds the output of any previous year. The same stations were operated as in 1893–94, with the addition of the one at St. Johnsbury, Vt. This was not completed in time for the collection of eggs, but a few fish were hatched there from eggs transferred from other stations.

Following is a list of the stations operated during the year:

Green Lake, Me.
Craig Brook, Me.
St. Johnsbury, Vt.
Gloucester, Mass.
Woods Hole, Mass.
Steamer *Fish Hawk* (Delaware River).
Battery Island, Md.
Fish Ponds, Washington, D. C.
Central Station, Washington, D. C.
Bryan Point, Md.
Wytheville, Va.
Put in Bay, Ohio.
Northville, Mich.
Alpena, Mich.
Duluth, Minn.
Quincy, Ill.
Neosho, Mo.
Leadville, Colo.
Baird, Cal.
Fort Gaston, Cal.
Korbel, Cal.
Clackamas, Oreg.

DISTRIBUTION OF FISHES.

The number of eggs, fry, and adult fish furnished by each of the stations is shown in the following table; also a summary of fishes distributed, arranged by species. This includes 30 species of fish and 1 crustacean, the lobster.

Fish and fish eggs furnished for distribution by the United States Fish Commission during the fiscal year ending June 30, 1895.

Source of supply.	Species.	Eggs.	Fry.	Adults and yearlings.
Green Lake, Me	Landlocked salmon	20,000		128,042
	Hybrid (landlocked-Von Behr)		4,500	
	Rainbow trout		350	
	Loch Leven trout			12,512
	Von Behr trout			7,324
	Brook trout			6,803
	Lake trout			2,500
Craig Brook, Me	Atlantic salmon	20,000		186,241
	Brook trout			7,307
Gloucester, Mass	Cod		12,896,000	
	Lobster		653,000	
Woods Hole, Mass	Cod	2,897,000	47,942,000	
	Flatfish		5,940,000	
	Lobster		71,000,000	
Delaware River (steamer *Fish Hawk*).	Shad	321,000	19,859,000	
Battery Island, Md	Shad	852,000	13,932,000	
Fish Ponds, Washington, D. C.	Carp			37,393
	Goldfish			6,830
	Tench			11,286
	Golden tench			64
	Golden ide			10
	Black bass			6,552
	Shad			1,000,000
Central Station, Washington, D. C.	Rainbow trout		8,000	
	Hybrid (landlocked-Von Behr)		5,500	
	Shad		41,984,000	
Bryan Point, Md	do	49,898,000		
Wytheville, Va	Rainbow trout	177,000	5,000	79,387
	Black bass			553
	Rock bass			5,558
	Carp			1,580
	Goldfish			3,002
Put-in-Bay, Ohio	Lake herring	9,852,000	2,600,000	
	Whitefish	5,000,000	80,198,000	
	Pike perch	30,000,000	202,380,000	
	Lake trout		447,500	
Northville, Mich	do	2,100,000	1,610,000	
	Brook trout		182,500	
	Von Behr trout	5,000	20,000	
	Loch Leven trout	5,000	10,000	
	Rainbow trout		13,000	6,234
	Steelhead trout		40,000	
Alpena, Mich	Whitefish	50,000	28,000,000	
	Lake trout	8,746,000		
Duluth, Minn	Pike perch		13,000,000	
	Whitefish		11,000,000	
	Lake trout		4,250,000	
	Rainbow trout		18,000	
	Steelhead trout		75,000	
Quincy, Ill	Black bass			21,820
	Crappie		50,000	5,675
	Warmouth bass			1,090
	White bass			71
	Sunfish			221
	Yellow perch			3,325
	Pike perch			299
	Catfish			5,916
	Pike			82
Neosho, Mo	Von Behr trout			3,440
	Rainbow trout	280,000	14,000	73,930
	Rock bass			53,619
	Black bass			3,761
	Tench			3,970
	Carp			340
	Catfish			1,965
	Goldfish			7,857
Leadville, Colo	Brook trout	70,000	230,000	70,325
	Rainbow trout		30,000	750
	Black-spotted trout			1,475
	Loch Leven trout			870
Baird, Cal	Quinnat salmon	3,076,000	500,000	
Fort Gaston, Cal	Steelhead trout	60,000	302,500	332,000
	Rainbow trout		1,000	
	Von Behr trout		4,000	
	Silver salmon		220,000	560,000
Korbel, Cal	do		470,000	
	Steelhead trout		550,000	
Clackamas, Oreg	Quinnat salmon	23,000		

Summary of distribution.

Species.	Eggs.	Fry.	Adults and yearlings.	Total.
Catfish	.....	.....	7,574	7,574
Carp	.....	.....	33,935	33,935
Tench	.....	.....	13,852	13,852
Goldfish	.....	.....	16,590	16,590
Golden tench	.....	.....	51	51
Golden ide	.....	.....	10	10
Shad	1,173,000	74,205,000	1,000,000	76,378,000
Quinnat salmon	3,699,000	500,000	.....	4,199,000
Silver salmon	.....	910,000	560,000	1,470,000
Atlantic salmon	20,000	.....	186,241	206,241
Landlocked salmon	20,000	.....	124,680	144,680
Steelhead trout	60,000	963,500	332,000	1,355,500
Loch Leven trout	5,000	10,000	13,382	28,382
Rainbow trout	457,200	89,350	142,946	689,496
Von Behr trout	5,000	24,000	10,399	39,399
Black-spotted trout	.....	.....	1,475	1,475
Brook trout	70,000	406,500	83,916	560,416
Lake trout	2,100,000	6,297,000	1,600	8,398,600
Whitefish	5,650,000	120,198,000	.....	125,248,000
Yellow perch	.....	.....	3,325	3,325
Pike perch	30,000,000	222,180,000	273	252,180,273
Lake herring	9,852,000	600,000	.....	10,452,000
Black bass	.....	.....	28,233	28,233
Rock bass	.....	.....	47,519	47,519
Warmouth bass	.....	.....	703	703
Sunfish	.....	.....	218	218
Crappie	.....	.....	4,368	4,368
White bass	.....	.....	12	12
Cod	2,897,000	57,318,000	.....	60,215,000
Flatfish	.....	5,940,000	.....	5,940,000
Lobster	.....	72,253,000	.....	72,253,000
Total	55,408,200	561,894,350	2,613,302	619,915,852

NOTE.—2,047,000 shad fry were deposited for rearing in the Fish Ponds, Washington, D. C., but these figures are not included in the summations; also 9,500 hybrids of Von Behr trout and landlocked salmon were hatched and distributed, but these not being a distinct species are not included.

In addition to the foregoing there were furnished for distribution, but lost in transit, 6,200,000 pike-perch eggs, 1,580,000 pike-perch fry, 1,570,000 shad fry, 328,000 cod fry, 6,000 brook-trout fry, 10,500 lake-trout fry, 4,000 steelhead-trout fry, and the following adults and yearling fish: 307 catfish, 5,860 carp, 1,404 tench, 1,099 goldfish, 3,362 landlocked salmon, 17,355 rainbow trout, 365 Von Behr trout, 519 brook trout, 900 lake trout, 26 pike perch, 4,478 black bass, 11,658 rock bass, 387 Warmouth bass, 3 sunfish, and 1,307 crappie.

GREEN LAKE STATION, MAINE (E. M. ROBINSON AND E. E. RACE, SUPERINTENDENTS).

Operations were continued under the direction of Mr. Robinson until November 27, when he was temporarily superseded by Mr. C. G. Atkins, superintendent of Craig Brook Station, who was detailed to assume charge of Green Lake Station pending the appointment of a successor to Mr. Robinson, and to report on the condition of affairs. Mr. Atkins remained in charge until January 23, 1895, when Mr. E. E. Race was appointed superintendent.

The fry and stock fish on hand at the station at the beginning of the fiscal year were as follows:

Variety.	When hatched.				
	1894.	1893.	1892.	1891.	1890 or before.
Landlocked salmon	149,941	.....	4,656	3,376	2
Von Behr trout	11,674	.....	1,140	.....	.....
Loch Leven trout	15,678	.....	1,788	.....	.....
Lake trout	15,000	.....	.....	.....	.....
Brook trout	.....	263	.....	.....	90

During July and August the station force was fully occupied in caring for the stock on hand. The losses of fry were comparatively small, notwithstanding the high temperature prevailing. The lake-trout fry were moved from the hatchery to Spring Branch in June, but had to be transferred later on to another spring at Rocky Pond, as the first one dried up. On September 8 Mr. Robinson reported that by actual count there were only 2,663 of these fishes left, from which it would appear that lake trout will not stand as high a temperature as the rainbow trout and the landlocked salmon. The landlocked salmon hatched in 1892, which had been held as brood stock, were planted in Green Lake in October, it having been found that the number held was too large for the pond space available. During the months of September and October the following fishes, resulting from eggs taken the previous fiscal year, were distributed: Landlocked salmon, 128,042; Loch Leven trout, 12,512; Von Behr trout 7,324; brook trout (produced at Craig Brook Station), 6,803; lake trout, 2,500.

Collection of eggs.—The station being entirely dependent on the capture of fish from the open waters for its supply of eggs of trout and landlocked salmon, arrangements were made in August for the erection of a pound net at Mann Brook for the capture of spawning salmon. The grounds at Winkempaugh Brook were also inspected, and arrangements made for the collection of eggs there, and new pens and traps were placed in Great Brook. A force of men was also sent to Branch Pond to conduct operations. The first salmon was taken on September 19 at the Great Brook trap, and by the pound net on September 27.

The collection of brood fish from all these sources was disappointing. At the close of the spawning season the eggs taken were as follows: Landlocked salmon, 164,000; brook trout, 71,750; golden trout (from Flood Pond), 17,000; square-tailed trout, 2,000; total, 254,750.

From the brood stock of Von Behr and Loch Leven trout 56,700 eggs were taken during the month of December. These were apparently of low vitality when fertilized, and died before the close of the year. The following table shows the number of eggs received at and transferred from the station during the year:

Localities.	Species.	Number.
Sent from Northville, Mich	Lake trout	100,000
Sent from Dumfries, Scotland, by J. J. Armistead	Loch Leven trout	20,000
Sent from Wytheville, Va	Rainbow trout	15,000
Sent to Central Station, Washington, D. C	Hybrid landlocked salmon and Von Behr.	5,231
Sent to California Fish Commission, Sisson, Cal	Landlocked salmon	10,000

The presence of immense numbers of parasites and a quantity of fungus, which made its appearance in February, necessitated the filtering of the water. To accomplish this, gravel filters were put in the ends of the hatching troughs and cheese-cloth screens in the supply trough. The cheese-cloth screens were used only during the day, and as they became clogged very quickly and had to be changed during the

night, wire screens were substituted. While the wire screen did not prevent the mud from entering the troughs, it stopped most of the parasites. It became necessary about this time to increase the amount of water from 5 to 12½ gallons, as with the smaller amount it was not unusual to find a thin scum of ice over the troughs in the morning. When the feeding of the fish in the ponds commenced, late in April, the stock consisted of 90,000 landlocked salmon fry, 19,538 brook trout, 10,352 golden trout, 83,257 lake trout, 5,066 rainbow trout, 7,259 Loch Leven trout, 4,892 hybrids; total, 220,364.

Arrangements were made to care for the lake-trout fry in troughs in the carpenter shop, the supply of water being taken from the main flume, but as the temperature rose it was deemed advisable to remove the lake trout and brook trout to a temporary nursery erected a half mile up the mountain side, east of the spawning-house. In preparing this nursery it was necessary to place a dam across the brook and to cut a road through the underbrush. The temperature of the water in the hatchery reached 71° on May 11, causing a large loss of fry, especially of those that had not absorbed the sac. The rainbow trout suffered such heavy losses that it was decided to deposit the balance (350) in Green Lake, also the 1,000 hybrid Von Behr and landlocked salmon and 3,700 Von Behr and brook. At the close of the month the following fry were reported on hand: 59,878 landlocked salmon, 14,314 brook trout, 6,800 golden trout, and 70,416 lake trout. All of the Loch Leven trout received from Scotland succumbed, owing to extreme heat, notwithstanding the fact that special efforts were made to save them by putting them in the temporary nursery.

The temperature of the water during June was normal, and the losses of fish and fry comparatively small. The maximum and minimum air and water temperatures during the year were as follows:

1894.	Water.		Air.		1895.	Water.		Air.	
	Max.	Min.	Max.	Min.		Max.	Min.	Max.	Min.
July	79½	69	93	59	January	34	33	46	— 7
August	77½	63	87	52	February	37½	32½	61	—16
September	70	58½	84	42	March	37½	32½	54	2
October	60	46½	69	32	April	51½	34½	75	22
November	66½	33	56	10½	May	70½	48½	89	43
December	45	31	50	—6	June	78	62½	89	54

During winter 50 tons of ice were cut and stored, and repairs were made on the main flume. Considerable work was also done on the roads leading to the station, and a temporary bridge, 60 feet long, was built across Great Brook so as to permit of the hauling of wood.

The experience of the past two years has demonstrated the fact that the temperature of the water at present furnished the hatchery is too high during certain portions of the year for the successful rearing of lake and brook trout, though the landlocked salmon thrive in it. It is therefore recommended that steps be taken to secure the spring which has been used for supplying the temporary nursery. The water is of standard temperature, 42° F., and its volume is from 50 to 100 gallons

per minute. There is another spring on the Government property between the hatchery and Rocky Pond which should be excavated and put in condition. The temperature of this is 46½°, and by mingling it with the water from the flume it would undoubtedly suffice for rearing a large quantity of brook trout.

Following is the list of fish and fry on hand June 30, 1895:

Species.	Calendar year in which fish were hatched.				
	1895.	1894.	1893.	1892.	1891 or before.
Landlocked salmon	54,950		3		3,000
Brook trout	13,350		138		
Golden trout	6,480				
Lake trout	61,539				
Von Behr trout				1,150	
Rainbow trout			7		
Total	136,319		148	1,150	3,000

CRAIG BROOK STATION (CHARLES G. ATKINS, SUPERINTENDENT).

The fiscal year opened with the following stock on hand:

Kind.	Calendar year in which hatched.						
	1894.	1893.	1892.	1891.	1889.	1888-89.	1888.
Atlantic salmon	214,033	867					11
Atlantic salmon domesticated	681	1,347	131				
Landlocked salmon						14	
Brook trout	9,370						
Rainbow trout					6		
Scotch sea trout				27			
Total	224,084	2,214	131	27	6	14	11

Atlantic salmon.—Of 174 Atlantic salmon collected at Penobscot Station in May and June, 1894, 143 remained alive in the inclosure at Dead Brook on July 1, but by October the number had been reduced to 71, 38 of which were females. These salmon were purchased conjointly with the State of Maine, and of the 415,350 good eggs obtained from them the United States Commission received 226,350 as its share, and the State 189,000. Twenty thousand of those belonging to the United States Commission were shipped to the New York Commission at Cold Spring Harbor, and the balance were retained at the station for hatching and rearing. The eggs commenced to hatch in March and finished in April, yielding 205,994 fry, of which 176,954 survived at the close of the fiscal year.

The 11 salmon hatched in 1888, and confined in small ponds over six years, died during the summer. These were the parents of the three broods of domesticated salmon which were hatched in the years 1892, 1893, and 1894, respectively. There were 2,159 of them in all at the beginning of the year, but the number was greatly reduced by two attacks of disease, one occurring in the summer of 1894 and the other in May, 1895. The survivors (991) appear to be healthy and vigorous and will be sufficient for the purpose of artificial landlocking. None of them are old enough as yet to yield eggs.

Landlocked salmon.—From the station's brood stock, consisting of remnants of the broods of 1888–89, which have been held in a very small shallow pond without change of quarters for the past four years, 8,800 eggs were taken in October. As they were of poor quality, only 2,783 fry were hatched from them, and of these but 1,346 remained at the close of the fiscal year. Arrangements were also made for the collection of eggs in Toddy Pond, it having first been stocked by the United States Fish Commission in 1891. An attempt to take eggs in that pond in 1892 resulted in the collection of only 4,200, but as sportsmen had reported the taking of a large number of adult fish there during the season 1893–94, it was believed that at least 100 spawners could be secured. The results were disappointing, however, as only 9 of the 40 salmon captured were females. The 12,600 eggs taken were healthy and hatched out 11,887 fish, of which 9,807 remained at the end of the year.

Rainbow trout.—All of the rainbow trout except one died during the year. The pond in which they were confined has a superficial area of 240 square feet, a maximum depth of about 2 feet, and is supplied with water from the waste of the rearing-troughs. The largest of these trout weighed 15⅝ pounds and measured 27¼ inches in length, 8½ in breadth, and 4½ in thickness. Eight of the others weighed over 5 pounds each, and two over 10 pounds. In a larger pond they would probably have lived longer and attained an even greater size. In January a consignment of 24,272 rainbow trout eggs was received from the Wytheville Station. These produced 20,260 fry, of which 11,506 remained on hand at the close of the year.

Swiss Lake trout.—A case of lake-trout eggs, said to contain 80,000, was received from Switzerland in March. The package had been delayed by some mischance, and the eggs arrived in such poor condition that only 541 fry were hatched from them, and but 20 of them were alive at the close of the year.

Brook trout.—In October and November collections of brook trout eggs were made from fish artificially reared at the station and from wild fish at Craig Pond, the station fish yielding 8,500 eggs and the others 16,000. The collection at Craig Pond was in the nature of a reconnoissance, the fish being taken on the spawning beds by means of a trap constructed with stakes and nets. Of 20 taken, only 13 were adults, and 9 of these were females. In addition to the collections made at the station a consignment of 49,480 eggs was received from the station at Leadville, Colo., and 61,145 fry were hatched from these and the station stock. The fry suffered severely during the months of May and June, and there were only 39,331 on hand at the close of the year.

The Atlantic salmon and trout were kept in troughs and fed as usual on maggots and chopped beef until October, when 7,207 trout were distributed to applicants in New England and 177,525 Atlantic salmon were liberated in the tributaries of Penobscot River, in the vicinity of the station. Of 10,000 wintered in the troughs, 9,020 were liberated in the Penobscot in May, the balance being retained.

The following statement shows in detail the distribution of salmon:

Date.	Where planted.	Number.
1894.		
Oct. 26	Frank Cotton's Brook, tributary of Alamoosook Lake	5,449
26	Meadow Brook, tributary of Alamoosook Lake	5,228
26	Saunders Cove, Toddy Pond	6,136
27	Trundy's Brook, Toddy Pond	8,543
27	Sacket Harbor, Toddy Pond	8,200
27	Luke Harriman's Brook, tributary of Toddy Brook	5,164
27	Wardwell Brook, tributary of Alamoosook Lake	2,252
29	Stubbs Brook, Bucks Mills	5,474
29	Little Dead Brook, Bucks Mills	3,330
29	Meadow Brook, Gilpin, tributary of Alamoosook Lake	8,967
29	Heart Pond	10,519
29	Pearts Stream, Toddy Pond	8,536
29	Wardwell Brook, tributary of Alamoosook Lake	5,529
31	Pearts Stream, Toddy Pond	8,304
31	Charles Harriman's Brook, tributary of Toddy Pond	5,613
31	Luke Harriman's Brook, tributary of Toddy Pond	2,808
Nov. 1	Dead Brook, tributary of Narramissic River	8,943
1	Toddy Pond	12,862
1	Gully Brook, tributary of Alamoosook Lake	6,795
2	Narramissic River	9,732
2	Saunders Cove, Toddy Pond	10,052
3	Brier Brook, Gilpin, tributary of Alamoosook Lake	8,409
3	Toddy Pond	6,982
30	Craig Brook	2,143
30	Alamoosook Lake	11,462
1895.		
May 13	.....do	1,540
14	.....do	200
22	.....do	2,404
24	.....do	1,700
25	.....do	2,403
28	.....do	773
	Total	186,542

On June 30 the following fish and fry were in stock:

Kind.	When hatched.							
	1895.	1894.	1893.	1892.	1891.	1890.	1889.	1888-9.
Atlantic salmon	176,954	624	342	.....	.....	.....	.....	.....
Atlantic salmon, domesticated	.....	216	725	50	.....	.....	.....	.....
Landlocked salmon	12,590	.....	.....	.....	.....	.....	.....	5
Brook trout	39,331	.....	.....	.....	.....	.....	.....	.....
Rainbow trout	11,506	.....	.....	.....	.....	.....	1	.....
Scotch sea trout	3,313	.....	.....	.....	22	.....	.....	.....
Swiss lake trout	20	.....	.....	.....	.....	.....	.....	.....
	243,714	840	1,067	50	22	.....	1	5

During the summer and fall of 1894 considerable attention was given to the problem of growing live food in artificial ponds for young fish. Entomostraca formed the most important subject of these studies and efforts, but several other kinds were cultivated also, and one species of *Polyphemus* became so abundant at one time as to incite the hope that a solution of the problem was near at hand. The supply was soon exhausted, however, and though no marked success was attained with any of the species handled, it is still deemed advisable to continue experiments in this line. The production of maggots for food is particularly valuable from the fact that it becomes possible to utilize in this way a great deal of material that would otherwise be lost. An excellent food was obtained from the carcasses of disabled or worn-out horses,

purchased at the rate of 1 cent per pound for what they would dress. Blood was also utilized by mixing it with cheap flour or meal and cooking into pudding, which was ground up before being fed. This was not taken very readily by the fish, however, and they did not appear to thrive so well on it as upon meat or maggots. Experiments were also made with canned herring spawn, shipped from the station at Havre de Grace, Md. The rainbow trout fry ate it readily and throve upon it, but the salmon and brook trout did not appear to relish it. The total amount of the various kinds of food purchased during the year and cost of same are shown by the accompanying statement:

Kind of food.	Pounds.	Cost.
Butchers' offal	3,765	$57.96
Refuse meat	3,555	51.06
Blood	2,720	30.17
Middlings	884	13.24
Flour	231	3.06
Shorts	50	.63
Salt (2 bushels)	.....	1.50
Horseflesh	7,249	72.86
Beef carcasses	1,608	16.08
Total	20,062	246.56

This added to the miscellaneous expense for trucking, etc., amounting to $76.40, makes the total cost of fish food for the year $322.96.

The maximum and minimum temperatures of the air and water, taken at 2 p. m. during the year, were as follows:

Month.	Air.		Water.				Snow.	Rain.
			Hatchery, west side.		Head of north stand.			
	Max.	Min.	Max.	Min.	Max.	Min.		
							Inches.	*Inches.*
1894—July	93	58	76	70	70.5	63	.....	2.6
August	85.5	59	73.5	66.5	70	63	.....	7.2
September	82	57	68.5	62	66.5	60	.....	2.95
October	66	42.5	62	53	61	53.5	.....	3.95
November	56.5	16	54	36.5	54	38	11	1.35
December	48.5	12	38.5	33	42.5	34.5	13	2.55
1895—January	44.5	8	35.5	32.5	38	34	27	2.9
February	37	—4	35.5	32	38	33	28	.....
March	47	17.5	38	33.5	48	35	8.5	2.1
April	63	35.5	51	35.5	52	37.5	2	3.25
May	89	43	68	50	66	50	.....	1.15
June	86.5	53	74	61	69	56	.....	1.6

ST. JOHNSBURY STATION, VERMONT (J. W. TITCOMB, SUPERINTENDENT).

During the previous fiscal year a dam was built across Sleeper River, trees were cleared away from the line of the proposed water pipe, spring brooks were ditched and bridged, a driveway was built to the railroad, a side track constructed by the St. Johnsbury and Lake Champlain Railroad Company on the west side of the station property, and grading was done for a site for the superintendent's house and stable. The stable was completed May 19, 1894, and at the close of the fiscal year the hatchery was nearly finished. On August 1, 1894, the building was

turned over to the superintendent, and arrangements were at once made for the construction and introduction of the necessary hatching-troughs, water supply, and drain pipes. An outbuilding, ice-house, and flag-staff were erected during the summer. A dam was constructed on the spring brook west of the hatchery, under the direction of Mr. G. H. Schneider. A small house was erected over the spring reservoir at the dam, and a 3-inch pipe was laid from the dam to the hatchery, which afforded a small supply of water. Fences were built along the highway and surrounding the station property back of the woods. During the summer and fall 40 hatching-troughs, equipped with screens and supply tanks, were made by the regular employees of the station.

Owing to the large amount of sediment with which the water was charged it was deemed necessary to provide filter screens at each spigot. The superintendent devised a new form of spigot, with a hood, for supplying the troughs, as he found that with those in use the water spurted over the aerating board, instead of falling against it, thus making it impossible to keep the eggs on the trays.

As the equipment of the hatchery was not completed until late in the fall, and the spring water supply was inadequate for the conduct of fish-cultural operations on a large scale, no efforts were made to collect eggs during the season, but on January 10 a consignment of 50,000 lake-trout eggs was received from Northville Station in excellent condition, only 87 dead ones being found. They were laid down in four troughs, with an average water supply of 2 gallons per minute, which was the total output of the spring at that time. The eggs commenced hatching on January 20, finishing March 31, with a loss of about 2½ per cent. The heavy thaw on the 7th of February caused a greatly increased volume of water, accompanied with a fine sediment, which adhered to the eggs and appeared to smother the fry. The variation in the water supply and the accompanying variations in its consistency continued to the end of the year, and frequently it would be so roily for days at a time that neither eggs nor fry could be seen. The longest period in which it was impossible to see to pick over the fry was five days. The volume of the spring during June was about 18½ gallons, which seems to be its normal capacity. The heavy losses of fry which occurred in May and June were due not only to the condition of the water, but also to the small amount available for each trough, namely, 2 gallons per minute, the average temperature being 52°. On June 28, 1895, the supply was increased by the introduction of water from the Sleeper River. On April 20, 25,000 steelhead-trout eggs were received from the Fort Gaston Station. They had been en route nine days, and though the upper trays nearest the ice were in good condition, the eggs in the lower trays had hatched and the fry were dead. The immediate loss was estimated at 8,500, and the loss in the troughs to the end of June was 9,827 additional. The 6,673 fry left at the close of the year were active, healthy fish, and took their food freely.

The maximum and minimum temperatures of the water and air at the station from January 1 to June 30, 1895, were as follows:

Month.	Water.		Air.	
	Max.	Min.	Max.	Min.
January	38	32	42	—26
February	36	32	37	—22
March	36	32	42	—10
April	50	33	66	12
May	58	41	86	33
June	63	45	90	52

NOTE.—The sign — indicates below zero.

GLOUCESTER STATION, MASSACHUSETTS (A. C. ADAMS IN CHARGE).

The lobster and mackerel work of the previous fiscal year was continued until July 14, under the direction of W. P. Sauerhoff, during which time, from 55 egg-bearing lobsters, 717,000 eggs were taken and 652,000 fry hatched and liberated in the harbor off Gloucester. During the season the fishermen in the vicinity of Gloucester apparently took but little interest in the work of the Commission, and it was difficult to get them to save their egg-bearing lobsters.

Mackerel.—Work with this species was very unsatisfactory, owing to the limited supply of eggs and the consequent lack of opportunity to experiment with water conditions, etc. Only four lots of eggs, aggregating 586,000, were obtained, 38,000 of them being taken in July, on the 10th. The eggs commenced hatching six days after being taken, but the fry died immediately.

On July 27 the station was closed and placed in charge of a watchman until November 1, when cod operations were resumed.

Cod.—The season opened November 22, 1894, and closed March 19, 1895, during which time 50,120,000 eggs were taken and 12,929,000 fry hatched and liberated. The spawn-taking force, directed by Capt. E. E. Hahn and consisting of a part of the crew of the *Grampus*, was stationed at Kittery Point, Me., for convenience in taking eggs caught by the Ipswich Bay fishermen, who usually market their catch in Portsmouth and Kittery Point. The balance of the crew was on duty at the station. From the 793,000 good eggs received in November 275,000 fry were hatched and liberated in good condition off Gloucester Harbor.

The weather in the month of December being favorable for good work, eggs were received almost daily, and by the 20th the hatchery was full. During the month 19,261,000 eggs were collected, from which 11,533,000 fry were hatched. Of this number 6,395,000 were liberated off Gloucester in December, and the balance in January, the last deposit being made on the 22d. Of the eggs obtained in December 2,481,000 were purchased from two small vessels fishing off Gloucester. The total number of good eggs received in January was 20,981,000, from which 1,121,000 fry were hatched and deposited in waters off Gloucester. Toward the end of the month two or three short storms caused the

water in the harbor to become so roily that it was impossible to wash the sediment from the eggs. Very few fry were hatched from the 9,085,000 eggs received in February, and none of them lived. This was due to the low temperature of the water, which fell to 29° F. and continued cold until March 26. The fry appeared to lack sufficient strength to break out of the shell, and on March 19 the remainder of the eggs (2,110,000) were put overboard, preparatory to the closing of the station on March 26.

WOODS HOLE STATION, MASSACHUSETTS (JOHN MAXWELL, SUPERINTENDENT).

During the summer a museum and aquarium were installed in the northeast section of the first floor of the laboratory building. The aquaria were made of wood, with glass fronts, and are of the following dimensions and capacity:

Five aquaria, with glass 6 feet 4½ inches long by 2 feet 5 inches wide by 1 inch thick; length, 6 feet 9 inches; capacity, 400 gallons.

Two aquaria, with glass 4 feet 5½ inches long by 2 feet 5 inches wide by 1 inch thick; length, 4 feet 10 inches; capacity, 300 gallons.

The tanks were cased in with ornamental panel work of cypress, and were appropriately decorated in the interior with cement and stone by L. G. Harron, the superintendent of the aquarium at Washington. The total cost of the aquarium, including the purchase of all material and labor, was $1,080.

Fifteen of the exhibition cases received from the World's Columbian Exposition were placed in the Zoological Museum and two in the hall entrance to the museum. In these were exhibited the various specimens of salt and fresh water fishes and other animals in alcohol and stuffed. A number of changes were made in the system of water supply, and hard-rubber jet-cocks were substituted for brass in the laboratory and hatching-room. The residence, laboratory, water tower, storehouse, and coalhouse were painted and other minor changes made. A brick chimney, 55 feet in height, was built, adding greatly to the efficiency of the steam plant. Four McDonald cod tables were added to the hatching equipment, which increased the hatching capacity about 16,000,000; also 6 tables for hatching lobster eggs. The McDonald cod boxes superseded the Chester jars which had been in use at the station for a number of years.

A southeasterly storm of unusual severity, which occurred on January 26, caused considerable damage to the stone pier at breakwater, which constitutes the harbor of refuge at the station. The work of repairing the wharf was commenced on April 27, under the direction of the Engineer Corps, and was in progress until the end of the fiscal year.

Cod.—The first consignment of brood codfish was received from the schooner *Grampus* on October 4, and during the season 1,622 were derived from the same source. In addition to this, 1,700 were purchased from fishing smacks, making a total of 3,322 brood fish. These were kept in live-cars at the station until ready to spawn, being fed daily on sea clams, quahogs, and small fishes caught in the fyke nets,

and examined every other day to note development. The first lot of eggs (80,000) was taken on November 12. The spawning season continued to February 4, during which time 85,505,000 eggs were secured from 1,107 fish. From these 46,672,942 fry, or about 56 per cent, were hatched and planted in adjacent waters. The largest number of eggs taken at one time was 5,327,000, obtained from a consignment received from Block Island. At another time 9,033,000 were taken at one overhauling from two lots of fish brought from different points. On December 17, from a fish weighing 18 pounds, 657,000 eggs were taken before it died. An examination of the roe showed scarcely any diminution, and it was estimated that three-fourths of the original number contained in the sac remained in a comparatively developed state.

Daily record of eggs taken and lost, fry planted, etc.

Date.	Number of eggs.		Number of fry.		Date of hatching.	Average temperature.		Density.
	Taken.	Lost.	Hatched.	Planted.		Air.	Water.	
1894						°	°	
Nov. 12	80,000	50,000	30,000	30,000	Nov. 24	41.5	47	1.0253
16	300,000	230,000	70,000	70,000	Dec. 2	41.5	44	1.0253
19	380,000	300,000	80,000	80,000	Dec. 3	41.5	44	1.0254
22	300,000	135,000	165,000	165,000	Dec. 5	36	43.5	1.0254
24	190,000	65,000	125,000	125,000	Dec. 7	36	43.5	1.0255
26	758,000	758,000						1.0255
27	1,530,000	530,000	1,000,000	1,000,000	Dec. 15	39	42.5	1.0255
28	696,000	124,000	572,000	572,000	Dec. 16	39	42	1.0255
30	2,090,000	1,092,000	1,598,000	1,598,000	Dec. 18	40	40.5	1.0255
Dec. 3	2,832,000	1,610,000	1,222,000	1,222,000	Dec. 20	40	40.5	1.0255
4	1,290,000	300,000	990,000	990,000	Dec. 23	40	40.5	1.0255
5	2,182,000	447,000	1,735,000	1,735,000	Dec. 25	39	39.5	1.0255
6	2,574,000	991,000	1,583,000	1,583,000	....do ...	39	39	1.0255
7	3,340,000	425,000	2,915,000	2,915,000	Dec. 26	39	39	1.0256
8	2,232,000	482,000	1,750,000	1,750,000	....do ...	39	39	1.0256
10	4,470,000	813,000	3,657,000	3,607,000	Dec. 27	39	39	1.0256
11	4,563,000	623,000	3,940,000	3,720,000	....do ...	39	39	1.0256
12	2,528,000	1,000,000	1,528,000	1,528,000	Dec. 30	33.5	36.5	1.0256
13	2,483,000	1,242,000	1,241,000	1,241,000	Dec. 31	33.5	37.5	1.0256
14	2,714,000	1,710,000	1,004,000	1,004,000	Jan. 9	33.5	37	1.0256
15	1,762,000	1,412,000	350,000	350,000	....do ...	33.5	37	1.0256
17	5,327,000	1,969,000	3,358,000	3,300,000	Jan. 10	32	37	1.0257
18	2,018,000	928,000	1,090,000	1,090,000	Jan. 12	30	37	1.0257
19	2,940,000	1,510,000	1,430,000	1,430,000	Jan. 14	30	36.5	1.0257
20	1,918,000	1,168,000	750,000	750,000	Jan. 16	30	36.5	1.0257
21	2,930,000	2,228,000	702,000	702,000	Jan. 20	30.5	36.5	1.0258
22	2,782,000	1,206,000	1,576,000	1,576,000	Jan. 21	30.5	36.5	1.0258
24	3,530,000	2,472,000	1,058,000	1,058,000	Jan. 22	30.5	36.5	1.0258
26	2,650,000	777,000	1,873,000	1,873,000	Jan. 23	30.5	35	1.0258
31	3,482,000	1,315,000	2,167,000	2,167,000	Jan. 28	30	34.5	1.0258
1895								
Jan. 2	2,350,000	358,000	1,992,000	1,992,000	Jan. 29	30	34	1.0257
3	1,200,000	598,000	602,000	602,000	Jan. 30	30	34	1.0257
4	1,300,000	537,000	763,000	763,000	Feb. 2	30	34	1.0257
7	2,350,000	1,631,000	719,000	719,000	Feb. 5	30	33	1.0257
9	2,025,000	531,000	1,494,000	1,494,000	.... do ...	30	33	1.0256
11	2,050,000	790,000	1,260,000	1,260,000	....do ...	30	33	1.0257
14	1,250,000	657,000	593,000	593,000	Feb. 19	20	31.5	1.0258
16	1,325,000	727,000	598,000	598,000	Feb. 20	20	31.5	1.0258
18	855,000	503,000	352,000	352,000	....do ...	20	31.5	1.0258
21	700,000	690,000	10,000	10,000	Mar. 13	20	31	1.0258
23	600,000	369,000		* 231,000		20	31	1.0258
24	509,000	468,000		* 41,000		20	31	1.0258
25	470,000	268,000		* 202,000		20	31	1.0258
26	945,000	945,000				20	31	1.0258
28	300,000	163,000		* 137,000		20	30	1.0258
30	816,000	332,000		* 484,000		20	30	1.0259
31	700,000	579,000		* 121,000		20	30	1.0259
Feb. 1	3,852,000	2,674,000		* 1,178,000		20	30	1.0259
1	360,000	360,000				20	30	1.0259
2	1,750,000	1,247,000		* 503,000		20	30	1.0259
3	75,000	75,000						
	93,253,000	42,414,000	47,942,000	47,614,000				

* 2,807,000 eggs planted after a period of incubation of from forty to fifty days.

The majority of the brood fish used at the station were caught in the vicinity of Block Island and Nantucket, and were of three kinds, as recognized by the fishermen, though all belong to the species *Gadus callarias*—school cod, ground cod, and rock cod. The first were taken off Block Island, and the others from Nantucket Shoals. The eggs of the school cod were clear, transparent, and almost crystal; those of the ground cod were much darker, while those of the rock cod were deep orange in color. All of them, however, were subject to slight variations, according to the color of the fish producing them. The eggs of the school cod gave the best results, and this is regarded of more importance as a brood fish. The ground cod possesses few qualities to recommend it for this purpose, and it spawns so late that it is almost certain to be killed by cold weather before it can be used.

The following table gives an idea of the relative value as egg-producers of the fishes from the fishing-grounds referred to:

Locality.	Fish.	Ripe fish.	Per cent.	Eggs per fish.	Eggs to January.
Nantucket	2,523	657	26	51,122	33,690,000
Block Island	799	450	56.33	79,588	35,915,000

After January 1 the fish became mixed, and it was impossible to keep accurate records. To avoid the loss of fish usually occurring in January from anchor frost, 283 of the best ones were transferred from the live-cars early in the month to tanks under the hatchery. This proved of no use, however, as they died at about the same time as the balance of the stock, which were left in the cars, when the temperature reached 28½°. The loss was of but little importance, as most of the fish had spawned. About 13,600,000 eggs were in the hatchery when the anchor frost appeared, including 7,776,000 received from Kittery Point, Me. Although development seemed almost at a standstill, it was thought the eggs would pull through, but after ten days a change was noted and they began to waste away. They seemed to break up and go to pieces, filling the hatching-box with fragments of shells and premature fish. This wasting process continued until the number was reduced to 2,897,000 good eggs and 10,000 fry. As these had been in the hatchery for fifty-one days, it was deemed advisable to plant them in the harbor. It is interesting to note that at this time there were 20,000 fry ten days old in the hatchery which did not appear to suffer any loss of strength on account of the intense cold, while those hatching had but little sac and were very weak. The 20,000 referred to were held until they were twenty-seven days old, and specimens of them were preserved. The cod work, as a whole, was the most successful ever done at the station, the take of eggs exceeding by 18,000,000 any number secured before, and 11,000,000 more fry were distributed. The number of brood fish was about the same as in previous years, and the increase was largely due to the improved quality of the breeders, also to the favorable weather, which permitted of daily overhauling. As usual, this branch of the work was under the direction of Alex. Jones, the fish-culturist.

Flatfish.—Owing to the severe weather which occurred in February, the flatfish were driven from the shallow water of the harbor into the deep water of the sound and bay and did not return until March 14, when the collection of eggs commenced. Between that date and the 22d of April 44 adult fish were taken, which yielded 9,263,000 eggs. From these, 5,940,000 fry were hatched and planted in Vineyard Sound and Buzzards Bay. The eggs were hatched in the Chester jar and the fry were planted within one or two days after hatching.

Lobster.—The first eggs were collected on April 15, and by the close of the season 81,800,000 eggs had been taken from 5,499 lobsters, from which were produced 71,000,000 fry, or 86½ per cent of the total number of eggs collected. The fry were planted in Vineyard Sound and Buzzards Bay within forty-eight hours after hatching.

Record of lobster hatching at Woods Hole Station, Massachusetts, season of 1895.

Date.	Number of lobsters.	Number of eggs. Taken.	Lost.	Number of fry planted.	Period of hatching. Began.	Ended.	Average temperature. Air.	Water.	Density.
							°	°	
Apr. 15	4	52,000			May 20	May 23	49	48.5	1.025
16	3	26,000			...do...	...do...	49	48.5	1.025
18	2	24,000	23,000	125,000	...do...	...do...	49	49	1.025
19	3	46,000			...do...	...do...	49	49.5	1.025
24	3	30,000			May 21	May 27	52	51.5	1.0248
25	57	783,000	88,000	975,000	...do...	May 28	52	52	1.0247
27	22	250,000			...do...	May 30	52	52.5	1.0246
30	55	707,000	57,000	650,000	May 22	May 29	52	52	1.0246
May 1	47	1,018,000	143,000	875,000	...do...	May 30	55	52.5	1.0245
3	22	247,000	22,000	225,000	...do...	May 29	53	52	1.0245
4	130	1,870,000	245,000	1,625,000	...do...	May 31	56	53	1.0245
6	38	329,000	29,000	300,000	May 23	May 29	53	53.5	1.0245
7	89	1,604,000	104,000	1,500,000	May 24	June 1	56	55.5	1.0245
8	27	548,000	28,000	520,000	May 23	May 29	53	55.5	1.0245
9	37	475,000	50,000	425,000	May 24	June 1	57	55.5	1.0245
10	261	3,585,000	210,000	3,375,000	...do...	June 2	58	56.5	1.0244
11	174	1,972,000	72,000	1,900,000	May 25	...do...	58	57	1.0244
13	235	6,179,000	579,000	5,600,000	May 26	June 5	58	58	1.0244
14	134	1,857,000	57,000	1,800,000	May 23	May 30	56	56	1.0243
16	143	1,900,000	200,000	1,700,000	May 24	June 3	58	57.5	1.0243
17	280	4,591,000	591,000	4,000,000	May 25	June 6	58	57.5	1.0243
18	114	956,000	446,000	2,200,000	...do...	June 5	58	57.5	1.0243
20	135	1,690,000			May 26	...do...	60	58	1.0243
21	95	1,309,000	109,000	1,200,000	...do...	June 8	60	58	1.0243
22	213	2,302,000	202,000	2,100,000	May 27	June 9	60	58	1.0242
23	260	6,073,000	473,000	5,600,000	...do...	June 8	63	58	1.0242
24	82	834,000	84,000	750,000	May 28	June 11	63	58.5	1.0242
25	99	1,315,000	215,000	1,100,000	May 29	June 9	63	58.5	1.0242
27	216	3,258,000	258,000	3,000,000	May 31	June 10	63	59	1.0242
28	144	1,501,000	151,000	1,350,000	June 2	June 12	63	60	1.0242
29	160	2,649,000	299,000	2,350,000	...do...	June 11	63	59	1.0242
30	133	1,595,000	170,000	1,425,000	June 3	June 12	63	60	1.0242
31	220	7,265,000	1,090,000	6,175,000	...do...	June 15	63	61	1.0242
June 1	62	1,188,000	113,000	1,075,000	...do...	June 17	63	62.5	1.0242
5	263	3,910,000	1,310,000	2,600,000	June 7	June 16	61	62.5	1.0242
6	292	3,362,000	312,000	3,050,000	June 9	June 18	61	62.5	1.0242
8	108	1,620,000	90,000	1,530,000	June 11	June 20	61	62.5	1.0241
11	265	2,771,000	221,000	2,550,000	June 13	June 22	64	63.5	1.024
12	162	1,790,000	140,000	1,650,000	June 14	June 23	64	64.5	1.024
14	205	1,927,000	277,000	1,650,000	June 16	June 24	64	65.5	1.024
15	40	521,000	51,000	470,000	June 17	June 25	64	65.5	1.024
20	83	700,000	300,000	400,000	June 21	June 26	65	66	1.024
21†	289	3,867,000	1,087,000	2,780,000	June 22	June 21 to June 27	64	66.5	1.0239
22	84	1,304,000	904,000	400,000	June 23	June 28	64	66.5	1.0239
	5,499	81,800,000	10,800,000	71,000,000					

*June 8, after three days' incubation, found 1,000,000 bad eggs.

†2,600,000 of these eggs are estimated, as the eggs hatched in the live-cars before they could be brought to the station.

‡The following shows the number of lobsters obtained at the different localities: Cuttyhunk, 1,640; Robinson Hole, 979; Penikese, 345; Cedar Tree Neck, 159; Hadley Harbor, 93; Woods Hole, 1,094; New Bedford, 884; Menemsha, 147; Tarpaulin Cove, 100; South Dartmouth, 58; total, 5,499.

The lobsters collected at New Bedford and Tarpaulin Cove (known by the fishermen as deep-sea lobsters) were caught 12 miles off No Mans Land and brought in in smacks. The greatest number of eggs taken from a single lobster during the season was 85,000. It was taken off No Mans Land and measured 16½ inches. The collection was made as in previous years, by means of a steam launch, which visited the various fishing centers several times a week. The work was under the direct charge of the superintendent until June 3, when C. G. Corliss, fish-culturist at large, was detailed to look out for it.

DELAWARE RIVER STATION, STEAMER FISH HAWK (LIEUT. ROBERT PLATT, U. S. N., COMMANDING).

On May 9, 1895, the steamer *Fish Hawk* arrived at Gloucester City, N. J., and immediately began its season's work of collecting shad eggs. Between that date and June 3 eggs were taken from 649 fish secured at the surrounding fishing shores, as follows: Howell Cove, 11,470,000; Bennett's Shore, 12,803,000; Eagle Point, 459,000; Gloucester Point, 449,000; gillers, 5,961,000; total, 31,142,000. From these eggs 19,859,000 fry were hatched and distributed as indicated below:

Lambertville, N. J	5,965,000	Lackawaxen, Pa	450,000
Delaware Water Gap, Pa	1,458,000	Milford, N. J	450,000
Port Jervis, N. Y	450,000	West Point, N. Y	2,000,000
Callicoon, N. Y	450,000	Easton, Pa	450,000
Seaford, Del	504,000	Deep River, Conn	2,170,000
Wilmington, Del	504,000	Bridgeton, N. J	1,800,000
Chestertown, Md	504,000	Timber Creek, N. J	651,000
Queen Anne, Md	504,000		
Salisbury, Md	504,000	Total	19,859,000
Frenchtown, N. J	1,045,000		

In addition to the plants of fry, 321,000 eggs were deposited in the Delaware on June 5, prior to the departure of the vessel from Gloucester.

The noon temperatures of air and water were:

Date.	Air.	Water.	Date.	Air.	Water.
	°	°		°	°
May 10	88	70	May 23	68	61
11	85	70	24	73	63
12	49	69	25	75	63
13	51	68	26	73	64
14	56	67	27	61	64
15	55	66	28	62	63
16	54	65	29	77	65
17	64	65	30	89	67
18	56	64	31	90	71
19	64	64	June 1	91	72
20	67	64	2	89	73
21	47	61	3	92	75
22	54	60	4	70	74

BATTERY STATION, HAVRE DE GRACE, MD.

The station was closed from July 1, 1894, to April, 1895. On April 1, 1895, Alex. Jones, fish-culturist, was detailed from the Woods Hole Station to take charge of the shad work, owing to the assignment of the superintendent, W. de C. Ravenel, to duty in Washington as acting assistant in charge of the Division of Fish-culture. Anticipating a successful season's work from the reports of the large takes of shad in the lower bay, the work of preparation was pushed rapidly, and by April

10 everything was in readiness for the collection of eggs. A new 10-inch water end was put on the large pump, increasing its capacity to 4,000 gallons per hour, thereby adding materially to its effectiveness. Steam launches *Plover* and *Canvasback* were overhauled and repaired, and a new boiler and propeller put in the *Plover*. During the season considerable work was done by the spawn-takers toward repairing the buildings on the main island. The old hatchery was raised and reblocked, and the old tank tower torn down.

The temporary employees, consisting of spawn-takers, assistants in hatchery, etc., reported for duty on April 20, and work was commenced with a force of 35 men, as follows: 2 fish-culturists, 2 assistants in hatchery, 2 machinists and 2 coxswains for launch, 2 firemen for main boiler, 11 first-class and 12 second-class spawn-takers, 1 cook, and 1 boy. Collecting continued until May 22, resulting in a take of 21,606,000 eggs, from which 13,932,000 fry were hatched and distributed. In addition, 852,000 eyed eggs were planted near the station.

The catch of fish was fair at the beginning of the season, but it dwindled and became so small by the middle of May that it was deemed advisable to discharge all of the temporary force except a sufficient number to dispose of the fry on hand, hence all the spawn-takers and other temporary men who could be spared were discharged May 16. It was the original intention to keep the station open until June 1 to receive eggs brought in by the fishermen, but they came in in such small numbers that it was decided to close up all work on the 22d.

The following table gives the number of eggs taken, fry hatched and planted, period of incubation, and meteorological conditions:

Date.	Number of eggs.		Number of fry.			Date of—		Average temperature.	
	Taken.	Lost.	Hatched.	Lost.	Planted.	Hatching.	Planting.	Air.	Water.
								°	°
Apr. 19	12,000	12,000							
21	20,000	9,000	20,000	20,000		Apr. 28		59	56.5
22	1,564,000	643,000	921,000		921,000	Apr. 30	May 4	58	56.5
23	2,264,000	873,000	1,391,000		1,391,000	May 2	May 6	58	56.5
24	4,007,000	1,168,000	2,839,000		2,839,000	....do ...	May 7-8	58.5	56.5
25	2,691,000	855,000	1,836,000		1,836,000	May 3	May 8	59	56.5
26	2,499,000	748,000	1,751,000		1,751,000	....do ...	{May 9, 10, 11}	58	56.5
27	135,000								
28	196,000	86,000	49,000		49,000	May 5	May 11	59	57.5
29	38,000	100,000	96,000		96,000	May 6	....do ...	59	58
30	672,000	19,000	19,000		19,000	....do ...	....do ...	60	59
May 2	245,000	192,000	480,000		480,000	May 7	May 13	62	60.5
3	682,000	55,000	190,000		190,000	....do ...	May 11	64	62.5
4	453,000	94,000	588,000		588,000	....do ...	May 13	65	64
5	444,000	103,000	350,000		350,000	May 8	May 11	67	67
6	804,000	80,000	364,000		364,000	....do ...	May 13	67	68
7	1,178,000	140,000	664,000		664,000	May 9	....do ...	69	70
8	743,000	360,000	818,000		818,000	May 10	....do ...	72.5	72
9	391,000	314,000	429,000		429,000	May 11	May 14	74.5	73.5
10	199,000	170,000	221,000		221,000	May 12	....do ...	72.5	74
13	247,000	110,000	89,000		89,000	May 15	May 16	64	68.5
14	607,000	96,000	151,000		151,000	May 21	May 23	57	60.5
15	300,000	144,000	463,000		463,000	May 22	....do ...	57	59.5
20	353,000	77,000	223,000		223,000	May 23	....do ...	58	59.5
21	733,000	121,000			*232,000		May 24	60	61
22	120,000	213,000			*520,000		....do ...	60	61
		20,000			*100,000		....do ...	62	61.5
	21,606,000	6,802,000	13,952,000	20,000	13,932,000 *852,000				

*Distributed as eggs.

Distribution of fry and eggs from Battery Station, Maryland, season of 1895.

Date.	Number of fry.	Number of eggs.	Point of deposit.	Stream.
May 4	750,000			Hudson River.
4	171,000		Garrett Island	Susquehanna River.
6	450,000		Port Deposit	Do.
6	941,000		Battery Shoals	Chesapeake Bay.
7	600,000			Swan Creek.
7	600,000		Northeast, Maryland	Northeast River.
8	750,000			Hudson River.
8	889,000		Battery Shoals	Chesapeake Bay.
8	918,000		Port Deposit	Susquehanna River.
8	918,000		Red Bank	Chesapeake Bay.
9	320,000		Carpenter Point	Northeast River.
10	450,000		Port Deposit	Susquehanna River.
11	750,000			Hudson River.
11	585,000		Battery Shoals	Chesapeake Bay.
11	350,000		....do	Do.
13	914,000		The Mountains	Do.
13	2,000,000		Deep River Station	Connecticut River.
14	650,000		Athens, N. Y	Hudson River.
16	89,000		Battery Shoals	Chesapeake Bay.
23	837,000		....do	Do.
24		852,000	....do	Do.
	13,932,000	852,000		

FISH PONDS, WASHINGTON, D. C. (R. HESSEL, SUPERINTENDENT).

The entire force of the station and an additional laborer were employed during July in cutting and removing injurious plants from the ponds, which had been introduced by the flood of 1893. This work was continued throughout the summer, but it became evident that the plants and injurious insects accompanying them could not be eradicated in this manner, and as the insects were increasing and doing considerable damage to the young fish, it was deemed advisable to use more effective measures. Accordingly, the ponds were laid bare in December and kept dry for three months, during which time the bottoms were scraped to a depth of 3 inches and all plants and roots not killed by the frost cut out. One of the most injurious plants noticed was the cat-tail, the roots of which extend 2 feet under the ground. The only way of eradicating them is to remove every particle of the root, as cutting the plants off at the surface of the ground does not seem to stop their growth.

The output of the station consisted of fish from 6 to 8 months old. The ponds were drawn as usual in the fall, and the fish, with the exception of the shad, were counted, sorted, and transferred to Central Station for distribution by means of cars and messengers to various parts of the country. Following is a list of the species transferred:

Leather carp	22,208	Golden tench	64
Scale carp	14,700	Golden ide	10
Blue-scale carp	485	Young goldfish	6,530
Tench, yearlings	10,240	Goldfish, adults	300
Tench, two years old	1,040	Black bass, large-mouthed	6,552

Tench.—Owing to the increased demand for tench, more attention was paid to the production of this species, and as a result 11,286 were distributed in the fall of 1894. The spawners were again placed in the ponds in April, 1895, and all indications point to a large crop at the close of the year.

Golden ide.—The golden ide spawned on April 10 and 11, but all of the eggs were killed on the nights of April 14 and 15, owing to the low temperature of the water.

Spotted catfish.—Although the brood fish were transferred to a larger pond during the early spring, they did not spawn. They are apparently healthy and take their food regularly, but it appears that they require a pond of greater area and depth.

Large-mouthed black bass.—In the spring the brood fish were confined in a small section of the north pond, which had been separated from the balance of the pond by a partition. They spawned as usual about the middle of May, and at the close of the season it was estimated that there were about 60,000 fry in stock. The brood fish were retained in the small section referred to, the fry passing out through a wire grating in the partition into the main body of the pond. This pond has an area of about 4½ acres, and though abundantly stocked with lilies and other aquatic plants the supply of natural food was so scarce that it soon became necessary to provide additional material. The most serious problem involved in the culture of this species is that of providing a sufficient quantity of suitable food. It is difficult at all times to make bass take artificial food, and in the early stages live food is absolutely essential. The small output of the previous fall (6,552) was undoubtedly due to the fact that the bass lived on each other to a greater or less extent, owing to difficulty in procuring sufficient natural food. During the past season a half million or more of young carp, reared in the ponds, have been utilized as food for the bass, and numbers of young fish of various kinds were obtained in the swamps in the neighborhood of Observatory Hill. They were also fed on young frogs and tadpoles.

Small-mouthed black bass.—In the south pond, containing 1½ acres, similar arrangements were made for rearing the small-mouthed black bass. The brood fish were confined in a small section at the west end of the pond, the fry passing into the body of the pond through a wire gate in the center of the partition. These fish spawned about the same time as the large-mouthed species, and it was estimated at the close of the fiscal year that there were about 8,000 fry in stock.

Rock bass.—During the month of February 45 rock bass were transferred from the Wytheville Station and placed in the pond recently constructed between the west pond and Executive avenue. This pond has an area of 17,500 square feet, varies in depth from 2 to 3 feet, and is well supplied with grass and aquatic plants. Mussels, crushed snails, and small fishes were introduced as food, but notwithstanding the fact that all conditions seemed favorable, the fish did not spawn. It is possible that they had not become sufficiently acclimated.

Shad.—The shad placed in the west pond were released in the Potomac in October; as they were not counted, it is impossible to state definitely the number liberated, but it is estimated at about 1,000,000. The pond was dry during the winter, and in the spring 2,047,000 fry transferred from Central Station were placed in it. They appear to be doing well, though they suffer slightly from the black water-beetles and their larvæ.

CENTRAL STATION, WASHINGTON, D. C. (S. G. WORTH, SUPERINTENDENT).

In addition to his regular duties, the superintendent was detailed to write the annual report of the Division of Fish-culture for the fiscal year 1892–93, and to examine into the working of the McDonald fishway at Great Falls, Md. He also acted as a member of the Fish Commission board of examiners for the United States Civil Service Commission, and assisted in preparing plans for repairs to the aquarium annex at the station.

The fish-cultural operations consisted in distributing the fishes reared at the fish ponds, Washington, D. C., and in receiving and forwarding consignments of eggs shipped from the Wytheville Station, intended for applicants in New England and foreign countries. The following tabulation shows the number of fish received and distributed:

Species.	Number received.	Number distributed.	Species.	Number received.	Number distributed.
Scale carp	14,700	14,450	Golden tench (large)	15	15
Blue-scale carp	485	465	Black bass	6,345	6,345
Scale carp (large)	4	4	Black bass (large)	207	207
Leather carp	22,190	21,748	Rock bass	1,600	1,590
Leather carp (large)	7	7	Rainbow trout	6,806	6,757
Mirror carp	16	16	Brook trout (large)	140	140
Goldfish	6,058	6,120	Black-spotted trout	12	12
Fantail goldfish	480	403	Golden ide	10	10
Fantail goldfish (gray)	30	30	Sunfish	11	11
Tench	10,258	10,171	Landlocked salmon	15	15
Tench (large)	1,028	1,028			
Golden tench	49	49	Total	71,066	69,593

The shad eggs collected at Bryan Point were hatched at this station as usual, and the output exceeded any previous year except 1888. The total number received was 49,898,000, from which 41,984,000 fry were hatched and distributed, the loss amounting to 7,914,000.

The eggs were packed on trays and transferred from Bryan Point, in charge of a messenger, by the steamers of the Mount Vernon and Marshall Hall Steamboat Company.

Between April 20 and May 29 eggs were daily received in good condition at Central Station, as follows:

Date.	Number.	Date.	Number.
April 20	922,000	May 10	1,283,000
22	2,252,000	11	1,231,000
23	1,645,000	12	804,000
24	2,579,000	15	977,000
25	3,188,000	17	788,000
26	2,790,000	18	2,159,000
27	2,643,000	19	1,328,000
29	2,813,000	20	2,101,000
30	297,000	21	1,096,000
May 1	781,000	22	1,378,000
2	1,020,000	24	272,000
3	110,000	25	1,035,000
4	1,293,000	26	1,067,000
5	2,885,000	27	894,000
6	3,230,000	29	1,021,000
7	871,000		
8	2,065,000	Total	49,898,000
9	1,080,000		

Another attempt was made to hatch pike-perch eggs shipped by express from Put-in-Bay Station, but two consignments, amounting to 2,000,000, were lost en route.

A rubber holder for air-liberator plugs was designed by the superintendent during the fall of 1894, and in February arrangements were made to have a number of them manufactured. This holder is made of hard rubber and can be used in either salt or fresh water. It is especially adapted for aerating aquaria and the tanks on the cars; it may also prove valuable for hatching floating eggs.

AQUARIA, CENTRAL STATION (L. G. HARRON, SUPERINTENDENT).

The defective imitation rockwork in the marine annex was removed early in the summer and replaced by galvanized metal, representing rock face. New rubber tubing and a new filter for the salt-water tanks were put in during the month of August, and a new fresh-water filter was purchased in December. This affords double the amount of water filtered by the old one. During the winter the salt water was kept at a temperature of from 50° to 56° by means of a steam drum 3 feet long, 6 inches in diameter, containing 9 feet of coiled 1-inch piping. With an average pressure of 25 pounds per square inch, the water was passed through the pipe at the rate of 350 gallons per hour.

On October 16 200 young shad, about 5 months old and from 2 to 3 inches long, were received from the fish ponds and were put in brackish water, the density of which was gradually increased to 1.020. They were fed on chopped oysters and were apparently healthy until the middle of January, when they were attacked by disease and 75 of them died. Canned roe was then substituted as food, and within two or three days the mortality ceased and the fish became healthy again.

Most of the marine specimens in the aquarium during the year were collected by the steamer *Fish Hawk* off Cape Charles in October, and at Old Point, Va., by the superintendent.

On February 13 a goldfish, which had been held for more than a year in a balance aquarium, spawned and about 100 of the eggs were placed in a McDonald jar, the temperature of the water being kept at 68. Ninety per cent of the eggs hatched and about 20 of the young fish are now alive and beginning to color. In June a 2-year-old paradise fish spawned in a balance aquarium, and the young are now on hand.

The fresh-water fishes in the aquarium suffered heavy losses in May on account of the high temperature of the water, and all of the brook trout and yearling landlocked salmon were lost. The temperature of the salt water from October, 1894, to June, 1895, was as follows:

Time.	Max.	Min.	Mean.	Time.	Max.	Min.	Mean.
	°	°	°		°	°	°
1894—October	74	48	60	1895—March	50	64	55
November	66	46	57	April	68	50	58
December	59	51	53	May	78	54	64
1895—January	58	51	52	June	82	66	73
February	58	48	54				

During the year the following marine and fresh-water fishes and other animals were exhibited in the aquarium:

Kind.	No.	Kind.	No.	Kind.	No.
Fresh-water specimens:		Fresh-water specimens—		Salt-water specimens—	
Leather carp	7	Continued.		Continued.	
Scale carp	4	Black-spotted trout		Pompano	11
Mirror carp	6	(adults)	12	Sea-robin	10
Golden ide	6	Salt-water specimens:		Skate	3
Common tench	20	Pinfish	40	Mummichog	200
Golden tench	8	Pigfish	44	Red drum	11
Chub sucker	6	Bluefish	3	Banded drum	15
Yellow perch	30	Lizard-fish	20	Gizzard shad	5
Pike	5	Swellfish	37	Young shad	200
Crappie	3	Moonfish	5	Tautog	40
Sunfish	40	Starfish	30	Conger eel	1
Black bass	6	Butter-fish	10	Striped bass	5
Warmouth bass	33	Toadfish	20	Sea-horse	8
Gar pike	2	Pipefish	6	Blenny	1
Common darter	100	Squeteague	1	Blue crab	20
Shiners or fresh-water		Spotted sea trout	13	Hermit crab	10
smelt	35	Croaker	13	Lady crab	2
Dace or mill roach	20	Sea bass	155	Lobster	7
Brook trout (yearlings)	129	Hog choker	45	Shrimp	12
Brook trout (adult)	1	Striped mullet	40	Sea-anemone	165
Landlocked salmon		Spot or goody	120	Spider-crab	2
(yearlings)	15	Flounder	15	Fresh-water terrapin	6
Rainbow trout (adults)	3	Sheepshead	5	Snapping turtle	3
Blue rainbow trout		Dogfish	14		
(yearlings)	3	Yellow-tail	40		

BRYAN POINT STATION, MARYLAND.

The season's work in the collection of shad eggs proved to be the most satisfactory in the history of the Commission's work on the Potomac. The water was more or less roily while operations were carried on, but the current did not at any time appreciably affect the tides. During the period of seine operations, extending from April 8th to May 21st, 204 hauls of seine were made. The total number of shad caught by the Bryan Point seine was 5,401, 2,663 of which were males and 2,738 females; 185 of these were ripe. The total number of eggs obtained was 66,065,000; of these, 5,261,000 were secured by the seine at Bryan Point, 8,024,000 by the Stony Point seine, 1,501,000 by the Tulip Hill seine, 726,000 by the Freestone Point seine, 177,000 by the Plum Tree Gut seine, and 50,376,000 from gillers. There were also 268,000 herring caught during the season.

The seine operations by the Commission were more extensive than in any previous season at Bryan Point. During the year, for the first time, the net was fished throughout the season, and a correct estimate of its relative value as an egg-producing source was obtained. After careful consideration the superintendent recommends that seine hauling, carried on for years by the Fish Commission in the Potomac River shad operations, be discontinued, for the reason that the returns at Bryan Point are not satisfactory. The egg collections are limited, and the relative catch of river herring so large that sales to the farming population cause local trap fishermen to lose business, the seine fish being preferred.

Table showing the catch of fish and the production of shad eggs by the Bryan Point seine, from 1892 to 1895, inclusive.

Year.	Period of seine operations.	No. of hauls made by seine.	Shad caught.				No. of herrings caught.	No. of shad eggs obtained.
			Males.	Females.	Total.	Ripe.		
1892	Apr. 18-May 4	155	563	519	1,082	55	86,426	1,816,000
1893	Apr. 14-May 20	169	920	813	1,733	160	326,307	939,000
1894	Apr. 5-May 18	215	2,777	2,442	5,219	253	231,405	4,350,000
1895	Apr. 8-May 18	204	2,663	2,738	5,401	185	268,000	5,261,000

The average product from the Bryan Point seine during the four years just ended was about 3,000,000. The following table shows the sources from which shad eggs were derived from 1892 to 1895, inclusive:

Year.	Bryan Point seine.	Chapman Point seine.	Stony Point seine.	Tulip Hill seine.	Gillers.	Total.
1892	1,816,000	798,000	1,067,000	2,503,000	7,262,000	13,446,000
1893	939,000	958,000	512,000	683,000	6,321,000	9,423,000
1894	4,350,000	2,007,000	2,216,000	573,000	19,763,000	32,393,000
1895	5,261,000	.....	8,024,000	1,501,000	50,376,000	66,065,000

NOTE.—In 1894 235,000 eggs were obtained from Tent Landing seine and 3,249,000 from Freestone Point seine. In 1895 726,000 were obtained from Freestone Point seine and 177,000 from Plum Tree Gut seine.

During the operations of the season Mr. L. G. Harron was assistant to superintendent, and Mr. W. T. Lindsey, custodian of the station, was directly in charge of the seine.

WYTHEVILLE STATION, VIRGINIA (GEORGE A. SEAGLE, SUPERINTENDENT).

At the beginning of the year there were estimated to be on hand at the station fish of various kinds, as shown by the following statement:

Species.	1894.	1893.	1892.	1891 or before.
Rainbow trout	93,500	1,200	3,400	1,200
Black-spotted trout	.....	.....	550	135
Black bass	500	.....	45	12
Rock bass	20,000	.....	.....	195
Grayling	.....	.....	34	10
Carp	6,000	.....	.....	200
Goldfish	2,500	.....	.....	180

The ponds were drawn in October and distribution commenced November 16. By February 3, when it was completed, the following fishes were furnished to cars and messengers for distribution: 79,387 rainbow trout, 553 large-mouthed black bass, 5,558 rock bass, 1,580 carp, and 3,002 goldfish. Rock bass, numbering 12,752, produced at Neosho, were transferred to this station and distributed at the same time; also 2,295 large-mouthed black bass, 3,500 carp, and 915 tench from the fish ponds in Washington.

Rainbow trout.—These trout commenced to spawn November 5, and continued 116 days, the last eggs being taken on February 29. There were obtained from 833 females 513,300 eggs, an average of 616 eggs to the fish. The males used numbered 648. Of these eggs 228,200 were

shipped to applicants in the United States and foreign countries and to other stations of the Commission, as indicated in the following table:

Distribution of rainbow-trout eggs from Wytheville Station for year ending June 30, 1895.

Date.	Consignee.	Destination.	No. of eggs.
1894			
Dec. 22	Charles G. Atkins	Green Lake, Me	15,000
25	do	Bucksport, Me	25,000
29	Maj. W. Turner	Bertrix, Belgium	25,000
31	Mr. Raveret-Wattel	Fécamp, France	25,000
1895			
Jan. 5	Maj. W. Turner	Bertrix, Belgium	25,000
7	Rev. H. B. Wolryche-Whitmore	Bridgenorth, England	25,000
12	S. G. Worth	U. S. Fish Commission, Washington, D. C.	11,000
14	William Burgess	Malvern Wells, England	25,000
29	Prof. W. K. Brooks	Johns Hopkins University, Baltimore, Md	200
Feb. 1	D. H. McLinn	Plymouth, N. H	25,000
4	do	do	25,000
4	Prof. R. G. Harrison	Bryn Mawr, Pa	2,000
	Total		228,200

The remainder were held at the station and produced 168,000 fry, 118,100 eggs being lost in incubation. Owing to excessive muddy water during the spring very heavy losses were sustained, so that in June there were left on hand only 83,600 fingerlings by actual count. There were 5,500 fry planted in April.

A consignment of 10,000 rainbow-trout eggs was received on May 17 from the California State Fish Commission at Beswick, Cal., but owing to the warm weather and length of time on the way they were all dead when the box was opened, having apparently hatched en route.

The breeding stock at the close of the year was as follows: 600 trout 4 to 10 years old; 1,960 fish 40 months old; 890 28 months old, and 700 16 months old.

Black bass.—The stock of brood fish was increased by 52 2-year-old large-mouth bass from the fish ponds, Washington, D. C.; but on April 7 all of the old stock and 28 of the 2-year-old fish were lost in an overflow of the ponds. The remaining 24 spawned early in May, and on June 30 there were estimated to be 5,000 fry in the pond.

Owing to the difficulty in collecting the fry of the bass from breeding ponds, the use of artificial nests is recommended.

Rock bass.—The ponds containing these fish were affected in the same way by floods as the black-bass ponds, but the loss of breeders was not so great. They spawned in May. Everything indicates a good crop of fry, but it is impossible to give accurate figures unless the ponds are drawn and the fry counted, which is not deemed desirable.

Tench.—During the early winter 50 2-year-old tench were received from the fish ponds, Washington, D. C., and placed in a small pond 60 by 75 feet, fed with water from Tates Run. The fish were noticed spawning on May 31, June 7 and 20, and at the close of the month many fry could be seen in the pond.

Carp.—The carp spawned in the ponds early in June, and will yield enough to supply all demands.

Goldfish.—The rearing of goldfish was discontinued at the close of the year, and the adults liberated in the neighboring streams.

During the year more than the usual repairs were made to ponds, walks, fences, etc., owing to damage caused by a freshet in April, which resulted in large loss not only of the fry from muddy water, but also the adult bass, tench, and carp. The damage was repaired at once, and was paid for by the State of Virginia from funds received for rental of station. Changes were also made in the raceways leading from the trout ponds, which produced beneficial results.

PUT-IN-BAY STATION, OHIO (J. J. STRANAHAN, SUPERINTENDENT).

The fish-cultural work during the past year was confined to whitefish, cisco or lake herring, lake trout, and pike perch.

Whitefish.—The whitefish season opened later than usual, the first eggs being taken November 11, and the last on November 29. The first eye-specks were visible December 16. The fry began hatching April 9, and finished on the 20th. The cone-shaped tube used throughout the hatchery proved very satisfactory, and there was almost no loss of eyed eggs. The few straight tubes used early in the season showed a loss so perceptibly greater than in the case of the cones that they were changed as soon as possible. The total number of eggs collected during the year was 114,435,000. The points of collection and the number taken at each are as follows: Port Clinton, Ohio, 51,822,000; North Bass Island, Lake Erie, 28,341,000; Middle Bass Island, Lake Erie, 10,197,000; Put-in-Bay Island, Lake Erie, 12,060,000; Kelley Island, Lake Erie, 10,989,000; Catawba Island, Lake Erie, 1,026,000; total, 114,435,000.

Of these, the following shipments were made: U. S. Fish Commission Station, Alpena, Mich., 8,000,000; Clayton, N. Y., for the State Fish Commission, 5,000,000; U. S. Fish Commission Car No. 3, for Utah, 2,000,000; total, 18,000,000.

Between April 11th and May 7th 80,198,000 fry were deposited in Lake Erie at the following points: Ballast Island Reef, 11,270,000; Green Island Reef, 2,350,000; Peach Point Reef, 19,258,000; West Sister Island, 2,600,000; North Bass Island Reef, 19,620,000; Moore's Point Reef, 1,600,000; Rattlesnake Island Reef, 3,000,000; Starve Island Reef, 5,050,000; Niagara Reef, 5,050,000; Cone Reef, 5,400,000; Kelley Island Reef, 3,000,000; Port Clinton, 2,000,000; total, 80,198,000.

Cisco.—All of the cisco eggs (10,452,000) were taken at Put-in-Bay Island and were of unusually good quality. The catch of fish was light and a dearth of males was noticeable everywhere. All the eggs, except 600,000 retained for hatching, were planted on Rattlesnake Island Reef, Lake Erie, the natural spawning-grounds of the fish, in order to make room for the whitefish eggs. All of the 600,000 retained were hatched and planted at Peach Point Reef, Lake Erie, on April 27.

Lake trout.—On December 7th 500,000 lake-trout eggs arrived from Northville, Mich., in fine condition, and on December 18th 150,000 were

taken at Dunkirk, N. Y., by spawn-takers from Put-in-Bay Station. These were in poor condition, owing to the severe weather prevailing during the spawn-taking period. On March 12 the eggs commenced to hatch, finishing April 7, and the 478,500 fry resulting from them were planted in the vicinity of the islands in Lake Erie.

Pike perch.—This work, though more successful in the aggregate than last year, was interfered with by frequent storms, some of which were of unusual severity. Eggs of this species aggregating 404,025,000 were collected as follows: Toledo, Ohio, 180,000,000; Port Clinton, Ohio, 77,625,000; Put-in-Bay, Ohio, 60,750,000; North Bass Island, Lake Erie, 55,687,500; Sandusky Bay, Ohio, 17,700,000; East Sister Island, 5,062,500; unknown, 7,200,000.

The first eggs were taken April 16 and the last on April 28. The period of incubation (running from 14 to 21 days) was 10 days shorter than usual, owing to the high temperature of the water. The eggs commenced hatching on May 6 and finished on the 12th. The first eye-specks were visible on April 28, 6 days after the eggs were taken.

An experiment was again made to prevent cannibalism among pike-perch fry. Four tanks of equal capacity were each supplied with 500,000 fry. The fry in two of these were fed regularly three times a day with fine wheat middlings, and once a day with finely chopped liver. Those in the other two tanks were not fed. Although some cannibalism was noticed in the tanks where the fry were fed up to and including the third day, the percentage of loss was very small, while it was great in the other two. On the fourth day, however, the fry refused to take the middlings, and from that time the destruction was so great that the experiment was abandoned and all the fry were planted.

The following deliveries of eggs and fry were made:

Eggs.	Number.	Fry.	Number.
Sandusky, Ohio, State Fish Commission	25,000,000	May 9, U. S. F. C. Car No. 2	10,000,000
U. S. F. C. Car No. 1	14,400,000	May 16, U. S. F. C. Car No. 2	5,000,000
Clayton, N. Y., State Fish Commission	5,000,000	May 18, U. S. F. C. Car No. 2	3,700,000
Washington, D. C., U. S. F. C.	2,000,000		
	46,400,000		18,700,000

Between the 8th and 20th of May 183,680,000 fry were deposited in Lake Erie.

Great difficulty was experienced in keeping the screens in the fry tanks free on account of the large accumulation of shells from the eggs, and with the large hatch of whitefish and pike perch it was found almost impossible to prevent the tanks overflowing. In order to remedy this a three-fourths-inch iron pipe, pierced with small holes at intervals of 5 inches, was connected with an air-pump and placed across the ends of the main tank on the inside, close to the bottom and near the screens. The continuous flow of air resulting from this not only prevented the clogging of the screens, but also proved beneficial to the fry by thoroughly aerating the water.

NORTHVILLE STATION, MICHIGAN (F. N. CLARK, SUPERINTENDENT).

Early in the fiscal year the outsides of the rearing-house and hatchery were painted, a new floor laid in the hatchery, twelve new rearing-ponds completed, alleys graded, etc. The water in the ponds which had contained diseased fish was drawn off, the sides of the ponds whitewashed, and the bottoms given a thorough sprinkling of salt. The main feed raceway to the large ponds was taken out and replaced with new sides and bottom throughout. The severe weather of the past winter did considerable damage to the ponds and raceways, causing the upheaval of ties, collapse of sides, and sinking of bottoms.

Lake trout.—The lake-trout eggs collected by Alpena spawn-takers, amounting to 8,746,000, were transferred as usual to this station. Of these, 2,750,000 were shipped to other stations of the Commission, State Fish Commissions, and private applicants. From the balance retained at the station (5,996,000) 1,390,000 fry were hatched and distributed. The poor results were probably due to the fact that it was necessary to hold the eggs on trays for a number of days before shipping at many of the field stations, owing to their being located at isolated points, which could not be reached by the boats in the inclement weather prevailing during the fall. The distribution of eggs and fry is given below:

Consignee.	Address.	Number.
Eggs.		
California Fish Commission	Truckee, Cal	100,000
Vermont Fish Commission	Roxbury, Vt	300,000
New York Fish Commission	Caledonia, N. Y	1,500,000
E. M. Robinson, for Green Lake Station	Green Lake, Me	100,000
J. J. Stranahan, for Put-in-Bay Station	Put-in-Bay, Ohio	500,000
Henry Studor	White Lake, N. Y	50,000
Massachusetts Fish Commission	Winchester, Mass	100,000
J. W. Titcomb, for St. Johnsbury Station	St. Johnsbury, Vt	50,000
Nebraska Fish Commission	South Bend, Nebr	50,000
Total		2,750,000
Fry.		
Chas. H. Grate	Manston, Wis	5,000
C. C. De Long	Pelican Lake, Wis	5,000
D. F. Chandler	Antigo Lake, Wis	5,000
Fred J. Vine	Lac du Flambeau, Wis	5,000
H. W. Bent, State Line	State Line, Wis	10,000
Geo. M. Brown	Saginaw, Mich	100,000
H. B. Roney	Gogebic Lake, Mich	40,000
Daniel W. Green	Ligonier, Ind	20,000
Lake Huron	Alpena, Mich	400,000
Do	Cheboygan, Mich	200,000
Do	East Tawas, Mich	200,000
Lake Michigan	Frankfort, Mich	200,000
Do	Manistique, Mich	200,000
Do	Charlevoix, Mich	200,000
Total		1,590,000

Brook trout.—From October 7 to December 15 there were 198,804 eggs taken from 812 female trout on hand. From these eggs, 177,000 fry were hatched and shipped to parties in Ohio, Michigan, Wisconsin, and Iowa, the distribution commencing March 26 and closing May 4.

In addition to this 5,500 fingerling brook trout were furnished to Michigan applicants.

Von Behr trout.—The total number of eggs taken was 58,370. Of these, 25,925 were taken from 105 2-year-old fish and the remainder from 40 old trout. Two shipments of eggs of 5,000 each were made, and 10,000 fry were distributed.

Loch Leven trout.—The spawning season opened November 6 and ended December 8, during which time 43,378 eggs were secured from the 44 females available. Ten thousand of these eggs were sent to the Leadville Station and 5,000 were furnished to the Minnesota Fish Commission. Of the fry hatched at the station 10,000 were shipped to J. C. Pond, Milwaukee, Wis.

Rainbow trout.—The 7,000 rainbow trout on hand at the beginning of the fiscal year were carried in a single pond until the middle of February, being fed three times a day on beef liver. When delivered to car No. 2, on February 14, the count was 6,234 healthy yearlings. On January 22 a consignment of 20,000 eggs of this species was received from Neosho Station. The fry hatched from them were distributed to parties in Wisconsin and Iowa.

Steelhead trout.—On March 20 a consignment of 22,000 eggs was received from Fort Gaston Station and another of 66,500 on April 3. Both shipments were in excellent condition when received and it was intended to hold all the fry for distribution as yearlings. The daily losses became so great in June, however, that it was deemed advisable to dispose of the greater part of the stock, and on the 23d of June 40,000 were delivered to car No. 2, to be distributed equally in the Baldwin and Pere Marquette rivers. Only 5,000 were retained for rearing.

Pike perch.—On May 20th 200,000 pike-perch fry were delivered at the station by car No. 2. It was intended to rear these to the yearling stage, and they were placed in tanks and small rearing-ponds with the finest perforated tin obtainable inserted at the overflows. Notwithstanding this precaution, the entire consignment made their escape through the screens inside of ten days into the North Branch of Rouge River.

Black bass.—Owing to the increased demand for black bass an attempt was made to rear both the large-mouthed and small-mouthed varieties. A consignment of 56 large-mouthed bass, collected in the Illinois River, were received April 24 and placed in the station ponds. They apparently arrived in excellent condition, but later on fungus developed, probably caused by injuries received in transportation. On May 20 a consignment of 24 small-mouthed bass was received from Put-in-Bay, Ohio. These were placed in suitable ponds, but, owing to the fact that they had been transferred too late for them to become acclimated, they failed to spawn, and at the close of the season there were no fry on hand.

The accompanying table shows the number of fishes of various kinds on hand at the close of the fiscal year:

Species.	Calendar year in which hatched.				
	1895.	1894.	1893.	1892.	1891 or before.
Brook trout	42,941	.....	90	621	.....
Von Behr trout	.....	.....	1,120	869	.....
Loch Leven trout	.....	.....	934	.....	227
Steelhead trout	3,608	.....	.....	.....	.....
Black bass	.....	.....	.....	36	.....
Goldfish	.....	.....	201	.....	.....
Total	46,549	.....	2,345	1,526	227

ALPENA STATION, MICHIGAN (F. N. CLARK, SUPERINTENDENT).

Previous to the opening of the spawning season the superintendent and foreman made a tour of Lakes Michigan, Superior, and Huron for the purpose of preparing for the fall work. Every fishery of importance was visited from Saginaw Bay, north through the Straits of Mackinac, down the eastern shore of Lake Michigan to Frankfort, the north shore of Lake Michigan, through Detour Passage and along Lake Superior as far as Whitefish Point. At the different grounds all possible arrangements were made for the use of tugs and nets.

Lake trout.—Of eggs of this species, there were collected during the season 8,746,000, more than three times the number collected in the fall of 1893, and twice as many as were ever handled before at the station. The season opened October 18, and the last eggs were taken on December 10. Following are the points at which the eggs were taken and the number taken at each point: Au Sable, 565,000; Alpena and vicinity, 451,000; Caribou Island, 1,000,000; Detour, 1,930,000; Manistique, 1,350,000; Beaver Island, 1,800,000; Charlevoix, 1,650,000; total, 8,746,000. All of these eggs were shipped to Northville Station to be hatched and distributed from that point.

Whitefish.—In former years not less than 70 per cent of whitefish eggs were collected from fish caught in pound nets, but this year most of the pound nets were blown out at the opening of the spawning season, and only 6,581,000 eggs were thus secured. The balance were taken from fish caught in gill nets in December, and the poor percentage hatched (57) is due to this fact, as gill-net fish usually yield very poor eggs.

A total of 49,299,000 whitefish eggs were collected at the following points: Charity Islands, 640,000; Miller Point, 300,000; Alpena and vicinity, 2,989,000; Warehouse, 640,000; Naubinway and Schelien, 2,030,000; Seulchoix, 200,000; Charlevoix (Manitou Island), 6,800,000; CrossVillage, 880,000; Beaver Island, 12,080,000; Manistique, 14,740,000; Put-in-Bay, 8,000,000; total, 49,299,000.

From these, 28,000,000 fry were hatched and planted as follows:

Date.	Where planted.	Number of fry.
Apr. 20	North Point, near Alpena, Mich., Lake Huron	4,000,000
20	Scarecrow Island, Thunder Bay, Lake Huron	2,000,000
22	Miller Point, near Oscoda, Mich., Lake Huron	2,000,000
29	North Point, near Alpena, Mich., Lake Huron	1,000,000
30	Sturgeon Point, near Oscoda, Mich., Lake Huron	2,000,000
30	Near East Tawas, Mich., Lake Huron	2,000,000
May 1	Detour Passage, Lake Huron	2,000,000
6	North Point, near Alpena, Mich	500,000
Apr. 17	Charlevoix, Mich., Lake Michigan	2,000,000
23	Mackinac City, Straits of Mackinac, Lake Michigan	2,000,000
26	Near Manistique, Mich., Lake Michigan	2,000,000
May 1	Epoufette, Lake Michigan	1,000,000
1	Naubinway, Lake Michigan	1,000,000
6	Near Frankfort, Mich., Lake Michigan	2,000,000
Apr. 26	E. A. Davis, Whitefish Lake, Michigan	2,000,000
May 6	Hubbard Lake, Michigan	500,000
	Total	28,000,000

DULUTH STATION, MINNESOTA (S. P. WIRES, SUPERINTENDENT).

During the year the usual repairs were made to the hatching apparatus. The carpenter shop and reservoir building were painted, the hatching-room, office, halls, and bedrooms calcimined, and other minor repairs were made to the interior of the building. A platform 41 feet long was constructed at the east side of the station for use in sending out shipments of fry and eggs. Seventy-six troughs, 7 feet 10 inches long, 14 inches wide, and 10 inches deep, were built on the outside of the hatchery, and a picking-trough 23 feet long, 15½ inches wide, and 5½ inches deep, at the rear of the hatching-room. The old mess-house, on the northeast corner of the grounds, was taken down, and the six unserviceable ponds on the west side of the station were filled with gravel and earth.

Lake trout.—The collection of lake-trout eggs began in September and closed in November. Following are the points at which collections were made:

Locality.	Number.
Vicinity of Port Arthur, Ontario	1,000,000
Vicinity of Grand Portage, Minn	255,000
Fish Island, near Isle Royale, Mich	200,000
Todd Harbor, near Isle Royale, Mich	990,000
Washington Harbor, near Isle Royale, Mich	625,000
Rock Harbor, near Isle Royale, Mich	175,000
Vicinity of Bayfield, Wis	1,880,000
Total	5,125,000

These eggs produced 4,250,000 fry, which were deposited between May 6 and June 24 in Lake Superior, near the shores of Michigan, Minnesota, and Wisconsin.

Whitefish.—During the months of October and November 1,500,000 whitefish eggs were collected at Pipestone Falls, Minn., and 10,000,000 more were received from the Michigan Fish Commission.

The fry resulting from them were planted as follows:

Date.	Locality.	Number.
Apr. 17	Raspberry Bay, near Bayfield, Wis	2,250,000
19	Lake Superior, near Bayfield, Wis	2,250,000
22	Lake Superior, near Iron River, Wis	2,250,000
25	Lake Superior, near Isle Royale, Mich	2,000,000
29	Siskowit Bay, near Isle Royale, Mich	1,500,000
May 2	....do	500,000
7	Lake Superior, near station	250,000
	Total	11,000,000

Pike perch.—Between the 23d and 26th of April 25,000,000 pike-perch eggs were collected in the vicinity of Pike River, Minn. From these, 13,000,000 fry were hatched and distributed between May 26 and 31 to parties in Wisconsin, Minnesota, Iowa, and South Dakota.

Steelhead trout.—In April 100,000 steelhead-trout eggs were received from Redwood, Cal., and nearly all of the 75,000 fry resulting from them were deposited in Lake Superior, near Washington Harbor.

Rainbow trout.—In February 20,000 rainbow-trout eggs were received from the station at Mammoth Spring, Ark., and 22,680 from Neosho Station. Part of the eggs from Mammoth Spring were too far advanced for successful shipment, and were in poor condition on arrival. From the two consignments 18,000 fry were hatched and distributed to parties in Minnesota and Michigan.

The water temperatures were as follows:

Year.	Month.	Average or range.	Temperature.
			°
1894	October	Range	50 to 40
	November	Average	34
1895	December	....do	32½
	January	....do	34
	February	....do	34
	March	....do	33
	April	Range	33 to 45
	May	....do	45 to 62
	June	Average	57

QUINCY STATION, ILLINOIS (S. P. BARTLETT, SUPERINTENDENT).

The season of 1894 was an unfortunate one, and had not the free use of a steamboat been obtained the work would have been even more of a failure than it was. The absence of the usual spring overflow of the Mississippi and Illinois rivers and the extreme and protracted drought of the spring and summer caused the ponds which usually furnished the supply of fish to dry up, and therefore extra and more expensive efforts had to be made in the collection. In addition to this the temperature of the water in the rivers was so high that the fish in the live-boxes rapidly developed fungus, and many thousands were lost.

At the opening of the season Mr. Ray, the owner of Meredosia Bay, a body of water about 5 miles in length and with an average width of 1,000 feet, offered the Commission the use of it, together with a pond just built and such land as might be needed for other ponds, practically

without compensation. This offer was accepted for a term of two years. Large black bass for spawning purposes were taken from the bay and put in the pond, and later collections of young bass were made and placed in it. The pond, which is about 400 feet long and from 50 to 75 feet wide, is fed by a spring, and, although a crude affair, is much better than the ordinary live-boxes for holding the fish collected.

The superintendent of the station secured the use of a large surface water pond at Baldwin Park, near Quincy, into which several hundred spawning crappie were put. The pond is well filled with young, but owing to its nature and location it has been difficult to remove the adult fish, and the ultimate success of the experiment is problematical.

The distribution of fish from the station during the fiscal year was as follows:

Species.	Fry.	Yearlings.
Black bass		21,820
Crappie	50,000	5,675
Catfish		5,916
Yellow perch		3,325
Warmouth bass		1,090
Sunfish		221
Pike perch		299
Pike		82
White bass		12
Total	50,000	38,440

In addition to these, large numbers of bass, crappie, perch, sunfish, catfish, and hundreds of thousands of the coarser species were saved by removing them from the drying ponds and returning them to the Mississippi and Illinois rivers. The usual method of collecting has been to use a small-meshed seine in the ponds and lakes formed by the receding waters of the rivers after an overflow. The fish wanted for distribution were selected from the catch, and when practicable the residue were returned to the river.

The seines used are 100 yards long, 6 feet deep, and one-fourth, one-half, and three-fourths inch in mesh. A two-wheeled cart, built with a platform like a railroad truck, is used to carry the small boat, cans, and seines out into the bottoms, and to bring the cans of fish from the ponds to the river. Large skiffs with three pairs of oars are used to transport the entire outfit from Meredosia or Quincy to such points as may be determined for the work. The cans are made of galvanized iron and hold 30 gallons each. Crabs are used to haul the seines, as the moss is often so heavy as to make work by hand very difficult.

NEOSHO STATION, MISSOURI (W. F. PAGE, SUPERINTENDENT).

During the fiscal year there were constructed at the station two ponds for the culture of bass, one with an area of 23,000 square feet and the other 4,500. A woodshed, 10 by 20 feet, for the storage of fuel and heavy outdoor tools was built, and the railroad spur was converted into a double-end switch. Certain necessary repairs were also made to the ponds, flume, hatching-house, and residence.

The following table shows the number and kinds of fish on hand at the beginning of the year:

Species.	Calendar year in which hatched.				
	1894.	1893.	1892.	1891.	1890 or before.
Rainbow trout	91,688		1,000		650
Rainbow trout (red-banded)	1,709				
Von Behr trout	10,312				
Black bass	5,687				47
Rock bass	57,283				99
Goldfish	7,857				8
Tench	275				25
Mud catfish	1,965				
Total	176,776		1,000		829

These fish were held at the station and cared for in the rearing-ponds until late in the fall. The distribution commenced in December and lasted until January 22, during which time 73,930 yearling rainbow trout, 3,440 Von Behr trout, 53,619 rock bass, 3,761 black bass, 3,970 tench, 340 carp, 1,965 catfish, and 7,857 goldfish were distributed. The net output of the basses and trout was very discouraging in view of the fact that these fish were carefully assorted each month and the different sizes kept separate. The loss of the bass was undoubtedly due to cannibalism, though enormous quantities of *Coriza* were collected as food for them. This food is very acceptable to the rock bass, but the black bass have been observed to eat each other when the bottom of the pond was covered with young *Coriza*. In view of these losses it is strongly recommended that the distribution hereafter be made during the months of September and October, as it is believed that a much larger percentage of the fish can be saved by so doing. In addition to this better results can be obtained by planting fish in the early fall, when the water is full of natural food.

Rainbow trout.—The brood stock consisted of 362 2-year-old and 503 5-year-old fish. The spawning of this species extended from December 8 to February 24, during which time 782,000 eggs were obtained. Of these, 448,000 were shipped to State Fish Commissions and to the other stations of the United States Commission, as indicated in the following table:

Consignee.	Number.
George T. Mills, for Nevada Commission	27,720
Dr. E. E. Tolhurst, Salt Lake City, Utah	12,880
J. G. Bailey, Silver Springs, Ark	5,040
J. E. Sherlock, Salt Lake City, Utah	21,000
A. Lauth, Cuba, Mo	23,800
F. N. Clark, for Northville Station	20,720
H. D. Dean, for Leadville Station	124,740
H. W. Bailey for Vermont Commission	52,080
Cold Springs Stock Company, Aurora, Wyo	20,880
Gustave Schnitger, for Wyoming Commission	64,680
S. P. Wiree, for Duluth Station	22,680
D. H. McLinn, for New Hampshire Commission	46,200
Total	448,420

There were 146,000 retained at the station for hatching and rearing; the balance were lost owing to lack of fertilization. From the eggs retained at the station, 118,978 fry were hatched, 20,000 of which were lost in the hatchery and 98,112 counted out into the pools for rearing. At the close of the fiscal year there remained on hand 84,012.

The following table shows in detail the eggs lost in incubation, the fry lost in the hatching-house, and the number placed in the rearing-pools:

Eggs retained.

Number of eggs.	Eggs lost in incubation.	Fry lost in troughs.	Total loss in house.	Fry counted out into pools.	Per cent of loss.
14,424	1,210	2,202	3,412	11,012	23
13,851	1,990	1,891	3,881	9,970	28
13,271	2,683	2,023	4,706	8,565	35
17,191	1,862	3,639	5,501	11,690	32
11,573	1,678	2,505	4,183	7,390	36
13,478	2,468	959	3,427	10,051	25
19,386	4,437	2,349	6,786	12,600	34
14,459	4,420	1,574	5,994	8,465	41
12,597	2,253	1,521	3,774	8,823	29
16,012	4,263	2,303	*a*6,566	9,446	41
146,242	27,264	20,966	48,230	98,012	32.4

a 5,000 of this lot were delivered at the hatchery as fry.

In view of the desirability of increasing the output of rainbow trout, arrangements were made with Mrs. M. B. Murrell, of Little Rock, Ark., for the Commission to collect eggs from the Mammoth Springs (Ark.) fish ponds on shares. Mr. Neill, an employee of Neosho Station, was detailed for this purpose and conducted the work under the direction of the superintendent. Only 73,000 eggs were obtained from the 104 females handled, 31,000 of which were shipped to Duluth. The balance were turned over to Mrs. Murrell. On May 12 a case containing 12,590 rainbow-trout eggs was received from the California Fish Commission. They commenced hatching immediately and finished May 19. The fry began to take food on May 26, when only two weeks old. On June 8 there remained on hand 9,925 of these fish. They will be retained at the hatchery and reared as brood stock.

Brook trout.—On December 8, 1894, a consignment of 20,000 brook-trout eggs was received from Leadville Station. The eggs commenced hatching on December 13 and finished December 21. They appeared to do well until April 10, when an epidemic, described by Livingston Stone as black-gill fever, made its appearance. From that time until the close of the year the death rate was very heavy, and by the end of June only 829 remained. Dissections and microscopic examinations were made. Every organ was normal except the gills, which presented a dark pasty appearance, like the lungs of an animal dead from pneumonia. A feature of the disease was its quick action; a fish would appear in perfect health and be dead in five minutes. The temperature of the water could not be changed, and the other remedies in general use, salt and muck, would obviously have aggravated the trouble.

Von Behr trout.—On July 1, 1894, the stock on hand was estimated at 10,312. They were counted on August 20 and found to number 6,500. The fish were never healthy, apparently, but the loss was comparatively light until January 15, when an epidemic occurred which reduced the number to 3,440.

Black bass.—As in past years, ponds Nos. 10 and 11 were reserved as breeding-ponds, and ponds Nos. 2, 4, 5, 6, and the new one, No. 14, as rearing-ponds. Fifteen breeders were put in No. 10 and 35 in No. 11. Early in April they commenced nesting, and by April 13 several schools were observed in No. 11. These fry could not have been over ten days old, and were three-quarters of an inch long. By the end of June 7,500 fry, ¾ to 1½ inches in length, had been transferred from pond No. 11 to Nos. 4, 6, and 14. Besides furnishing them *Coriza* and other insects as food, the eggs of the common goldfish and suckers were collected from the neighboring branches and utilized for this purpose.

Rock bass.—As heretofore, ponds Nos. 7 and 8 were used as breeding-ponds. The first nest was found on April 13, and by June 12 the older fry were 1½ inches long. At this time some of the adult fish were still occupying nests. All indications point to a successful season, but it is impossible to give the number on hand at the close of the year, as the ponds had not been drawn and the fish counted at that time.

Carp.—The propagation of carp has been discontinued at this station, and all of the breeding carp on hand were disposed of in May, 1894.

Tench.—At the beginning of the year but 275 young fish were found in the ponds, but the breeders apparently spawned again on August 22, and a second crop of 4,600 was harvested in the fall. In the spring the spawning of the tench occurred on April 12, and again on June 12, but it is improbable that any results will be secured, as a number of bass escaped from pond No. 10 into the tench pond.

Goldfish.—The brood stock of this species consists of 8 adult fish, which produced during the previous year 7,857. They spawned as usual in the spring, but the indications are that most of the young have been killed by boat-flies, snakes, and crawfish.

Enemies of fish-culture.—The enemies of fish killed at the station during the year are as follows: Kingfishers, 24; ducks, 33; grebe, 24; water-hens, 3; fishhawks, 3; snakes in ponds, 75; frogs in ponds, 18; muskrats, 18; owls, 1; turtles, 32; cormorant, 1; bitterns, 29; herons, 2; opossums, 2; water rats, 28; crawfish, 1,555 pounds.

Following is a summary of temperatures of the water during the year to which the various fishes were subjected:

Species.	Maximum.	Minimum.
	°	°
Trout, yearlings and older	69	38
Trout, yearlings and less	78	47
Black bass	90	55
Rock bass	86	42
Goldfish and tench	80	40

LEADVILLE STATION, COLORADO (H. D. DEAN AND E. A. TULIAN, SUPERINTENDENTS).

The work at this station during the fiscal year was directed by H. D. Dean and E. A. Tulian, superintendents, the latter relieving Mr. Dean on February 7, 1895.

Repairs, etc.—During the year 400 feet of 6-inch wood pipe was laid from the large spring and connected with a 3-inch pipe to the hatchery, thereby increasing the water supply to 90 gallons per minute. A new waste overflow from the reservoir was also put in, the old one not being adequate. A substantial fishtrap was constructed in the creek connecting Upper and Lower Twin Lakes at a cost of $500 and a watchman's shanty built near it. A flagpole 65 feet high was erected at the station and much other work done toward improving the grounds and buildings.

The following table shows the stock of fish and eggs on hand at the beginning of the fiscal year:

Species.	Eggs.	Fry.	Yearlings.	Adults.
Brook trout	.....	145,500	3,445	1,123
Rainbow trout	.....	570	.....	26
Loch Leven trout	.....	2,000	1,580	27
Black-spotted trout	55,000	13,500	.....	424
	55,000	161,570	5,025	1,600

There were heavy and unaccountable losses of fry and adult fish during the summer months. Every possible effort was made to check the death rate, but without avail. The adult fish were apparently suffering from diseases of the gills, but there was no visible cause for death in the case of the fry. A number of the specimens sent to headquarters were carefully examined, but failed to show any disease of the organs.

The regular distribution was commenced by car No. 3 on October 27 and finished December 4, though a small part of the stock was disposed of in July, August, and September.

The total number of fish distributed was 70,325 brook trout, 570 rainbow trout, 1,475 black-spotted trout, and 870 Loch Leven trout; in all, 73,240, less than 50 per cent of the stock on hand at the beginning of the year.

Brook trout.—During the summer arrangements were made with the owners of Wellington, Uneva, and Aspen lakes for the collection of trout eggs on shares, the owners to get one-half of the fry resulting from the eggs collected, and the United States Fish Commission to pay all expenses. The first eggs were taken at Uneva Lake on August 11, and at Wellington on November 8. By the close of the season 1,754,700 eggs had been collected from all sources, as indicated in the accompanying table.

Table showing collections of brook trout eggs, etc.

Point of collection.	Adult fish.	Eggs.
Wellington Lake	695	592,000
Uneva Lake	396	530,900
Station	522	444,100
Lower Lake	163	42,100
Aspen Lake	.....	145,600
Total	1,776	1,754,700

The eggs taken at Uneva Lake turned out much better than those collected at any of the other points or from the brood fish at the station, the loss during incubation being only 72,400. From the remainder 100,000 eyed eggs were shipped to Northville, and 358,500 fry were hatched. The Wellington Lake trout eggs were probably injured by the long haul over rough roads. Of the 592,000 collected there, 182,000 were lost in the hatchery, 50,000 eyed eggs transferred to other stations, and 359,700 fry hatched. The advantage of spring water over creek water was clearly demonstrated this season, the eggs from Uneva and Wellington lakes hatching in from 72 to 73 days, whereas in previous years, when creek water was used, the eggs were frequently in the troughs from 140 to 160 days.

The following table shows the number of eggs shipped from the station and the number received during the year:

Eggs shipped.

Date.	Consignee.	Address.	Kind.	Number sent.
1894.				
Dec. 3	W. F. Page, for Neosho Station	Neosho, Mo	Brook trout	20,000
1895.				
Jan. 8	F. W. Child	Brattleboro, Vt	do	25,000
8	F. N. Clark, for Northville Station	Northville, Mich	do	100,000
15	J. G. Bailey	Silver Spring, Ark	do	5,000
15	S. S. Watkins	St. Paul, Minn	do	20,000
15	Geo. E. Delavan	Estherville, Iowa	do	20,000
24	C. G. Atkins, for Craig Brook Station	Bucksport, Me	do	50,000
	Total			240,000

Eggs received.

Sent from—	Species.	Number.	Condition.
Neosho Station	Rainbow trout	126,000	102,800 very poor fish hatched from them. Loss to July 1 was 69,650.
Northville Station	Loch Leven trout	10,000	Loss on eggs 600. Loss on fry to July 1, 6,400.

During the month of May 254,700 brook-trout fry were delivered to the owners of Wellington, Uneva, and Aspen lakes, and 230,000 brook and 30,000 rainbow trout fry were distributed to applicants in Colorado; the balance of the stock was retained for the fall distribution.

Native and rainbow trout.—A substantial trap having been built at Twin Lakes, it was hoped that a large collection of eggs of the black-spotted, yellow-finned, and rainbow trouts would be secured. Very few fish were taken, however, either by the State or the station trap, probably because of very cold and rough weather prevailing during the spawning season. The total egg collections were 62,600 black-spotted (43,100 from Twin Lakes and 19,500 from the station fish), 26,500 yellow-finned from Twin Lakes, and 13,500 rainbows (11,000 from Uneva and 2,500 from the station stock.

At the close of the year the stock of eggs and fish was as follows:

Species.	Eggs.	Fry.	Adults.
Brook trout	.....	112,200	1,002
Rainbow trout	9,916	4,400	.....
Loch Leven trout	.....	3,000	475
Black-spotted trout	36,580	.....	40
Yellow-finned trout	11,300	.....	.....
Total	57,796	119,600	1,517

BAIRD STATION, CALIFORNIA (LIVINGSTON STONE, SUPERINTENDENT).

Work at this station during the year was confined, as in past years, to the quinnat salmon (*Oncorhynchus tschawytscha*). There are two runs of this salmon each year, one in the summer and one in the fall. The summer run spawn from about August 20 to September 20; the fall run spawn from about October 25 to the first week in December. By reason of the fact that the close season in California does not begin (according to the law of that State) until September 1, thereby permitting the operation of seines until that time, very few, comparatively, of the summer run of salmon reach this station.

On August 24 the summer fishing and spawning season opened with the taking of 90,000 eggs and continued until September 30. The total number of eggs taken from the 816 fish secured was 3,294,300, an average yield of 4,037 eggs per fish. The fall run began October 22 in the midst of seven days' storm, which commenced on the 17th and lasted until the 24th. The McCloud River rose rapidly, and on the night of the 23d a portion of the rack was carried away, notwithstanding the fact that several men were kept on it day and night to keep it clear of leaves and dirt. This caused a large number of breeding salmon to escape through the breach. The river was closed again on the 27th, but it was too late to retrieve the great loss of breeders occasioned by the accident to the rack.

The total number of eggs taken up to November 23, when the fall run ceased, was 1,098,800, an average of 4,300 per fish.

During the fiscal year 3,526,300 eggs were sent to the State hatchery at Sisson, Cal., and 150,000 to the Société d'Acclimatation, Paris, France. From the remainder, 400,000 young salmon were deposited in McCloud

River from October 24 to 26, and between January 7 and February 7 100,000 fry were deposited in Garden Brook, a tributary of the McCloud River.

During the year some extensive repairs and improvements were made at the station, including the building of an aqueduct for bringing the water supply to the hatching-house by gravity from a stream near by. This will render unnecessary the use of the wheel as a means of supplying the hatching-house with water during fall and winter, and, in consequence, much labor, expense, and risk of life will be avoided. A rack and footbridge were also constructed across McCloud River and the mess-house repaired.

The hatching apparatus used at the station is the Williamson trough, fitted with deep trays, which is undoubtedly one of the best appliances for hatching eggs of the *Salmonidæ* on a large scale. The trays used are made of wire netting, 10 inches wide by 24 inches long, and deep enough to bring the tops of the trays an inch or two above the water, which is 5 or 6 inches deep. Into these trays 2 gallons of salmon eggs are poured at a time, making the eggs 12 or 15 tiers deep. They are not injured by being so piled up because the water is continually forcing its way up through and loosening them, thus lightening the weight of those above them and at the same time furnishing them a supply of fresh air.

The advantages of this method are—

(1) The top of the tray is above the water and always entirely dry, consequently it is convenient to handle.

(2) The white eggs can be forced to the top by tilting one end of the tray a little or by lifting it up and setting it gently back in its place. By this means no feather is required to pick over the eggs, and thus the injuries often inflicted upon them in that way are obviated.

(3) The top of the tray being above water, the eggs can not escape in any way.

(4) It economizes space, as 50,000 eggs can be kept on a superficial area of 2 square feet. Two troughs, 20 feet long and 1 foot wide, will, by this method, carry 1,000,000 salmon eggs.

The maximum and minimum temperatures of air and water at the station during each month are shown by the following table:

1894.	Air.		Water.		1895.	Air.		Water.	
	Max.	Min.	Max.	Min.		Max.	Min.	Max.	Min.
	°	°	°	°		°	°	°	°
July	112	50	62	55	January	84	30	49	43
August	116	46	62	50	February	88	28	49	40
September	108	32	58	46	March	87	25	50	48
October	102	38	55	49	April	100	30	52	44
November	98	28	50	38	May	108	40	55	48
December	88	26	47	39	June	115	44	58	50

FORT GASTON AND SUBSTATIONS, CALIFORNIA (CAPT. WM. E. DOUGHERTY, U. S. A., SUPERINTENDENT).

During July and August only routine work was performed at the station and substation (Redwood). In September timbers were taken out for the construction of piers at the substation, and in October three piers were built in the bed of Redwood Creek just above the mouth of Minor Creek, and stringers and racks erected on the structure. The greatest care was taken to make this barrier substantial, yet the first high water that came (on December 1) undermined the pier and disabled the structure for the remainder of the season. It is believed that the pier system, or any system by which a considerable body of water is displaced, can not be made successful as a means of stopping the passage of fish in any of the streams of the Coast Range. The causes of this are that the streams all run in synclinal axes, the bed rock being from 80 to 200 feet beneath the bed of the stream (it is about 80 feet at Redwood), and that the current is so rapid and the volume of water so great during a rise that the undermining of the piers by the displaced water is inevitable. This system is successful at the Baird Station because McCloud River has a firm bottom.

The salmon began to run early in December, but hardly any were taken until the water was low enough to put a temporary dam in the creek. Eggs were taken during the season as follows: Salmon (from 80 females), 221,000; steelhead (from 138 females), 557,500; Von Behr trout (from 31 females), 20,800; rainbow trout (from 33 females), 16,321. Most of the salmon and steelhead eggs were taken at the substation, as there was no run of either kind in Trinity River, all the fish having been taken at the cannery at the mouth of Klamath River. Fishing and spawn-taking were suspended on May 6.

Fish and eggs were distributed during the year as follows:

Eggs distributed.

Consignee.	Species.	Number.
The consul of Japan at San Francisco, Cal	Steelhead	30,000
F. N. Clark, for Northville Station	do	91,850
S. P. Wires, for Duluth Station	do	100,000
J. W. Titcomb, for St. Johnsbury Station	do	25,000
Total		246,850

Fry distributed.

Applicant.	Point of deposit.	Species.	Number.
Humboldt Sporting and Recreation Club, Eureka, Cal.	Elk River	Rainbow trout	1,000
Do	Yager Creek	Von Behr trout	1,000
Country Club, San Francisco, Cal.	Streams in Marin County, Cal	do	3,000
U. S. F. C. assignment	Trinity River, California (60 miles from the ocean).	Chinook and silver salmon.	150,000
Do	Redwood Creek, California (30 miles from the ocean).	do	70,000
Do	do	Steelhead	277,500

Brood stock and fry on hand June 30, 1895.

Species.	Calendar year in which hatched.		
	1895.	1894.	1893.
Rainbow trout	14,000	6,000	200
Von Behr trout	10,000	800	12
Eastern trout	200	.....	A few.

During the year the station grounds were extended and inclosed by a fence; two ponds, 15 by 60 feet, were constructed; a dam 5 feet high and 20 feet long was erected in Hospital Creek, and a flume 3,060 feet in length was constructed, which gives the station an independent water supply from Hospital Creek. At the substation a new hatchery, 18 by 42 feet, with a finished room for the keeper, 12 by 18 feet, and porch full length, storeroom, etc.. was constructed. The large ponds were also subdivided.

KORBEL.

The station was closed from July 1 to September 15. On the 16th work was begun procuring timbers for the construction of a dam, to consist of log piers and stringers for the placing of the racks. Three triangular piers and two abutments, 6 feet in height, were erected, the largest pier having a base of 16 feet on the sides and 10 feet in rear, the two center spans being 40 feet wide, and the shore spans 30 feet. These structures were filled with loose rock, faced on the sides with rough material, and reinforced all round by a revetment of loose rock 2 feet in height. Every precaution was taken in order to make the structure permanent.

The water being low in October and November, no salmon reached the station, although great numbers were taken at the mouth of the river. On November 26 the first rain came, and early in December chinook and silver salmon became very plentiful. During December 7 and 8 the water rose rapidly, making a breach under the dam in the deepest part of the current 18 feet wide and nearly 10 feet deep, and letting down one side of the largest pier. A temporary dam of wire netting was put in as soon as the water subsided sufficiently, the breach was repaired by inserting bags of sand, and the pier carried up by means of timbers and rock. These repairs were completed on the 29th. In February the water again rose so high that the whole structure had to be dismantled, causing much loss of time. During March the water became so low that the fishing had to be done in the main channel of Mad River, 2 miles distant from the station.

Fishing ceased May 1 and spawn-taking on May 10. Eggs were taken during the season as follows: Chinook and silver salmon (from 180 females), 471,500; steelhead trout (from 105 females), 594,000.

Distribution of fish and eggs complete.

Applicant.	Point of deposit.	Species.	Eggs.	Fry.
Consul of Japan at San Francisco, Cal.		Steelhead	30,000	
U. S. F. C. assignment	Mad River	Salmon		470,000
Do	do	Steelhead		550,000

CLACKAMAS STATION, OREGON (W. F. HUBBARD, SUPERINTENDENT).

On account of the poor results attained on Clackamas River in the past few years, it was decided to discontinue operations there and to depend on Sandy River for the supply of eggs; also to operate, as an auxiliary station, the hatchery on the Siuslaw River, belonging to the Oregon Fish Commission.

SANDY RIVER.

A rack 400 feet long was built across the river to prevent the ascent of the salmon. Much difficulty was experienced in carrying on this work on account of sawlogs and cordwood, and it was found necessary to make a gate in the rack through which the logs and wood could be passed, also to build a boom 600 feet above the rack to direct them to the gate. A small, temporary hatchery was built and hatching-troughs erected, which were supplied with water from a spring brook not far distant. Heavy rains in the first part of September brought down an immense quantity of wood and logs, which broke the boom and carried away a large part of the rack, thus permitting the salmon collected to escape. The rack was repaired, and on the 18th of September 23,000 eggs were collected from six salmon. Additional rains caused a rise in the river, and on the 1st of October the rack was taken away again. As all of the salmon below the rack had passed up, operations were suspended. The 23,000 eggs were placed in a small brook emptying into the Sandy and left to hatch.

SIUSLAW RIVER.

The hatchery on the Siuslaw River is located at Seaton, 25 miles above the mouth of the river, and is well furnished with troughs and everything necessary for carrying on salmon work, being supplied with excellent water from a brook near by. In July arrangements were made for the construction of a rack across the river about a mile above the hatchery. This was completed on July 24 and the station placed in charge of S. S. Bass, assisted by George H. Tolbert. About the middle of August salmon appeared in the river in fairly large numbers, but very few of them succeeded in getting up as far as the station, as the fishermen set their nets below, clear across the stream. No eggs were taken, and operations were abandoned about the middle of September, as the run of quinnat salmon was over.

CAR AND MESSENGER SERVICE (J. F. ELLIS, SUPERINTENDENT).

In July cars Nos. 2, 3, and 4 were placed in the shops of the Harlan & Hollingsworth Company, Wilmington, Del., where they were repainted, revarnished, and generally overhauled. A new steel range was placed under car No. 4, a permit having been obtained from the New York Board of Railroad Commissioners to use a range of that character in the State. In December Allen paper wheels were placed under this car, as many of the railroads object to hauling a car equipped with iron wheels. During the month of November car No. 1 was thoroughly repaired, painted, varnished, and a new tin roof put on. It was also equipped with a storage tank of 600 gallons capacity, pressure tanks, new boiler and circulating pumps, and connections were made for hatching apparatus.

Trout, salmon, etc.—The first work undertaken was the continuation from last year of the distribution of fingerling trout from the Northville Station. This was finished by car No. 1, which made two trips, traveling 1,100 miles and distributing 6,500 trout, with a loss of 325. The distribution at Green Lake was commenced on October 1 and finished on November 16, the output consisting of 36,023 trout and 53,015 landlocked salmon. Car No. 4 made seven trips in carrying these fish, traveling 5,318 miles. The number of trout lost was 1,525 and the number of salmon 946. Car No. 3 made the distribution from Leadville, commencing October 27 and finishing December 4, during which time it made five trips, traveling 8,818 miles. The number of trout moved was 53,424 and the total loss was 351. The largest number taken on one trip was 16,000. The trout distribution from Neosho Station was begun December 11 and completed on January 30, the number of fish moved being 63,190, on which there was a loss of 4,430. The number of trips made was ten and the number of miles traveled 9,862.

Considerable difficulty was experienced, as heretofore, in moving the rainbow trout. Various experiments were made in order to remedy this trouble, but without avail. The car captains received instructions to conduct a series of experiments with the view to determining the best temperature in which to carry them, and to ascertain, if possible, the cause of the large losses. On car No. 3 they were carried in water varying in temperature from 40 to 60°, and on car No. 2 from 35 to 55°. The loss on car No. 3 was the same in all cases, but on No. 2 they did better, apparently, at a temperature varying from 40 to 42°. The difference in loss, however, was too slight to justify the conclusion that the temperature of the water was the cause of death. Many other theories have been advanced, but the evidence furnished is not sufficient to account for the loss.

The trout distribution from Wytheville Station was made by cars Nos. 1 and 4, and lasted from December 9 to February 3, 80,460 fish being moved, with a loss of 6,358. The number of miles traveled was 9,026. Between March 26 and June 22, 1,634,000 trout fry were distrib-

uted from Northville Station, the loss being 15,000. Ten trips were made, and 6,426 miles traveled. In addition to this distribution, 3,300 adult wild trout were transferred from Grayling, Mich., to Northville, with a loss of 76. From Duluth Station 200,000 trout fry were planted in streams in Minnesota.

The summary of distribution by cars and messengers is as follows:

Number of trout carried	2,332,658
lost	85,500
trips made	52
miles traveled	47,380
Average temperature	42
Cost of distribution	$7,201.48

Native food-fishes.—The distribution of these fishes commenced July 16 from Quincy, Ill., cars Nos. 1, 2, and 3 being utilized for the purpose. The loss on the 40,723 fish moved was 3,338, and the number of miles traveled was 24,500. The average temperature of the water during this distribution was 71° F. on car No. 1, 57° on car No. 2, and 60° on car No. 3. The loss on those moved at 70° was much less in proportion to the number handled than on those carried at a lower temperature.

Carp.—The distribution of carp from Central Station was commenced October 19, all four of the cars taking part in it. The number moved was 55,950, the loss being 639. Thirteen trips were made and 5,813 miles traveled.

Whitefish.—The distribution of eggs of this species commenced from Put-in-Bay Station on March 11, when 2,000,000 eggs were shipped on car No. 3 to Salt Lake City, Utah. The eggs were hatched en route and the fry deposited in Utah waters. At Alpena Station the first whitefish fry were distributed on April 17. The output consisted of 28,500,000 fry, and the last of them were shipped May 6. Ten trips were made and 7,020 miles traveled. The average temperature of the water in which they were carried was 43°.

Pike perch.—The distribution of eggs of this species commenced April 27, when 14,400,000 were shipped from Put-in-Bay Station on car No. 4, to be hatched at Knoxville and planted in the waters of Kentucky and Tennessee. The first fry were moved from that station on May 15 and the last on May 17. One trip with this species was also made from Duluth Station. Four trips were required to move the 38,100,000 fry shipped, and the number of miles traveled was 3,967. The loss was 9,400,000, of which 6,200,000 were eggs lost in process of hatching. The average temperature of the water was 51°.

Shad.—The shad distribution from Central Station commenced on May 1, and from the steamer *Fish Hawk*, stationed at Gloucester, N. J., on May 17. The work closed on June 6, the cars having distributed 27,459,000 fry, 270,000 of which were lost. Seven trips were made and 3,841 miles traveled. The average temperature in which the fish were carried was 60°.

The total number of miles traveled by the cars during the year in the distribution of fishes was 93,377, of which 28,188 were paid for and 65,189 were free. The whole number of trips made by the cars was 100, and the number of days engaged in the actual distribution of fish was 653. The number of miles traveled by detached messengers was 75,384, of which 59,445 were paid for and 16,389 were free. The total number of fish and eggs handled by the cars was 96,565,088, of which 9,762,448 were lost en route (6,000,000 pike-perch eggs).

FREE TRANSPORTATION FURNISHED BY RAILROADS.

The Commission is under continued obligations to various railroad companies in the United States for free transportation furnished during the year, as indicated by the following statement:

Summary showing total number of miles of free transportation furnished United States Fish Commission cars and messengers during the fiscal year ending June 30, 1895.

Name of railroad.	Cars.	Messengers.	Total.
Atchison, Topeka and Santa Fe	4,071	1,586	5,657
Atlantic and Pacific	1,558	.....	1,558
Baltimore and Ohio	776	.....	776
Burlington and Missouri River in Nebraska	382	.....	382
Burlington, Cedar Rapids and Northern	2,546	.....	2,546
Canadian Pacific	278	.....	278
Chicago and Northwestern	1,791	.....	1,791
Chicago and West Michigan	419	.....	419
Cincinnati and Ohio	2,011	.....	2,011
Chicago, Burlington and Quincy	2,142	448	2,590
Chicago, St. Paul, Minneapolis and Omaha	273	.....	273
Cleveland, Cincinnati, Chicago and St. Louis	2,933	.....	2,933
Delaware and Hudson Canal	710	626	1,336
Denver and Rio Grande	1,602	3,642	5,244
Denver, Leadville and Gunnison	.....	1,523	1,523
Detroit, Bay City and Alpena and Detroit and Mackinac	1,918	.....	1,918
Detroit, Lansing and Northern	153	.....	153
Duluth and Iron Range	456	192	648
Duluth, South Shore and Atlantic	573	.....	573
Flint and Pere Marquette	3,780	.....	3,780
Fremont, Elkhorn and Missouri Valley	200	.....	200
Fort Worth and Denver City	.....	1,336	1,336
Grand Rapids and Indiana	615	149	764
Great Northern	762	184	946
Gulf, Colorado and Santa Fe	271	.....	271
International and Great Northern	686	.....	686
Kansas City, Fort Scott and Memphis	1,769	1,189	2,958
Kansas City, Pittsburg and Gulf	343	40	383
Lexington and Eastern	.....	56	56
Michigan Central	5,315	.....	5,315
Minneapolis, St. Paul and Ste. Marie	404	.....	404
Missouri, Kansas and Texas	1,331	.....	1,331
Missouri Pacific	1,686	58	1,744
Mobile and Ohio	280	304	584
Montana Union	7	.....	7
Northern Pacific	1,522	615	2,137
Oregon Railway and Navigation Company	404	.....	404
Pennsylvania R. R	.....	18	18
Philadelphia, Reading and New England	.....	58	58
Rio Grande Western	50	.....	50
Santa Fe, Prescott and Phoenix	120	.....	120
Southern Pacific	1,780	1,056	2,836
St. Louis and Santa Fe	2,167	900	3,067
St. Louis, Iron Mountain and Southern	1,285	.....	1,285
Texas Pacific	634	1,269	1,903
Toledo, Ann Arbor and North Michigan	368	.....	368
Union Pacific	10,809	214	11,023
Union Pacific, Denver and Gulf	608	562	1,170
Wabash	1,271	364	1,635
West Virginia, Pittsburg and Gulf	208	.....	208
Wisconsin Central	1,022	.....	1,022
Total	65,189	16,389	81,578

AID TO STATE AND TERRITORIAL COMMISSIONS.

As in the past, aid was furnished to the fish commissions of the various States and Territories, and the extent of this work is exhibited in the following tabulation:

Statement showing the kinds and numbers of eggs and fish furnished to State and Territorial fish commissions during the fiscal year 1894–95.

State or Territory.	Species.	Eggs.	Fry.	Adults and yearlings.
Arizona	Catfish			45
	Black bass			100
California	Quinnat salmon	3,526,000		
	Landlocked salmon	10,000		
	Lake trout	100,000		
	Whitefish	25,000		
	Black bass			2,500
	White bass			12
	Sunfish			12
	Crappie		50,000	
Colorado	Black bass			100
Connecticut	Shad		3,800,000	
Delaware	Carp			500
	Goldfish			300
	Black bass			100
Georgia	Carp			1,355
	Tench			400
	Goldfish			150
	Rainbow trout			75
Iowa	Carp			500
	Goldfish			200
	Brook trout	20,000		
Kansas	Tench			100
	Goldfish			600
	Yellow perch			25
Maryland	Carp			500
	Goldfish			375
Massachusetts	Lake trout	100,000		
Michigan	Goldfish			700
Minnesota	Carp			500
	Goldfish			200
	Brook trout	20,000		
Nebraska	Rainbow trout			2,000
	Lake trout	50,000		
	Von Behr trout			1,000
Nevada	Rainbow trout	29,500		
New Hampshire	do	95,500		
New York	Shad		4,900,000	
	Atlantic salmon	20,000		
	Lake trout	1,500,000		
	Whitefish	5,000,000		
	Pike perch	5,000,000		
Ohio	Tench			800
	Goldfish			500
	Von Behr trout			200
	Pike perch	25,000,000		
	Rock bass			3,900
Utah	Carp			100
	Goldfish			100
	Whitefish		2,000,000	
Vermont	Goldfish			500
	Brook trout			400
	Rainbow trout	52,000		
	Lake trout	300,000		
Wisconsin	Loch Leven trout	5,000		
Wyoming	Rainbow trout	64,500		
	Von Behr trout	5,000		

Statement of fish and fish eggs furnished to the States and Territories during the fiscal year 1894–95.

State or Territory.	Species.	Eggs.	Fry.	Adults and yearlings.
Alabama	Carp			485
	Tench			80
	Goldfish			60
	Black bass			460
	Rock bass			660
Arizona	Catfish			300
	Carp			19
	Tench			50
	Brook trout			1,225
	Yellow perch			25
	Black bass			225
	Rock bass			2,000
	Crappie			100
Arkansas	Catfish			100
	Carp			555
	Tench			30
	Goldfish			181
	Rainbow trout	5,000		17,000
	Von Behr trout			500
	Brook trout	5,000		
	Black bass			725
	Rock bass			2,525
California	Catfish			10
	Quinnat salmon	3,526,000	500,000	
	Silver salmon	910,000	560,000	
	Landlocked salmon	20,000		
	Steelhead trout		852,500	332,000
	Rainbow trout		1,000	577
	Von Behr trout		4,000	
	Lake trout	100,000		
	Whitefish	25,000		
	Black bass			2,650
	White bass			12
	Sunfish			48
	Crappie		50,000	
Colorado	Tench			85
	Goldfish			100
	Loch Leven trout			870
	Rainbow trout		30,000	570
	Brook trout		229,500	35,450
	Von Behr trout			1,475
	Yellow perch			100
	Black bass			647
	Warmouth bass			25
	Crappie			25
Connecticut	Carp			485
	Goldfish			24
	Shad		3,800,000	
	Von Behr trout			1,810
	Brook trout			2,400
Delaware	Black bass			300
	Carp			530
	Goldfish			306
	Shad		3,976,000	
	Black bass			200
District of Columbia	Carp			336
	Tench			140
	Goldfish			2,136
	Golden tench			16
	Shad		6,195,000	1,000,000
	Rainbow trout			20
	Black bass			363
Florida	Rock bass			590
	Carp			84
	Tench			50
Georgia	Goldfish			144
	Carp			2,374
	Tench			659
	Goldfish			388
	Shad		2,021,000	
	Rainbow trout			475
	Black bass			327
Idaho	Rock bass			1,448
Illinois	Carp			270
	Catfish			1,105
	Carp			210
	Tench			30
	Goldfish			1,970
	Rainbow trout			660
	Yellow perch			120

Fish and fish eggs furnished to States and Territories during fiscal year 1894-95—Cont'd.

State or Territory.	Species.	Eggs.	Fry.	Adults and yearlings.
Illinois	Pike perch		1,000,000	
	Black bass			989
	Rock bass			300
	Crappie			135
Indiana	Carp			130
	Tench			25
	Goldfish			88
	Rainbow trout			2,950
	Lake trout		20,000	
	Pike perch		6,800,000	
	Black bass			100
	Rock bass			1,445
Indian Territory	Carp			290
	Tench			10
Iowa	Carp			740
	Tench			100
	Goldfish			280
	Rainbow trout		5,000	2,950
	Von Behr trout			500
	Brook trout	20,000	20,000	
	Pike perch		3,000,000	
	Rock bass			450
Kansas	Catfish			1,362
	Carp			2,276
	Tench			805
	Goldfish			767
	Rainbow trout		4,000	6,050
	Yellow perch			275
	Pike perch			217
	Black bass			5,844
	Rock bass			3,575
	Warmouth bass			56
	Sunfish			170
	Crappie			2,219
Kentucky	Catfish			150
	Carp			660
	Tench			80
	Goldfish			58
	Rainbow trout			1,000
	Yellow perch			225
	Pike perch		3,000,000	
	Black bass			777
	Rock bass			200
	Warmouth bass			452
Louisiana	Carp			220
	Tench			50
	Goldfish			254
Maine	Carp			60
	Goldfish			16
	Atlantic salmon			186,241
	Landlocked salmon			101,856
	Loch Leven trout			12,512
	Rainbow trout		350	
	Von Behr trout			2,614
	Brook trout			600
Maryland	Carp			1,179
	Tench			175
	Goldfish			479
	Shad	852,000	18,073,000	
	Rainbow trout	200	8,000	7,800
	Black bass			721
	Rock bass			400
Massachusetts	Carp			518
	Goldfish			43
	Shad		200,000	
	Von Behr trout			700
	Brook trout			600
	Lake trout	100,000		1,600
	Black bass			200
	Rock bass			300
	Cod	2,897,000	57,318,000	
	Flatfish		5,940,000	
	Lobster		72,253,000	
Michigan	Carp			620
	Goldfish			1,012
	Steelhead trout		105,000	
	Rainbow trout		12,000	1,800
	Von Behr trout		10,000	800
	Brook trout		35,000	5,440
	Lake trout		3,124,500	
	Whitefish		32,250,000	

Fish and fish eggs furnished to States and Territories during fiscal year 1894-95—Cont'd.

State or Territory.	Species.	Eggs.	Fry.	Adults and yearlings.
Michigan	Pike perch		3,700,000	
Minnesota	Catfish			50
	Carp			700
	Goldfish			206
	Steelhead trout		5,000	
	Rainbow trout		6,000	2,700
	Brook trout	20,000		
	Lake trout		1,375,000	
	Yellow perch			50
	Pike perch		4,000,000	
	Black bass			75
	Rock bass			250
	Crappie			75
Mississippi	Carp			639
	Tench			690
	Goldfish			88
	Rainbow trout			900
	Black bass			100
	Rock bass			1,150
Missouri	Catfish			2,840
	Carp			1,885
	Tench			1,995
	Goldfish			2,739
	Rainbow trout	23,500	10,000	23,070
	Yellow perch			50
	Black bass			1,278
	Rock bass			5,800
	Warmouth bass			110
	Crappie			1,005
Montana	Carp			1,105
	Brook trout			3,000
Nebraska	Carp			460
	Tench			206
	Goldfish			91
	Golden ide			6
	Rainbow trout			2,500
	Von Behr trout			1,000
	Brook trout			1,950
	Lake trout	50,000		
Nevada	Rainbow trout	29,500		
New Hampshire	Carp			150
	Goldfish			6
	Landlocked salmon			1,000
	Rainbow trout	95,500		
	Brook trout			400
	Black bass			100
New Jersey	Carp			210
	Tench			1,600
	Goldfish			66
	Shad	321,000	9,911,000	
	Rainbow trout			5,000
	Brook trout			2,500
	Black bass			425
New Mexico	Catfish			57
	Carp			1,249
	Tench			300
	Brook trout			3,150
	Yellow perch			175
	Black bass			775
	Rock bass			250
	Crappie			125
New York	Carp			880
	Goldfish			93
	Golden tench			15
	Golden ide			4
	Shad		5,800,000	
	Atlantic salmon	20,000		
	Landlocked salmon			19,824
	Rainbow trout			3,410
	Von Behr trout			1,400
	Brook trout			800
	Lake trout	1,550,000		
	Whitefish	5,000,000		
	Pike perch	5,000,000		
	Black bass			614
North Carolina	Carp			3,230
	Tench			1,553
	Goldfish			215
	Shad		2,069,000	
	Rainbow trout			13,340
	Black bass			680

Fish and fish eggs furnished to States and Territories during fiscal year 1894-95—Cont'd.

State or Territory.	Species.	Eggs.	Fry.	Adults and yearlings.
North Carolina	Rock bass			2,900
North Dakota	Catfish			400
	Carp			315
	Yellow perch			375
	Pike perch			4
	Black bass			2,150
	Rock bass			1,050
Ohio	Catfish			75
	Carp			641
	Tench			880
	Goldfish			1,028
	Rainbow trout			2,000
	Von Behr trout		10,000	600
	Brook trout		26,000	.....
	Lake trout		447,500	.....
	Whitefish		79,198,000	.....
	Yellow perch			100
	Pike perch	25,000,000	190,680,000	.....
	Lake herring	9,852,000	600,000	.....
	Black bass			357
	Rock bass			5,615
	Crappie			36
Oklahoma	Catfish			50
	Carp			1,810
	Tench			360
	Rainbow trout			300
	Yellow perch			100
	Black bass			150
	Rock bass			800
	Warmouth bass			50
	Crappie			25
Oregon	Quinnat salmon	23,000		.....
	Brook trout			1,600
Pennsylvania	Carp			780
	Tench			330
	Goldfish			511
	Golden tench			20
	Shad		2,358,000	.....
	Rainbow trout	2,000		26,679
	Black bass			508
	Rock bass			5,235
Rhode Island	Goldfish			31
	Von Behr trout			475
	Brook trout			400
South Carolina	Carp			426
	Tench			1,299
	Goldfish			178
	Shad		2,362,000	.....
	Black bass			648
	Rock bass			1,400
South Dakota	Catfish			275
	Carp			522
	Brook trout			5,700
	Goldfish			12
	Yellow perch			750
	Pike perch		2,050,000	.....
	Black bass			1,005
	Rock bass			1,900
	Crappie			20
Tennessee	Carp			511
	Catfish			50
	Tench			100
	Goldfish			276
	Rainbow trout			4,663
	Pike perch		4,400,000	.....
	Black bass			600
	Rock bass			1,300
	Crappie			100
Texas	Catfish			450
	Carp			1,477
	Tench			1,480
	Goldfish			168
	Rainbow trout			2,200
	Yellow perch			505
	Pike perch			52
	Black bass			2,390
	Rock bass			2,600
	Warmouth bass			16
	Crappie			172
Utah	Carp			1,394

Fish and fish eggs furnished to States and Territories during fiscal year 1894-95—Cont'd.

State or Territory.	Species.	Eggs.	Fry.	Adults and yearlings.
Utah	Goldfish			124
	Rainbow trout	33,500		
	Brook trout			2,325
	Whitefish		3,000,000	
	Black bass			100
	Crappie			25
Vermont	Carp			90
	Goldfish			500
	Landlocked salmon			2,000
	Steelhead trout		4,000	
	Rainbow trout	52,000		
	Brook trout	25,000		1,400
	Lake trout	300,000		
Virginia	Carp			2,848
	Tench			690
	Goldfish			1,907
	Shad		16,540,000	
	Rainbow trout		5,000	10,832
	Black bass			1,050
	Rock bass			4,276
Washington	Carp			197
	Brook trout			4,976
	Yellow perch			450
	Black bass			500
West Virginia	Carp			120
	Goldfish			80
	Rainbow trout			2,600
Wisconsin	Catfish			300
	Carp			195
	Goldfish			25
	Loch Leven trout	5,000	10,000	
	Rainbow trout		8,000	9,000
	Brook trout		96,000	
	Lake trout		1,330,000	
	Whitefish		6,750,000	
	Pike perch		2,000,000	
	Crappie			300
	Black bass			500
Wyoming	Carp			60
	Rainbow trout	91,000		
	Von Behr trout	5,000		
	Brook trout			10,300
	Black bass			50

Details of distribution, 1894–95.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
Catfish:			
Stourmans Lake near Flagstaff, Ariz			25
Mormon Lake near Flagstaff, Ariz			25
Marshall Lake near Flagstaff, Ariz			25
City reservoir, Prescott, Ariz			25
Clear Creek near Winslow, Ariz			50
Arizona Fish Commission			45
Applicants in Arizona			105
Arkansas			100
California			10
Thorn Creek near Thornton, Ill			25
Channel Lake near Antioch, Ill			100
Cedar Lake near Cedar Lake, Ill			200
Fox River near Elgin, Ill			780
Saline River near Salina, Kans			25
Neosho River near Chanute, Kans			45
Osage River near Ottawa, Kans			20
Marais des Cygnes near Ottawa, Kans			25
Little River near Wellington, Kans			50
Slate River near Wellington, Kans			175
Lake View near Lawrence, Kans			195
Solomon River near Solomon City, Kans			25
Applicants in Kansas			802
Lake Ellerslie near Lexington, Ky			50
Applicants in Kentucky			100
Shetek Lake near Tracy, Minn			50
Benton Parke Lake near Independence, Mo			825
Hickory Creek near Neosho, Mo			1,965
Applicants in Missouri			50
New Mexico			57
Devils Lake near Devils Lake, N. Dak			100
Stump Lake near Michigan, N. Dak			300
Applicants in Ohio			75
Oklahoma			50
Lake Kampeska near Watertown, S. Dak			175
Pickerel Lake near Webster, S. Dak			100
Beaver Creek near Huntington, Tenn			50
Spring Creek near Amorilla, Tex			50
Katy Lake near Hillsboro, Tex			50
Picnic Lake near Sulphur Springs, Tex			75
Lake McDonald near Austin, Tex			100
Saluda Creek near San Antonio, Tex			75
Applicants in Texas			100
Browns Lake near Burlington, Wis			300
Carp:			
Applicants in Alabama			485
Arizona			19
Arkansas			555
Naugatuck River near Torrington, Conn			199
Applicants in Connecticut			286
Delaware			30
Delaware Fish Commission			500
Applicants in District of Columbia			336
Florida			84
Georgia			989
Ogeechee River near Midville, Ga			30
Georgia Fish Commission			1,355
Applicants in Idaho			270
Illinois			210
Indiana			130
Indian Territory			290
Iowa			240
Iowa Fish Commission			500
Applicants in Kansas			2,241
Clark Creek near White City, Kans			35
Kinniconick River near Vanceburg, Ky			60
Applicants in Kentucky			600
Louisiana			220
Maine			60
Maryland			679
Maryland Fish Commission			500
Applicants in Massachusetts			518
Michigan			620
Minnesota Fish Commission			500
Applicants in Minnesota			200
Mississippi			639
Missouri			685
Marais des Cygnes near Katy, Mo			600
Hickory Creek near Amoret, Mo			600
Applicants in Montana			1,105
Nebraska			460
New Hampshire			150

Details of distribution, 1894–95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
Carp—Continued.			
Applicants in New Jersey			210
New Mexico			1,249
New York			880
North Carolina			1,105
Catawba River near Marion, N. C.			2,125
Applicants in North Dakota			315
Ohio			641
Oklahoma			1,810
Pennsylvania			780
South Carolina			426
South Dakota			522
Tennessee			411
Ball Creek near Lone Mountain, Tennessee			100
Applicants in Texas			1,477
Utah			1,294
Utah Fish Commission			100
Applicants in Vermont			90
Virginia			2,408
Tates Run near Wytheville, Va.			440
Applicants in Washington			197
West Virginia			120
Wisconsin			195
Wyoming			60
Tench:			
Applicants in Alabama			80
Arizona			50
Arkansas			30
Colorado			85
District of Columbia			140
Florida			50
Georgia			259
Georgia Fish Commission			400
Applicants in Illinois			30
Indiana			25
Indian Territory			10
Iowa			100
Kansas			705
Kansas Fish Commission			100
Applicants in Kentucky			80
Louisiana			50
Maryland			175
Mississippi			690
Missouri			495
Maramec River near Moselle, Mo			1,500
Applicants in Nebraska			206
Musconetcong River near Washington, N. J			1,600
Applicants in New Mexico			100
Manco Bunco Creek near Raton, N. Mex.			200
Applicants in North Carolina			915
Catawba River near Marion, N. C.			638
Ohio Fish Commission			800
Applicants in Ohio			80
Oklahoma			360
Pennsylvania			330
South Carolina			200
Congaree River near Columbia, S. C			1,000
Applicants in Tennessee			100
Texas			280
Longview Pond near Longview, Tex			1,000
Palestine Club Lake near Palestine, Tex			200
Tates Run near Wytheville, Va.			440
Applicants in Virginia			250
Goldfish:			
Applicants in Alabama			60
Arkansas			181
Colorado			100
Connecticut			24
Delaware			6
Delaware Fish Commission			300
Applicants in District of Columbia			2,136
Florida			144
Georgia			238
Georgia Fish Commission			150
Applicants in Illinois			1,970
Indiana			88
Iowa			80
Iowa Fish Commission			200
Applicants in Kansas			167
Kansas Fish Commission			600
Applicants in Kentucky			58
Massachusetts			43

Details of distribution, 1894–95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
Goldfish—Continued.			
Applicants in Michigan			312
Michigan Fish Commission			700
Applicants in Louisiana			254
Maine			16
Maryland			104
Maryland Fish Commission			375
Applicants in Minnesota			6
Minnesota Fish Commission			200
Applicants in Mississippi			88
Missouri			168
Hickory Creek near Neosho, Mo			2,571
Applicants in Nebraska			91
New Hampshire			6
New Jersey			66
New York			93
North Carolina			215
Ohio			528
Ohio Fish Commission			500
Applicants in Pennsylvania			511
Rhode Island			31
South Carolina			178
South Dakota			12
Tennessee			276
Texas			168
Utah			24
Utah Fish Commission			100
Vermont Fish Commission			500
Applicants in Virginia			442
Tates Run near Wytheville, Va			1,465
Applicants in West Virginia			80
Wisconsin			25
Golden tench:			
Applicants in District of Columbia			16
New York			15
Pennsylvania			20
Golden ide:			
Applicants in Nebraska			6
New York			4
Shad:			
Connecticut Fish Commission		3,800,000	
Indian River near Millsboro, Del		448,000	
Blackbird River near Middletown, Del		480,000	
Smyrna River near Clayton, Del		360,000	
St. Jones Creek near Dover, Del		456,000	
Leipsic River near Felton, Del		600,000	
Murderkill Creek near Ellendale, Del		144,000	
Brandywine River, Wilmington, Del		504,000	
Nanticoke River, Seaford, Del		504,000	
Mispillion Creek near Milford, Del		480,000	
Potomac River, Washington, D. C		4,384,000	1,000,000
Eastern Branch of Potomac River, Washington, D. C		1,811,000	
U. S. F. C. Ponds, Washington, D. C		2,047,000	
Ocmulgee River near Macon, Ga		450,000	
Ogeechee River near Midville, Ga		450,000	
Savannah River, Augusta, Ga		1,121,000	
Patuxent River near Laurel, Md		1,826,000	
Potomac River near Point of Rocks, Md		1,788,000	
Weaverton, Md		454,000	
Washington Junction, Md		1,796,000	
Hancock, Md		366,000	
Patapsco River at Relay Station, Md		1,347,000	
Susquehanna River at Port Deposit, Md		1,368,000	
Garrett Island, Md		621,000	
North East River, Red Bank, Md		1,518,000	
Carpenter Point, Md		320,000	
Chesapeake Bay, Battery Island, Md	852,000	4,543,000	
Spesutia Island, Md		914,000	
Swan Creek near Plum Point, Md		600,000	
Wicomico River near Salisbury, Md		504,000	
Tuckahoe Creek near Queen Anne, Md		504,000	
Chester River near Chestertown, Md		504,000	
Parker Mill Pond near Wareham, Mass		200,000	
Delaware River near Lambertville, N. J		5,985,000	
Frenchtown, N. J		1,045,000	
Milford, N. J		450,000	
Cohansey River near Bridgeton, N. J		1,800,000	
Timber Creek near Gloucester, N. J		651,000	
Delaware River near Gloucester, N. J	321,000		
Callicoon, N. Y		450,000	
Port Jervis, N. Y		450,000	
New York Fish Commission		4,000,000	

Details of distribution, 1894-95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
Shad—Continued.			
Lumber River near Lumberton, N. C.		409,000	
Yadkin River near Salisbury, N. C.		225,000	
Catawba River near Morgantown, N. C.		225,000	
Pasquotank River near Elizabeth City, N. C.		410,000	
Neuse River near Goldsboro, N. C.		400,000	
Rockfish Creek near Wallace, N. C.		400,000	
Delaware River near Delaware Water Gap, Pa.		1,458,000	
Lackawaxen, Pa.		450,000	
Easton, Pa.		450,000	
Ashepoo River near Colleton, S. C.		360,000	
Ashley River near Charleston, S. C.		442,000	
Combahee River near Yemassee, S. C.		360,000	
Peedee River near Peedee, S. C.		400,000	
Santee River near Lanes, S. C.		400,000	
Santee Canal near Moncks Corner, S. C.		400,000	
Cedar Run near Catletts, Va.		1,398,000	
Rapidan River near Rapidan, Va.		1,352,000	
Little River near Taylorsville, Va.		864,000	
Occoquan River near Woodbridge, Va.		2,280,000	
Rappahannock River near Fredericksburg, Va.		1,353,000	
Remington, Va.		448,000	
Otter River near Evington, Va.		461,000	
Rockfish River near Rockfish, Va.		446,000	
Mattaponi River near Milford, Va.		1,355,000	
Meherrin River near Belfield, Va.		907,000	
Tye River near Tye River Station, Va.		465,000	
Stoney Creek near Stoney Creek, Va.		883,000	
Chappawansic Creek near Quantico, Va.		1,829,000	
Nansemond River near Suffolk, Va.		862,000	
Potomac River near Widewater, Va.		366,000	
Chain Bridge, Virginia		820,000	
North Anne River, near Dosmee, Va.		444,000	
Quinnat salmon:			
California Fish Commission	3,526,000		
McCloud River, near Baird, Cal.		500,000	
Tributary of Sandy River, near Troutdale, Oreg.	23,000		
Société d'Acclimatation, Paris, France	150,000		
Silver salmon:			
Redwood Creek in Humboldt County, Cal.			400,000
Trinity River in Humboldt County, Cal.			100,000
Supply Creek in Humboldt County, Cal.		150,000	
Redwood Creek in Humboldt County, Cal.		140,000	
North Fork of Mad River in Humboldt County, Cal.		470,000	
Trinity River in Humboldt County, Cal.		150,000	
Atlantic salmon:			
Tributary Alamoosook Lake near Orland, Me.			65,245
Toddy Pond in Hancock County, Me.			82,998
Heart Pond in Hancock County, Me.			10,519
Narramissic River in Hancock County, Me.			27,479
New York Fish Commission	20,000		
Landlocked salmon:			
Country Club, San Francisco, Cal.	10,000		
California Fish Commission	10,000		
Long Pond in Hancock County, Me.			1,000
Jones Pond in Hancock County, Me.			1,000
Flanders Pond in Hancock County, Me.			1,000
Phillips Pond near Lake House, Me.			2,000
Toddy Pond in Hancock County, Me.			6,000
Green Lake in Hancock County, Me.			35,930
Great Brook in Hancock County, Me.			10,000
Rocky Pond in Hancock County, Me.			2,000
Branch Pond near East Dedham, Me.			4,000
Winkempaugh Brook near East Dedham, Me.			2,000
Hatcase Pond near Holden, Me.			3,000
Varnum Pond near Temple, Me.			600
Clearwater Pond near Industry, Me.			500
Sweets Pond near Temple, Me.			2,000
Blunts Pond near Franklin Roads, Me.			1,000
Ducks Lake near South Springfield, Me.			2,000
Madwaska and Square lakes near Caribou, Me.			7,814
Squaw Pond Lake near Presque Isle, Me.			2,000
Long Pond near Southwest Harbor, Me.			5,000
Moose Lake near Hartland, Me.			5,000
Wight Pond near Penobscot, Me.			2,000
City Reservoir near Belfast, Me.			1,000
Donnells Pond near Franklin, Me.			5,000
Applicants in Maine			12
Blackwater and Green Hill brooks near Dover, N. H.			1,000
Lake Champlain, off Port Henry, Port Douglas, and Westport, N. Y.			9,770
Lake George near Caldwell, N. Y.			10,054

Details of distribution, 1894–95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
Landlocked salmon—Continued.			
Lake Morey near Fairlee, Vt			2,000
Government of Japan	60,000		
Redwood Creek in Humboldt County, Cal		277,500	32,000
Trinity River in Humboldt County, Cal		25,000	300,000
Mad River in Humboldt County, Cal		550,000	
Lake Superior near Isle Royale, Mich		70,000	
Marquette River near Baldwin, Mich		17,500	
Baldwin Creek near Baldwin, Mich		17,500	
Lake Superior near French River, Minn		5,000	
Loch Leven trout:			
Wisconsin Fish Commission	5,000		
Pear Creek in Waupaca County, Wis		2,000	
Caley Creek in Waupaca County, Wis		2,000	
Rasbennans Creek in Waupaca County, Wis		2,000	
Shadow Creek in Waupaca County, Wis		2,000	
Webb Creek in Waupaca County, Wis		2,000	
Lake Creek in Lake County, Colo			795
Applicants in Colorado			75
Onawa Lake near Monson, Me			500
Morancy Pond near Sorrento, Me			1,000
Rowe Pond near Bingham, Me			500
City Reservoir, Belfast, Me			500
Seal Cove Pond near Tremont, Me			1,000
Branch Pond near Ellsworth, Me			250
Winkempaugh Brook near East Dedham, Me			1,750
Floods Pond, Floods Pond, Me			3,000
Spitical Pond near Aurora, Me			4,000
Applicants in Maine			12
Von Behr trout:			
Wyoming Fish Commission	5,000		
Larrabee Creek near Hydesville, Cal		1,000	
Country Club of San Francisco, Cal		3,000	
Mill Creek near Harrisville, Mich		10,000	
Muskingum River in McConnellsville, Ohio		10,000	
Applicants in Arkansas			500
Comstock Brook near Wilton, Conn			200
Cold Spring and brooks near South Norwalk, Conn			410
Brook near Norwalk, Conn			400
Norwalk River near Norwalk, Conn			800
Mink Creek near Wadena, Iowa			500
Branch Pond near Ellsworth, Me			2,000
Applicants in Maine			614
Hadway Pond near Hyannis, Mass			175
Blue Hill River near Randolph, Mass			350
Applicants in Massachusetts			175
Big Black Creek near Muskegon, Mich			800
Nebraska Fish Commission			1,000
Ockerman Brook near Chenango Forks, N. Y			400
Indian Lake near North Creek, N. Y			1,000
Applicants in Ohio			400
Ohio Fish Commission			200
Gould Pond near Georgiaville, R. I			300
Applicants in Rhode Island			175
Black-spotted trout:			
Middle Evergreen Lake near Leadville, Colo			1,475
Rainbow trout:			
J. G. Bailey, Silver Springs, Ark	5,000		
Johns Hopkins University, Baltimore, Md	200		
A. Lanth, St. Louis, Mo	23,500		
Nevada Fish Commission	29,500		
New Hampshire Fish Commission	95,500		
R. G. Harrison, Bryn Mawr, Pa	2,000		
C. E. Tolhurst, Salt Lake City, Utah	12,500		
J. E. Sherlock, Salt Lake City, Utah	21,000		
Vermont Fish Commission	52,000		
Wyoming Fish Commission	64,500		
Wm. E. Carlin, Aurora, Wyo	26,500		
Maj. W. Turner, Bertrix, Belgium	50,000		
Midland Counties Fish-cultural Establishment, Malvern Wells, England	25,000		
Rev. H. B. Wolryche-Whitmore, Bridgenorth, England	25,000		
M. Raveret-Wattel, Fécamp, France	25,000		
Elk River near Eureka, Cal		1,000	
Silver Lake near Ruedi, Colo		10,000	
Lake Loveland near Loveland, Colo		10,000	
Applicants in Colorado		10,000	
Templeton Pond near Riceville, Iowa		5,000	
Applicants in Kansas		4,000	
Great Brook near Green Lake, Me		350	
Stream near Randolph, Md		8,000	
Washington River near Isle Royale, Mich		12,000	

Details of distribution, 1894–95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
Rainbow trout—Continued.			
Otter Creek near Duluth, Minn		6,000	
Spring River near Joplin, Mo		5,000	
Applicants in Missouri		5,000	
Wolf Creek near Burkes Garden, Va		5,000	
Manston Mill Pond, near Manston, Wis		4,000	
Long Creek near Pratt, Wis		4,000	
Cave Spring Pond near Cannon, Ark			500
Park Lake near Sulphur Springs, Ark			2,000
Frog Bayou near Chester, Ark			1,500
Sugar Creek near Brightwater, Ark			1,000
Clear Fork of Illinois River near Johnsons			1,500
West Fork of White River near West Fork			1,000
Brentwood, Ark			1,000
Illinois River near Siloam Springs, Ark			4,000
White River near Harris, Ark			800
Thompson, Ark			800
St. Paul, Ark			800
Spring River near Mammoth Springs, Ark			1,000
Applicants in Arkansas			1,100
Elk River near Eureka, Cal			177
Fish Tang-a-tang Creek on Trinity Mountain, California			200
Summit Lake Creek on Trinity Mountain, California			200
Middle Evergreen Lake in Lake County, Colo			570
Applicants in District of Columbia			20
Georgia			400
Georgia Fish Commission			75
Applicants in Illinois			310
Spring Lake near Mount Summit, Ind			500
Hillsdale Lake near New Castle, Ind			500
Allison Creek near Westville, Ind			500
Poll Run near Warsaw, Ind			450
Artificial Lake near Hartford City, Ind			500
Carroll Creek near Hartford City, Ind			500
Applicants in Illinois			350
Bacon Creek near Lansing, Iowa			750
Silver Stream near Decorah, Iowa			800
Spring Creek near Riceville, Iowa			400
Otter Creek near West Union, Iowa			1,000
Rock Creek near Atchison, Kans			400
Duck Creek near Elk City, Kans			1,000
Higgies Park Pond near Girard, Kans			1,000
Walnut Creek near Great Bend, Kans			300
Lyons Creek near Junction City, Kans			1,000
Zimmerman Pond near Dodge City, Kans			600
Applicants in Kansas			1,750
Sinking Creek near London, Ky			1,000
Big Tree Run near Bentley Springs, Md			500
Indian Spring near Frederick, Md			300
Monocacy River near Frederick, Md. (Junct.)			500
Marsh Run near McHenry, Md			800
Western Run near Glyndon, Md			1,000
Little Gunpowder River near Glencoe, Md			900
Stream near Glyndon, Md			500
Horsey Stream near Hebron, Md			500
Lake Brown near Oakland, Md			400
Stream near Finksburg, Md			500
Savage Stream near Lonaconing, Md			500
Applicants in Maryland			1,400
Beitner Creek near Muskegon, Mich			800
Ellis Brook near Battle Creek, Mich			500
Brandywine Creek near Niles, Mich			500
Eagle Nest Lake near Eagle Nest, Minn			1,200
Chub Brook near Cloquet, Minn			500
Union Creek near Wadena, Mich			1,000
Lake near Booneville, Miss			900
Spring River near Aurora, Mo			1,000
Verona, Mo			500
Williams Creek near West Vernon, Mo			1,000
Grove Creek near Scotland, Mo			1,000
Tributary of Five Mile Creek near Hornet, Mo			250
Lake near Columbia, Mo			1,000
Clinton Spring near Wilson, Mo			1,000
Roubidoux Creek near Waynesville, Mo			1,000
Cowskin River near Lanagan, Mo			4,000
Grove Creek near Webb City, Mo			1,000
Indian Creek near Harmony, Mo			1,000
Lanagan, Mo			1,220
Hickory Creek near Neosho, Mo			1,000
Shoal Creek near Allens Ford, Mo			1,000
Chicopee, Mo			3,000
Applicants in Missouri			4,100

Details of distribution, 1894-95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
Rainbow trout—Continued.			
Nebraska *Fish Commission*			2,000
Spring Brook Ponds near Omaha, Nebr			500
Pequest River near Rocksburg, N. J			1,000
Stream near Far Hills, N. J			1,000
Pohatcong Creek near Washington, N. J			1,000
Adams Pond near Somerville, N. J			500
Artificial lake near Eatontown, N. J			500
Musconetcong River near Changewater, N. J			1,000
Millsbrook Creek near Millbrook, N. Y			400
Oriskany Creek near Waterville, N. Y			550
Bennett Creek near Canisteo, N. Y			412
Tributaries of Unadilla River near West Winfield, N. Y			500
North Creek near North Creek, N. Y			900
Applicants in New York			648
Reims Creek near Asheville, N. C			500
Big Hungary Creek near Baxter, N. C			500
Scott Creek near Beta, N. C			490
Fishers Creek near Addie, N. C			500
Little Hungary Creek near Edneyville, N. C			500
Dicks Creek near Dillsboro, N. C			500
Fisher Creek near Beta, N. C			490
Dills Creek near Beta, N. C			490
Upper Green River near Zirconia, N. C			500
Head of Fisher Creek near Beta, N. C			490
Buck Creek near Marion, N. C			500
Buck Knob Creek near Beta, N. C			490
Little Buck Creek near Marion, N. C			500
Mill Creek near Marion N. C			1,500
Carloogachaye Creek near Franklin, N. C			500
Clear Creek near Edneyville, N. C			500
Carncross Creek near Highlands, N. C			500
Tributaries of Mills River near Hendersonville, N. C			500
Green River near Zirconia, N. C			500
Cane Creek near Asheville, N. C			500
Fisher Creek near Addie, N. C			500
Winchester Creek near Balsam, N. C			490
Broad River near Bat Cave, N. C			500
Bluff Creek near Addie, N. C			500
Roanoke River near Weldon, N. C			400
Rauney Run near Akron, Ohio			500
Rockwell Mill Pond near Bellevue, Ohio			500
Applicants in Ohio			1,000
Walnut Spring Pond near Guthrie, Okla			300
Spring Brook near Pittston, Pa			1,000
Bellman Run near Blossburg, Pa			348
Tioga River near Blossburg, Pa			609
Stoney Creek near Ashland, Pa			300
Little Pine Creek near Mocanaqua, Pa			300
Leona Creek near Troy, Pa			1,000
Letort Spring near Carlisle, Pa			1,300
Morgan Run near Troy, Pa			800
Starrucca Creek near Brandt, Pa			250
Aukney Run near Jenner Cross Roads, Pa			300
Collins Brook near Cherry Ridge, Pa			270
Spring Brook near Wilkesbarre, Pa			400
Mill Creek near Tioga, Pa			330
Deloe's dam near Elk City, Pa			200
Musquito Creek near Williamsport, Pa			500
West Branch of Dyberry Run near Honesdale, Pa			945
Allegheny River near Coudersport, Pa			720
Tub Mill Creek near Latrobe, Pa			300
Cowanesque Creek near Knoxville, Pa			500
Lick Run near Lockhaven, Pa			412
Outlet of Beech Lake near Honesdale, Pa			225
Middle Creek near Honesdale, Pa			180
Hoffman Run near Maytown, Pa			400
Dingman Run near Coudersport, Pa			240
East Creek near Blossburg, Pa			261
East Branch of Lackawaxen River near Seeleysville, Pa			270
Sullivan Run near Mount Pocono, Pa			285
Lackawaxen River near Pleasant Mount, Pa			400
Lake Ida and Shades near Wilkesbarre, Pa			1,000
Rocky Run near Palmyra, Pa			225
Blockhouse near Blossburg, Pa			261
Cedar Run near Wilmore, Pa			500
Hemlock Creek near Brandt, Pa			250
Elk Run near Gaines, Pa			250
Lake near Colmar, Pa			200
Tub Mill Creek, near Johnstown, Pa			500
Taylor Run near Blossburg, Pa			435
Quakake Creek near Doylestown, Pa			300

Details of distribution, 1894–95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
Rainbow trout—Continued.			
Trout Run near Winterstown, Pa			300
Pipes Creek near Wilkesbarre, Pa			400
South Branch near Scranton, Pa			500
Stoney Creek near Shenandoah, Pa			500
Bees Run near Coudersport, Pa			240
Lick Run near Lockhaven, Pa			825
Roaring Brook near Brandt, Pa			250
Spring Meadow near Bedford, Pa			500
Piney Creek near Williamsburg, Pa			500
Boggs Run near North Bend, Pa			412
Stafford Meadow Brook near Scranton, Pa			500
Mill Creek near Coudersport, Pa			240
Stream near Entlerville, Pa			100
Jamison Creek near Sabinsville, Pa			600
Allegheny River near Coudersport, Pa			240
Carpenter Run near Blossburg, Pa			261
Spruce Creek near Tyrone, Pa			500
Outlet of Beech Lake near Berlin, Pa			270
Brandywine Creek near Reading, Pa			375
Applicants in Pennsylvania			1,300
Ball Creek near Lone Mountain, Tenn			383
Piney River near Spring City, Tenn			780
Reservoir near Monterey, Tenn			300
Fountain Spring near Knoxville, Tenn			400
Turkey Creek and Lake near Concord, Tenn			300
South Indian Creek near Johnson City, Tenn			1,600
Mill Creek near Athens, Tenn			400
Stoney Creek near Elizabeth, Tenn			500
Saline Creek near Tyler, Tex			1,000
Cantonment Creek near Mobeetie, Tex			900
Clark Tank near Schulenberg, Tex			300
Wilson Creek near Edgewater, Va			500
Clinch River near Steelburg, Va			200
Mill Creek near Nace, Va			200
Artificial pond near Aldie, Va			100
South Fork of Holston River near Marion, Va			500
Middle Fork of Holston River near Rural Retreat, Va			500
Stream near Rural Retreat, Va			500
White Top Creek near Abingdon, Va			500
Kenilworth Creek near Stephensons, Va			30
Elk Garden Creek near Elk Garden, Va			400
Stoney Creek near Lantz Mills, Va			500
Four Mile Run near Alexandria, Va			500
Big Cedar Creek near Lebanon, Va			500
Duffs Creek near Abingdon, Va			400
Wrights Pond near Winchester, Va			500
Abrams Creek near Winchester, Va			500
Falling Creek near Christianburg, Va			500
Crab Creek near Christianburg, Va			500
Stony Run near Harrisonburg, Va			500
Roaring Run near Craig City, Va			500
Burton Creek near Lynchburg, Va			500
Sandy River near Danville, Va			475
Tates Run near Wytheville, Va			927
Applicants in Virginia			900
Beaver Pond Creek near Bluefield, W. Va			500
Gauley River near Camden-on-Gauley, W. Va			1,000
West Fork Monongahela River near Weston, W. Va			1,100
Lake Osceola near Osceola Mills, Wis			900
Brook trout:			
John G. Bailey, Silver Springs, Ark	5,000		
Iowa Fish Commission	20,000		
Minnesota Fish Commission	20,000		
Fish and Game Club, Brattleboro, Vt	25,000		
North Fork of St. Vrain River near Denver, Colo		10,000	
North Fork of Platte River near Estabrook, Colo		10,000	
Upper Lake Creek near Twin Lakes, Colo		35,000	
Lake Lenore near Ouray, Colo		10,000	
Derrys Lake in Lake County, Colo		10,000	
Naylor Lake near Georgetown, Colo		10,000	
Boulder Creek and tributaries, Colo		19,500	
West Fork of South Platte River near Webster, Colo		40,000	
South Platte, Colo		40,000	
Jenny Lind Creek near Central City, Colo		10,000	
Mammoth Building near Central City, Colo		10,000	
Applicants in Colorado		25,000	
Spring Creek near Osage, Iowa		5,000	
Canoe Creek near Decorah, Iowa		10,000	
Clear and Van Cooley Creeks near Lansing, Iowa		5,000	
Cranberry Creek near Muskegon, Mich		2,500	
Gordon Creek near Muskegon, Mich		2,500	

Details of distribution, 1894–95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
Brook trout—Continued.			
Silver Creek and Pine River near Au Sable, Mich		5,000	
Fleming and Walting Creeks near Ypsilanti, Mich		5,000	
Bear, Dowd, Sand, and Townline Creeks near Allegan, Mich		5,000	
Stream near Kalamazoo, Mich		5,000	
Chamberlain Stream near Schoolcraft, Mich		5,000	
Wright Creek near Schoolcraft, Mich		5,000	
Rockwell Springs near Clyde, Ohio		10,000	
Macocheek Creek near West Liberty, Ohio		7,000	
Ranney Run near Hudson, Ohio		7,000	
Applicants in Ohio		2,000	
Pike River near Amberg, Wis		8,000	
McEldawney Creek near West Salem, Wis		5,000	
Garvin Creek near Elroy, Wis		5,000	
Kawan Creek near Elroy, Wis		5,000	
Crawfish River near Columbus, Wis		5,000	
Big Wausaukee River near Wausaukee, Wis		5,000	
Riders Creek near Manston, Wis		5,000	
Fountain, Brewer, and Little Lemonwier Creeks near New Lisbon, Wis		8,000	
Iron River near Marinette, Wis		10,000	
Tributaries of Brule River near Marinette, Wis		5,000	
Iron River near Marinette, Wis		5,000	
South Branch of Pike River, Wis		5,000	
Big Plover River near Stevens Point, Wis		20,000	
Spring Creek near Turtle Lake, Wis		5,000	
Cataract River near Williams, Ariz			1,075
Applicants in Arizona			150
North Fork of St. Vrain River near Lyons, Colo			750
Platte River near Meadows, Colo			2,500
Baileys, Colo			1,000
Estabrook, Colo			1,500
Cliff, Colo			1,500
Pine Grove, Colo			2,375
Dawson, Colo			2,000
Grant, Colo			1,500
Elk Creek and Eagle River near Red Cliff, Colo			1,200
Texas Creeks near West Cliff, Colo			375
Valley View Lakes near Leadville, Colo			1,500
Box Creek in Lake County, Colo			500
Unova Lake in Lake County, Colo			1,500
Crystal Lakes near Malta, Colo			500
Diamond Lakes near Leadville, Colo			1,000
Deer Creek near Bailey, Colo			750
Lake Creek in Lake County, Colo			1,500
Los Pinos Creeks near Los Pinos, Colo			2,250
Twin Lakes in Lake County, Colo			1,500
Lake near Farnham, Colo			400
Upper Evergreen Lake in Lake County, Colo			1,400
Rio Grande River near Wagonwheel Gap, Colo			3,750
Applicants in Colorado			3,900
Brook near Norwalk, Conn			300
Lockwood Creek near Norwalk, Conn			300
Farmington River near Litchfield, Conn			400
Little and Big Jacks Brook near Litchfield, Conn			300
Lake Wampenaw near New Canaan, Conn			300
Cold Spring Brook near North Wilton, Conn			300
Saugatuck stream near Saugatuck, Conn			200
Comstock Brook near Wilton, Conn			300
Doles Brook near Arrington, Me			200
Cathance stream near Topsham, Me			400
Brook near North Plymouth, Mass			400
Applicants in Massachusetts			200
Macon Creek near Macon, Mich			940
Branch of Tobacco River near Farwell, Mich			1,125
Baldwin Creek near Baldwin, Mich			1,125
Bowman Creek near Wingleton, Mich			1,125
Sweetwater Creek near Branch, Mich			1,125
Beartooth Lake near Red Lodge, Mont			1,500
Little Rocky Creek near Townsend, Mont			750
Tributaries of Lump Gulch near Helena, Mont			750
Long Pine Creek near South Bend, Nebr			1,500
Spring Brook near Omaha, Nebr			450
Trout Brook near Claremont, N. H			400
Staatz Spring in Somerset County, N. J			2,500
Brook and Gallinas River near East Las Vegas, N. Mex			1,500
San Jose River near Laguna, N. Mex			750
Chicarrica Creek near Raton, N. Mex			750
Applicants in New Mexico			150
Streams on Long Island near Bay Shore, N. Y			400
Willay, McMaster, and Kerschere brooks near Sherburne, N. Y			400
South Fork of Umatilla River near Gibbons, Oreg			800

Details of distribution, 1894–95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
Brook trout—Continued.			
Tributary of Dead Point Stream near Hood River, Oreg.			800
Cold Spring Brook near Westerly, R. I.			200
Bedford Blim Brook near Westerly, R. I.			200
White Clay Creek near Pine Ridge, S. Dak.			1,500
French Creek near Custer, S. Dak.			750
Spearfish Creek near Spearfish, S. Dak.			1,500
Higgins Gulch Creek near Spearfish, S. Dak.			750
Lime Creek near Rapid City, S. Dak.			750
Applicants in South Dakota			450
Miller Creek near Price, Utah			375
Utah Lake in Salt Lake County, Utah			1,800
Applicants in Utah			150
Vermont Fish Commission			400
Ottaquechee River near Proctor, Vt.			1,000
Twin Lake near Olga, Wash.			375
Mountain Lake near Olga, Wash.			750
Kelly Lake near Sumner, Wash.			750
Lake Hooker near Leland, Wash.			750
Cranberry Creek near Shelton, Wash.			1,150
Johns Lake near Shelton, Wash.			1,150
Lake Washington near Lowell, Wash.			51
Lake tributary to Platte River near Glenrock, Wyo.			375
Beaver Creek near New Castle, Wyo.			3,050
Clear Creek in Johnson County, Wyo.			762
Powder River in Johnson County, Wyo.			762
North Fork of Powder River in Johnson County, Wyo.			763
Red River in Johnson County, Wyo.			763
Big Goose Creek in Johnson County, Wyo.			1,537
Wolf Creek in Johnson County, Wyo.			1,538
Applicants in Wyoming			750
Lake trout:			
California Fish Commission	100,000		
Massachusetts Fish Commission	100,000		
Nebraska Fish Commission	50,000		
Adirondack League Club, in Herkimer County, N. Y.	50,000		
New York Fish Commission	1,500,000		
Vermont Fish Commission	300,000		
Diamond Lake near Ligonier, Ind.		20,000	
Lake Huron off North Point, Mich.		19,500	
Thunder Bay, Mich		200,000	
East Tawas, Mich		200,000	
Alpena, Mich		195,000	
Straits of Mackinac near Mackinaw City, Mich.		200,000	
Crooked Lake in Clare County, Mich.		30,000	
Eight Point Lake near Harrison, Mich.		20,000	
Star Lake near Baldwin, Mich.		30,000	
Budd Lake near Baldwin, Mich.		20,000	
Lake Michigan near Charlevoix, Mich.		200,000	
Manistique, Mich.		195,000	
Frankfort, Mich.		200,000	
Gogebic Lake near Gogebic, Mich.		40,000	
Lake Superior near Isle Royale, Mich.		1,250,000	
Washington Harbor, Mich.		225,000	
Lake Superior off Little Boat Harbor, Mich.		100,000	
Lake Superior near Grand Marais, Minn.		300,000	
Grand Portage, Minn.		300,000	
Duluth, Minn.		125,000	
Two Harbors, Minn.		100,000	
Chicago Bay, Minn.		200,000	
Burntside Lake near Ely, Minn.		75,000	
Eagle Nest Lake near Mesaba, Minn.		25,000	
Trout Lake near Tower, Minn.		100,000	
French River near Duluth, Minn.		50,000	
Beaver Bay near Two Harbors, Minn.		100,000	
Lake Erie near Put-in-Bay, Ohio		447,500	
Thousand Island Lake near State Line, Wis.		10,000	
Pelican Lake near Pelican Lake, Wis.		5,000	
Moose Lake near Antigo, Wis.		5,000	
Sand and Pokegimac Lakes near Lac du Flambeau, Wis.		5,000	
Manston Mill Pond near Manston, Wis.		5,000	
Lake Superior off Rice Island, Wis.		150,000	
Willeys, Wis		150,000	
Sand Island near Bayfield, Wis.		275,000	
Magdalena Island near Bayfield, Wis.		250,000	
Basswood Island near Bayfield, Wis.		125,000	
Oak Island near Bayfield, Wis.		125,000	
Raspberry Bay near Bayfield, Wis.		225,000	
Monponsett Lake near Halifax, Mass.			320
Nine Mile Pond near Centerville, Mass.			320
Applicants in Massachusetts			960
Whitefish:			
California Fish Commission	25,000		
New York Fish Commission	5,000,000		

Details of distribution, 1894–95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
Whitefish—Continued.			
Midland Counties Fish-cultural Establishment, Malvern Wells, England	25,000		
Whitefish Lake near Corinne, Mich.		2,000,000	
Lake Michigan near Charlevoix, Mich.		2,000,000	
Manistique, Mich		2,000,000	
Epoufette, Mich.		2,000,000	
Frankfort, Mich.		2,000,000	
Lake Huron near North Point, Mich		5,500,000	
Alpena, Mich		2,000,000	
Miller Point, Mich.		2,000,000	
Detour Passage, Mich.		2,000,000	
Sturgeon Point, Mich.		2,000,000	
East Tawas, Mich		2,000,000	
Lake Superior near Isle Royale, Mich		2,000,000	
Duluth, Minn		259,000	
Mackinac Straits near Mackinaw City, Mich.		2,000,000	
Siskowit Bay, Isle Royale, Mich.		2,000,000	
Hubbard Lake near Ossineke, Mich.		500,000	
Lake Erie off Green Island Reef, Ohio		2,350,000	
Peach Point Reef, Ohio.		20,948,000	
West Sister Island, Ohio		2,600,000	
North Bass Island Reef, Ohio.		18,620,000	
Ballast Island Reef, Ohio.		11,270,000	
Moore Point Reef, Ohio.		1,600,000	
Cone Reef, Ohio		5,400,000	
Rattlesnake Island Reef, Ohio.		3,000,000	
Kelley Island Reef, Ohio.		3,000,000	
Port Clinton, Ohio.		2,000,000	
Sterne Island, Ohio		5,050,000	
Niagara Reef, Ohio		3,360,000	
Utah Lake near Geneva, Utah		2,000,000	
Lake Superior near Bayfield, Wis		2,250,000	
Iron River, Wis.		2,250,000	
Raspberry Bay near Bayfield, Wis.		2,250,000	
Lake herring:			
Lake Erie off Peach Point Reef, Ohio	9,852,000	600,000	
White bass:			
California Fish Commission			12
Yellow perch:			
Applicants in Arizona			25
Stevens Lake near Cucharas, Colo.			100
Fox River near Elgin, Ill.			20
Vermilion River near Danville, Ill.			100
Kansas Fish Commission			25
Little River near Wichita, Kans.			50
Cow Creek near Hutchinson, Kans			75
Applicants in Kansas			125
Walnut Lake near Wells, Minn			25
Lake Ellerslie near Lexington, Ky			125
Applicants in Kentucky			100
Shetek Lake near Tracy, Minn.			50
Spring Lake near Bolivar, Mo.			25
Applicants in Missouri			25
Cherry Valley Lake near Las Vegas, N. Mex.			50
Applicants in New Mexico			125
Devils Lake near Devils Lake, N. Dak.			100
Stump Lake near Michigan, N. Dak.			275
Park Lake, Cincinnati, Ohio			40
Applicants in Ohio			60
Oklahoma			100
Lake Kampeska near Watertown, S. Dak.			600
Pickerel Lake near Webster, S. Dak.			100
Cochran Lake near Gary, S. Dak.			50
Picnic Lake near Sulphur Springs, Tex.			25
Lake McDonald near Austin, Tex.			100
Saluda Creek near San Antonio, Tex.			50
Thorne Lake near Longview, Tex.			255
Applicants in Texas			75
South Palouse River near Guy, Wash.			200
Loon Lake near Tacoma, Wash.			50
Lake St. Clair near Tacoma, Wash.			100
Silver Lake near Castle Rock, Wash.			100
Pike perch:			
New York Fish Commission	5,000,000		
Ohio Fish Commission	25,000,000		
Illinois Central Railroad Reservoir, Vandalia, Ill.		1,000,000	
East Fork of Whitewater River near Richmond, Ind.		1,200,000	
Loon Lake near Columbus City, Ind.		1,500,000	
Lost River, Patoka River, and Lick Creek near Paoli, Ind.		1,000,000	
Huntingburg Waterworks near Huntingburg, Ind.		000,000	
Spring Lake near La Porte, Ind.		1,500,000	
Applicants in Indiana		1,000,000	
Turkey River near West Union, Iowa		1,000,000	

Details of distribution, 1894–95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
Pike perch—Continued.			
Spirit Lake, Spirit Lake, Iowa		2,000,000	
Cedar River near Cedar Rapids, Iowa		1,000,000	
North Fork Kentucky River near St. Helens, Ky		1,000,000	
Lake Ellerslie near Lexington, Ky		1,000,000	
Clear Lake near Shelbyville, Ky		1,000,000	
Ludlow Lagoon near Ludlow, Ky		600,000	
Prospect Lake near Prospect Lake, Mich		2,000,000	
Whitmore Lake near Whitmore Lake, Mich		1,500,000	
North Branch of River Rough near Northville, Mich		200,000	
Bear Lake and Hanging Horns Lake near Barnum, Minn		1,000,000	
Chub Lake near Carlton, Minn		2,000,000	
Lake Vermillion near Tower, Minn		2,000,000	
Black Pond near Akron, Ohio		1,000,000	
Phalanx Pond near Leavittsburg, Ohio		1,500,000	
Olentangy Stream near Cardington, Ohio		1,500,000	
Tuscarawas River near Zoar, Ohio		1,000,000	
Lake Erie off Ballast Island Reef, Ohio		38,980,000	
Middle Bass Island Reef, Ohio		11,200,000	
Rattlesnake Island Reef, Ohio		15,400,000	
North Bass Island Reef, Ohio		36,800,000	
Green Island Reef, Ohio		25,760,000	
Port Clinton Reef, Ohio		30,240,000	
Put-in-Bay Reef, Ohio		6,500,000	
Maumee Bay near Toledo, Ohio		20,800,000	
Lake Hendrick near Brookings, S. Dak		1,000,000	
Wall Lake near Sioux Falls, S. Dak		1,000,000	
Pigeon River near Henderson Springs, Tenn		1,000,000	
Holston River near Burems Store, Tenn		400,000	
Tennessee River, Sweetwater and Pond Creeks in Loudon County, Tenn		1,000,000	
Coalhulla Creek near Cleveland, Tenn		1,000,000	
Clinch and Powells River near Russellville, Tenn		1,000,000	
Lake near State Line, Wis		1,000,000	
Lemonweir River near Manston, Wis		1,000,000	
Lake View near Lawrence, Kans			217
Devils Lake near Devils Lake, N. Dak			4
Lake McDonald near Austin, Tex			52
Black bass:			
Jackson Lake near Montgomery, Ala			50
Street Lake near Montgomery, Ala			50
Houston Pretty Pond near Selma, Ala			70
Blackwell Lake near Selma, Ala			120
Cypress Creek near Florence, Ala			100
Applicants in Alabama			70
Clear Creek near Winslow, Ariz			100
Arizona Fish Commission			100
Applicants in Arizona			25
Ouachita River near Malvern, Ark			100
Maysville Fish Pond near Bentonville, Ark			25
St. Francis River at crossing of St. Louis, Iron Mountain and Southern Railroad, St. Francis, Ark			100
Spring Lake near Mammoth Springs, Ark			100
Applicants in Arkansas			400
Buena Vista Lake near Bakersfield, Cal			50
California Fish Commission			2,500
Reservoir near San Diego, Cal			50
Elsinore Lake near Elsinore, Cal			50
Lake San Cristoval near Lake City, Colo			200
Lake near Fort Collins, Colo			50
Rocky Ford, Colo			100
Colorado Fish Commission			100
Applicants in Colorado			197
Lake Whitney near Whitneyville, Conn			100
Saltonstall Lake near East Haven, Conn			100
Applicants in Connecticut			100
Delaware and Chesapeake Canal near Delaware City, Del			100
Delaware Fish Commission			100
Rock Creek in Rock Creek Park, D. C			363
Texas Valley Creek near Rome, Ga			100
Applicants in Georgia			227
Channel Creek near Antioch, Ill			300
Thorn Creek near Thornton, Ill			25
Vermilion River near Danville, Ill			100
Cedar Lake near Lake Villa Station, Ill			400
Fox River near Elgin, Ill			64
Applicants in Illinois			100
Grand Calumet River near Miller, Ind			100
Big Blue River near Blue Rapids, Kans			75
Little Beaver Creek near Atwood, Kans			100
Cow Creek near Hutchinson, Kans			100
Parker Pond near Atchison, Kans			25
Slate Creek near Wellington, Kans			125
Woods Run near Wellington, Kans			25

Details of distribution, 1894–95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
Black bass—Continued.			
Pawnee Creek near Great Bend, Kans			100
Saline and Smoky Hill rivers near Salina, Kans			800
Saline River near Beverly, Kans			200
Lincoln Center, Kans			1,200
Solomon River near Beloit, Kans			600
Lake Chanute near Olathe, Kans			100
Pleasure Lake near Salina, Kans			100
Tributary of Blue River near Blue Rapids, Kans			50
Neosho River near Chanute, Kans			20
Osage River (Marais des Cygnes) near Ottawa, Kans			30
Lake View near Lawrence, Kans			1,224
Lyon Creek near Junction City, Kans			100
Tributary of Smoky Hill River near Wilson, Kans			100
Mulberry Creek near Ford City, Kans			35
Applicants in Kansas			735
North Elkhorn Creek near Georgetown, Ky			100
Lake near Covington, Ky			100
Lake Ellerslie near Lexington, Ky			125
Green River near Liberty, Ky			200
Applicants in Kentucky			252
Louisiana			200
Lake near Halpin, Md			100
Winters Dam near Westminster, Md			100
Potomac River near Woodmont, Md			100
Chesapeake and Ohio Canal above Great Falls, Md			91
Applicants in Maryland			130
Nine Mile Lake near Springfield, Mass			100
Leverett Pond near Leverett, Mass			100
Walnut Lake near Wells, Minn			20
Shetek Lake near Tracy, Minn			55
Booneville Fish Lake near Booneville, Miss			100
Lake near Centralia, Mo			50
Spring Lake near Bolivar, Mo			25
Creek near Hornet, Mo			100
Crystal Lake near Marshall, Mo			150
Snodgrass Lake near Webb City, Mo			548
Applicants in Missouri			405
Waterworks Pond near Hanover, N. H			100
Good Interest Pond near Blackwood, N. J			125
Pohateong Lake near Tuckerton, N. J			100
Applicants in New Jersey			200
Una de Gato River near Raton, N. Mex			100
Lake near Maxwell, N. Mex			250
Mangas Lake near Silver City, N Mex			50
Cherry Valley Lake near Las Vegas, N. Mex			25
Applicants in New Mexico			350
Stony Point Creek near Stony Point, N. Y			100
Schroon Lake near Taylors on Schroon, N. Y			100
Applicants in New York			414
Ararat River near Mount Airy, N. C			55
Tributary of Ararat River near Mount Airy, N. C			55
Ponders Branch near Grover, N. C			50
Lake Lucila near Reidsville, N. C			55
Applicants in North Carolina			465
Devils Lake near Devils Lake, N. Dak			200
Stump Lake near Michigan, N. Dak			1,650
Hankinson Lake near Hankinson, N. Dak			200
Fish Lake near Bottineau, N. Dak			100
Little Miami River near Loveland, Ohio			75
Stone Lake near North Bend, Ohio			25
Applicants in Ohio			257
Carizo Creek near Mineral City, Okla			50
Applicants in Oklahoma Territory			100
Krieder Dam near Annville, Pa			200
Quittapahilla Creek near Annville, Pa			100
Waterworks Pond near Annville, Pa			100
Conodoquinette Creek near Carlisle, Pa			48
Lakemont Lake near Altoona, Pa			100
Applicants in Pennsylvania			50
Arm of swamp near Grahamville, S. C			100
Goose Creek near Otranto, S. C			198
Little River near Seneca, S. C			100
Applicants in South Carolina			250
Oakwood Lake near Brookings, S. Dak			100
Pickerel Lake near Webster, S. Dak			100
Lake Cochran near Gary, S. Dak			50
Lake Kampeska near Watertown, S. Dak			665
Applicants in South Dakota			150
Tributary of Cumberland River in Putnam County, Tenn			100
Sulphur Fork Creek near Cedar Hill, Tenn			100
Nolechucky River near Johnson City, Tenn			100
Beaver Creek near Huntingdon, Tenn			200
Applicants in Tennessee			100

Details of distribution, 1894–95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
Black bass—Continued.			
Salado Creek near San Antonio, Tex			40
Lake Creek near San Antonio, Tex			60
Spring Creek near Amorilla, Tex			100
Lake near Hillsboro, Tex			200
Nebo Lake near Blooming Grove, Tex			25
Lake McDonald near Austin, Tex			100
Picnic Lake near Sulphur Springs, Tex			25
Housley Lake near Housley, Tex			50
Hit Lake near Tyler, Tex			150
Lake Park near Tyler, Tex			150
Roebuck Lake in Lamar County, Tex			50
Applicants in Texas			1,440
Utah Lake in Salt Lake County, Utah			100
Catoctin Creek near Waterford, Va			100
Lakeside Park near Marion, Va			100
Headwaters Johnymore Run near Clifton, Va			50
James River near Buchanan, Va			100
Joy Creek near Lynchburg, Va			100
Blackwater River near Heckman, Va			100
City Reservoir, Petersburg, Va			100
Smith River near Martinsville, Va			100
Applicants in Virginia			300
Browns Lake near Burlington, Wis			500
Applicants in Wyoming			60
Crappie:			
Applicants in Arizona			100
California Fish Commission		50,000	.....
Stevens Lake near Cucharas, Colo			25
Thorn Creek near Thornton, Ill			25
Vermilion River near Danville, Ill			50
Fox River near Elgin, Ill			60
Cow Creek near Hutchinson, Kans			25
Slate Creek near Wellington, Kans			125
Woods Run near Wellington, Kans			25
Saline and Smoky Hill Rivers near Salina, Kans			100
Solomon River near Beloit, Kans			85
Saline River near Lincoln Center, Kans			127
Hickory Head Ponds near Brazilton, Kans			100
Neosho River near Chanute, Kans			250
Waterworks Lake near Garnett, Kans			200
Osage River near Ottawa, Kans			225
Marais des Cygnes near Ottawa, Kans			225
Lake View near Lawrence, Kans			363
Lyon Creek near Junction City, Kans			50
Applicants in Kansas			319
Walnut Lake near Wells, Minn			25
Shetek Lake near Tracy, Minn			50
Benton Park Lakes near Independence, Mo			880
Applicants in Missouri			125
Una de Gato River near Raton, N. Mex			50
Conquilla Creek near Clayton, N. Mex			25
Applicants in New Mexico			50
Stone Lake near North Bend, Ohio			36
Applicants in Oklahoma			25
Lake Cochrane near Gary, S. Dak			26
Dyer Lake near Huntingdon, Tenn			100
Pollock Creek near San Antonio, Tex			45
Lake McDonald near Austin, Tex			25
Applicants in Texas			132
Utah Lake in Salt Lake County, Utah			25
Browns Lake near Burlington, Wis			300
Warmouth bass:			
Stevens Lake near Cucharas, Colo			25
Hickory Head Ponds near Brazilton, Kans			10
Osage River near Ottawa, Kans			6
Applicants in Kansas			40
Lake Ellerslie near Lexington, Ky			152
White Oak Creek near Junction City, Ky			125
Applicants in Kentucky			175
Benton Park Lakes near Independence, Mo			85
Applicants in Missouri			25
Oklahoma			50
Texas			16
Rock bass:			
Mattox Pond near Clanton, Ala			260
Choccolocco Pond near Choccolocco, Ala			400
Mormon Lake near Flagstaff, Ariz			1,250
Marshall Lake near Flagstaff, Ariz			250
Applicants in Arizona			500
Silver Springs Fish Farm, Silver Springs, Ark			500
Three Elms River near Russellville, Ark			500
Applicants in Arkansas			1,525
Rock Creek in Rock Creek Park, D. C			590

Details of distribution, 1894-95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
Rock bass—Continued.			
Texas Valley Creek near Rome, Ga			300
Applicants in Georgia			1,148
Echo Lake near Moline, Ill			300
Applicants in Indiana			700
Lake Kurtz near Riley, Ind			500
Springdale Lake near Cayuga, Ind			245
Applicants in Iowa			250
Cedar River near Cedar Rapids, Iowa			200
South Branch of Little River near Wichita, Kans			500
Mill Creek near Maple Hill, Kans			250
Cow Creek near Hutchinson, Kans			250
Dry Creek near Salina, Kans			300
Applicants in Kansas			2,275
North Elkhorn Creek near Georgetown, Ky			100
Applicants in Kentucky			100
Benastico Creek near Weverton, Md			200
Patapsco River near Westminster, Md			200
Lake Cochituate near Natick, Mass			300
Walnut Lake near Wells, Minn			250
Lake near Booneville, Miss			500
Applicants in Mississippi			650
Lake near Osceola, Mo			200
Fordland Pond in Webster County, Mo			1,300
Cedar Gap Pond near Cedar Gap, Mo			2,000
Mountain Grove Pond near Mountain Grove, Mo			1,700
Applicants in Missouri			600
New Mexico			250
North Carolina			2,900
Stump Lake near Michigan, N. Dak			450
Hankinson Lake near Hankinson, N. Dak			600
Mineral Lake near Middlefield, Ohio			165
McMahon Creek near Lewis Mill, Ohio			400
Mahoning River near Leavittsburg, Ohio			300
Ohio Fish Commission			3,900
Applicants in Ohio			850
Brush Creek near Guthrie, Okla			200
Applicants in Oklahoma			600
Lake Grinnell near Bethlehem, Pa			300
Wissahickon Creek near Chestnut Hill, Pa			300
Conodoquit Creek near Kimberton, Pa			2,500
Whites Lake near Yardley, Pa			300
Brandywine Creek in Berks County, Pa			1,535
Applicants in Pennsylvania			300
Goose Creek near Otranto, S. C			500
Applicants in South Carolina			900
Lake Kampeska near Watertown, S. Dak			500
James River near Huron, S. Dak			500
Lake View near Chattanooga, Tenn			200
Nolachucky River near Erwin, Tenn			200
Applicants in Tennessee			900
Spring Lake near Weatherford, Tex			300
Oil Mill Lake near Marlin, Tex			250
Applicants in Texas			2,050
Holston River near Marion, Va			200
Hatshead Creek near Church Road, Va			200
Miller's Mill Pond near Rice Depot, Va			300
Smith River near Martinsville, Va			300
Lafferty Lake near Crozet, Va			300
Applicants in Virginia			2,976
Sunfish:			
California Fish Commission			12
Elsinore Lake near Elsinore, Cal			18
Balsa Chico River near Westminster, Cal			18
Solomon River near Solomon City, Kans			100
Lake View near Lawrence, Kans			10
Applicants in Kansas			60
Cod:			
Vineyard Sound off Massachusetts coast	2,897,000	39,735,000	
Buzzards Bay off Massachusetts coast		4,654,000	
Boston Bay off Massachusetts coast		12,929,000	
Flatfish:			
Buzzards Bay off Massachusetts coast		670,000	
Vineyard Sound off Massachusetts coast		5,270,000	
Lobster:			
Vineyard Sound off Massachusetts coast		67,725,000	
Buzzards Bay off Massachusetts coast		3,875,000	
Magnolia Harbor off Massachusetts coast		100,000	
Boston Bay off Massachusetts coast		553,000	
Total	55,408,200	561,894,350	2,613,302

NOTE.—9,500 hybrids of Von Behr trout and landlocked salmon fry were hatched and distributed as an experiment, but not being a distinct species are not included in any of the tables.

REPORT UPON THE INQUIRY RESPECTING FOOD-FISHES AND THE FISHING-GROUNDS.

By RICHARD RATHBUN, *Assistant in charge.*

FUR-SEAL INVESTIGATIONS.

In the last annual report a brief outline was presented of the inquiries conducted by this Government, immediately preceding and subsequent to the Paris Tribunal of Arbitration, relative to the natural history of the fur-seal and the industry to which it gives rise in the North Pacific Ocean and Bering Sea, and also of the part taken by the Fish Commission in connection therewith. By act of Congress approved March 3, 1893, the Fish Commissioner was instructed to have examinations made annually respecting the condition of the rookeries on the Pribilof Islands, the same to be carried out under the direction of the Secretary of the Treasury, to whom the results are to be submitted, and he was also charged with the further investigation of the pelagic habits and life-history of the seals. The former of these subjects, although requiring a prolonged series of observations during each season, does not present any serious obstacles in the way of execution, but the study of the latter is rendered exceedingly difficult on account of the wide pelagic distribution of the seals through a large part of the year, their extensive migrations and rapid movements, and their well-known timidity at sea, especially in the presence of a steamer. Nevertheless, much important information of this character has been obtained both by direct observation and by the inspection of the catch made by sealing vessels.

As it has been found inexpedient to attempt the killing of seals from the steamer *Albatross*, and the examination of a large number of fresh specimens was considered advisable, Mr. A. B. Alexander, the fishery expert of that steamer, was detailed to accompany one of the pelagic sealers in Bering Sea during the open part of the season of 1894. Accommodations were furnished to him on board the schooner *Louis Olsen*, of Astoria, Oreg., through the courtesy of her master, Captain Guillams, thus affording an excellent opportunity for making accurate observations regarding the proportion of each sex obtained by the sealers in the open waters of Bering Sea, the condition of the females so taken as to nursing and pregnancy, the nature of the food, etc. These observations were further supplemented in the fall by the custom-house inspections at United States ports as the vessels returned with their

cargoes, both Mr. Townsend and Mr. Alexander taking part in that examination, and by their familiarity with the structure of the seals insuring greater precision in the results.

The customary examination of the rookeries on St. Paul and St. George islands, including the delineation of their outlines and the photographing of characteristic areas, was made between July 12 and August 1, 1894, by Mr. C. H. Townsend, naturalist of the *Albatross*, assisted by Mr. N. B. Miller in the photographic work. Mr. Townsend and Mr. Miller again visited these islands between September 9 and 13, for the purpose of ascertaining the extent of mortality among the seal pups, caused by the destruction of the females in connection with pelagic sealing, and succeeded in obtaining a very fair count of the loss by that means.

In planning for the sealing investigations during the season of 1895, arrangements were made for much more extensive operations than had previously been undertaken in any one year, and before the close of the fiscal year the work was well under way. Besides the regular annual examination of the rookeries by Mr. Townsend and the detailing of Mr. Alexander to a second cruise on board one of the pelagic sealers, two additional series of inquiries have been provided for, one on the Pribilof Islands, the other on the Commander Islands. These are designed especially to cover the natural history of the seals as exemplified under the conditions now existing, with the object of affording the means for comparison with the results of earlier researches, and of establishing more clearly the relations of the different practices connected with their killing, both on land and at sea, to the depletion of the seal herds.

To carry on these special investigations it was fortunately possible to secure the services of two accomplished and experienced naturalists, Mr. F. W. True and Mr. Leonhard Stejneger, the former curator of mammals, the latter of reptiles, in the United States National Museum. Mr. True was assigned to the Pribilof Islands and took with him as assistant Mr. D. Webster Prentiss, jr., also detailed by the National Museum.

They proceeded with the *Albatross* from Port Townsend to Alaska in June, 1895, being landed upon the Pribilof Islands in the latter part of the month. Mr. Stejneger had had a previous acquaintance with the Commander Islands, where he was stationed during eighteen months in 1882–83, under the auspices of the Smithsonian Institution, and in the course of his observations at that time he paid considerable attention to the habits of the fur-seals, as well as to the condition of the rookeries. He is, therefore, especially well qualified to pass upon the changes which have taken place during the past twelve years, covering the entire period of extensive pelagic sealing; and the study of this problem has therefore been assigned to him. The accomplishment of this part of the investigation has been rendered possible through the courtesy of the Russian Government, which not only granted permission for Mr. Stejneger to reside upon the islands and make the

necessary observations, but also signified its hearty indorsement of the objects of his visit. Mr. Stejneger left San Francisco June 6, 1895, on the Alaska Commercial Company's steamer *Bertha*, for Unalaska, where he joined the *Albatross*, and was taken thence to the Commander Islands, stopping for a few days en route to examine the rookeries of the Pribilof Islands.

OPERATIONS OF THE ALBATROSS IN THE NORTH PACIFIC OCEAN AND BERING SEA.

During the summer of 1894, as in the previous year, the steamer *Albatross*, Lieut. Commander F. J. Drake, U. S. N., commanding, was again serving in connection with the sealing patrol fleet in the North Pacific Ocean and Bering Sea, under the direction of the Secretary of the Navy. Her movements were therefore subject to the orders of the senior naval officer in charge, but, so far as the exigencies of this special detail permitted, the customary inquiries respecting the Alaskan fishing-grounds and the pelagic habits of the fur-seal were to be carried on, and complete instructions covering those subjects were issued to the commanding officer. The annual examination of the rookeries of the Pribilof Islands also devolved upon the naturalist of the *Albatross*, whose observations in that regard are elsewhere referred to.

On May 17, 1894, in company with the flagship of the fleet, the U. S. S. *Mohican*, the *Albatross* left Port Townsend, Wash., and proceeded to Unalaska, going thence to Attu Island, at the western end of the Aleutian chain, for the purpose of conveying Lieutenant Jacobs, U. S. R. M., to that place, which had been selected as the point of registry for the fur-seal vessels entering Bering Sea from the Asiatic side. On the return trip an outlook was kept for sealing schooners among the passes of the Aleutian Islands, and stops were made at the islands of Agattu, Kyska, and Atka, the fishing-grounds in their vicinity being hastily examined. The regular patrolling work in Bering Sea was taken up before the close of June, 1894, and was continued until after the middle of September, being interrupted only by visits to Unalaska for coal and to the Pribilof Islands in connection with the rookery investigations, and by a trip to the region of the Sannak Islands. In the course of the season the cruising-ground of the *Albatross* was extended practically to all sides of the seal islands, both outside and inside of the protected zone of 60 miles radius.

The first part of July Shaw Bay, on the north side of Unimak Island, and Akutan Bay were visited. On the 12th of the same month Mr. C. H. Townsend and Mr. N. B. Miller were landed on the Pribilof Islands to begin the photographing and delineation of the rookeries, and the steamer proceeded thence to the southern entrance to Isanotski Strait, between Unimak Island and the mainland, in order to intercept any sealing vessels that might attempt a passage through. After remaining there and at Morzhovoi village several days she joined with the U. S. S. *Petrel* in an examination of the anchorages about the Sannak

Islands to which small vessels resort, and also did some sounding work between those islands and the mainland. The latter part of July Mr. A. B. Alexander, fishery expert of the *Albatross*, was detailed to the sealing schooner *Louis Olsen*, of Astoria, Oreg., to enable him to make more complete observations relative to the fur-seal at sea than were possible from the steamer. He remained with the schooner during her entire cruise, and went with her to Victoria, B. C., where he subsequently rejoined the *Albatross*.

Early in August, while tracing the limit of seal movements to the northwestward of St. Paul Island, in the direction of Cape Nazarin, on the Siberian coast, a line of soundings was run out into the deep water beyond the 100-fathom curve, which developed an elevation or submarine ridge of proportionally great height above the surrounding bottom, but the examination was too limited in extent to show its relations with the platform. The region is a favorite feeding-ground for seals, and Lieutenant-Commander Drake believes that the ridge has more or less influence upon the currents bordering the platform, possibly affecting the presence and abundance of pelagic life. Only a comparatively small number of fishing trials by hand lines were made during this season, but the shore fisheries were studied and collections made by seining at all places visited by the steamer. Many important hydrographic results, both at sea and along the coast (the latter relating to the shore line, harbors, etc.), were accomplished.

The *Albatross* left Unalaska on September 20, and proceeded by way of Sitka and Port Townsend to the Mare Island navy-yard, where she arrived on October 17. A brief stop was made in the Puget Sound region in order to obtain information from the recently returned sealing vessels respecting the extent and character of their catch and their experiences during the past season. Mr. Townsend and Mr. Alexander were also left in this region, where they remained for several weeks, continuing the investigation of the local sea and salmon fisheries which had previously been taken up.

The control of the *Albatross* was relinquished by the Secretary of the Navy on October 20, soon after which extensive repairs to the hull and fittings were begun; they were not finally completed until the middle of May, 1895. During this interval two examinations of Willapa Bay, Washington, were made by Mr. Townsend and Mr. Miller, respectively. The former visited the bay in the fall of 1894, for the purpose of determining the best location for making a plant of eastern oysters. The latter was there in March, 1895, and made a general study of the bottom and of the density and temperature of the water with reference to oyster-culture.

The work of the *Albatross* for the summer of 1895 was planned upon a different basis from that of the previous two years, although her cruising ground was to be essentially the same. Instead of being attached to the patrol fleet, the steamer was given an independent status, under the direction of the Commissioner, in order that the several lines of

inquiry which more properly belonged to her might be carried on with less interruption. The commanding officer, however, was duly commissioned to board and inspect any pelagic sealers which he might encounter, so as to afford the means of securing the important character of information only to be obtained in that way. Besides serving for the transportation of the several persons detailed to conduct the special researches relative to the fur-seal on the Pribilof and Commander islands, as elsewhere explained, the work laid out provided for the same character of observations as heretofore. The hydrographic features of Bering Sea, both on the eastern platform and in the deeper waters, were to be studied with reference to their bearing upon the different fishery and sealing problems. The pelagic sealing investigations were to be made the principal feature of the cruise, and fishing trials were to be conducted whenever the vessel was on suitable ground for that purpose. Arrangements were also made to have Mr. Alexander join one of the larger sealing schooners during the open season for hunting in the sea, in order that he might confirm and extend his observations of the previous season.

Leaving San Francisco on May 18, 1895, the *Albatross* proceeded to Victoria, B. C., and Port Townsend, Wash., where several days were spent in gathering information respecting the spring seal-fishery and the intention of the hunters relative to summer fishing in Bering Sea. She was joined at Port Townsend by Mr. True and Mr. Prentiss, bound for the Pribilof Islands. On June 15 the vessel reached Unalaska, where Mr. Stejneger reported on board for transportation to the Commander Islands. St. Paul Island was visited on June 24 for the purpose of landing Messrs. True, Prentiss, and Miller, and on the 26th of that month the *Albatross* started for the Asiatic side, running a line of soundings westward along the parallel of 56° N. from longitude 177° 30′ W., to which point her hydrographic surveys had previously been carried. This work was still under way at the close of the fiscal year, but enough progress had been made to show the comparatively uniform level of the bottom across this part of the Bering Sea basin, the depths ranging only from 2,056 to 2,105 fathoms, and the bottom consisting of brown mud and ooze.

During the fiscal year 1894–95 the *Albatross* was at sea 112 days and steamed 13,181 miles.

JOINT INVESTIGATION OF FISHERIES IN WATERS CONTIGUOUS TO CANADA AND THE UNITED STATES.

The investigation of the fisheries in the waters contiguous to Canada and the United States, undertaken in accordance with the provisions of the joint agreement of December 6, 1892, between this country and Great Britain, was continued during the summer, fall, and spring months and related chiefly to the chain of the Great Lakes and Lake of the Woods, and to the mackerel fisheries. The two representatives, Dr. William Wakeham, on the part of Great Britain, and Mr. Richard

Rathbun, on the part of the United States, visited all of the waters examined and gave their personal attention to the different problems arising in connection with each of them. The study of the Great Lake system was first taken up by them in the fall of 1893, at which time the inquiries were restricted to the upper part of the St. Lawrence River and the Canadian shores of Lake Ontario and Lake Erie. The work was resumed in June, 1894, when the examination of the United States waters was begun, a large force being organized for this purpose in order to complete the task in as short a time as possible.

The statistical inquiries were prosecuted by the Division of Statistics under the direction of Dr. Hugh M. Smith, the assistant in charge, while the investigation of the fishes and fishing methods was carried on by several special parties, as follows:

Lakes Ontario, Champlain, and Memphremagog, and the upper St. Lawrence River, by B. W. Evermann and R. R. Gurley, of the Fish Commission, assisted by Barton A. Bean, of the United States National Museum, and R. H. Hinckley, of Bowdoin College.

Lake Erie and Lake St. Clair by H. F. Moore, of the University of Pennsylvania; B. L. Hardin, of the Fish Commission, and Cloud, Rutter, of Stanford University.

Lake Huron by J. T. Scovell and D. C. Ridgely, of Indiana.

Lake Superior and Lake of the Woods by Dr. Wakeham, Mr. Rathbun, and A. J. Woolman and U. O. Cox, of Minnesota.

The examinations along the Canadian shores of Lake Superior and Lake Huron, including Georgian Bay, were made by the representatives themselves, having the use of the Canadian fishery cruiser *Petrel* in the last-mentioned waters. They also held conferences with the fishermen at all the important fishery centers along the chain of lakes except on Lake Michigan, which was omitted from their inquiries as not forming a part of the boundary system.

The investigations made in these waters were conducted upon as comprehensive a basis and in as thorough a manner as the time and circumstances permitted. Their object, as explained in previous reports, was to determine the present condition of the fisheries as compared with their condition in the past, the extent and causes of any decrease which had occurred, the necessity for remedial measures, and the regulations best suited to insure the maintenance of the supply of fishes and to provide for its increase where a depletion had taken place. The scope of the work, in view of the short period available for its completion, precluded to a great extent the making of the detailed researches essential to positive conclusions on all points. The testimony of the fishermen had, therefore, to be depended upon in large part, but their statements were carefully weighed in the light of the combined evidence obtained, and much important and accurate information was secured through the direct observations of the field assistants.

The most essential feature of the investigation was the study of the important market fishes in their relation to fishing methods employed

for their capture. This required a knowledge of the distribution of the several species, of their habits and movements, their food, their spawning seasons and places, and of the history of the younger stages. With respect to the apparatus, it was essential to ascertain the character, location, and amount of each kind in use and the conditions under which their operation is effective. The position and extent of all fixed appliances were accurately determined and represented on a series of charts to illustrate graphically their relations at different periods to the bodies of fishes which they intercept, and the distribution by quantity of the movable appliances, the gill nets especially, was worked out, for each season, with as much definiteness as possible. The sizes at which the different fishes reach maturity in relation to the sizes of the mesh in the several kinds of nets by which they are taken, and the extent of capture of immature sizes were also studied, as well as the effects of fishing during the spawning seasons and at other periods when harmful results are claimed to be produced, the effects of polluting agencies, etc.

The relations of the size of mesh in the pound nets to the sizes of the fishes taken by that means was, moreover, made the subject of experiment both in the fall of 1894 and in the spring of 1895, a pound net specially constructed with a different size of mesh on each side being employed for that purpose. During the former period it was fished off Huron, Ohio, in one of the pound-net strings owned by Messrs. Wickham & Co., and during the latter period off the south side of Kelley Island in one of the strings belonging to the Sandusky Fish Company. The net was operated free of charge by both of these firms, and every means was taken by them to insure it a fair trial. Mr. Rutter was in charge during the fall season and Mr. Hardin during the spring.

The mackerel inquiries conducted in part with reference to the requirements of the joint investigation were continued during the summer of 1894 and were again taken up in the spring of 1895, as explained under another head. During May, 1895, the representatives visited the southwestern coast of Nova Scotia for the purpose of investigating the movements and other points in the natural history of the mackerel, as well as the fisheries to which they give rise in that region, no previous observations having been made with respect to that subject there.

During July and August, 1894, a detailed hydrographic survey of the upper tidal part of the St. Croix River, lying between the State of Maine and the Province of New Brunswick, was made by Ensign W. L. Dodd, U. S. N., executive officer of the steamer *Fish Hawk*, assisted by H. A. Ross and W. F. White, of Bowdoin College. The object of this work was to provide the necessary data for determining the extent to which the sawmill refuse from the mills above have affected the river channel since the previous Government surveys, and its consequent influence upon navigation and upon the salmon and other anadromous fishes which resort to those waters.

MACKEREL AND MENHADEN INVESTIGATIONS.

MACKEREL.

The observations made in 1893–94 respecting the natural history of the mackerel and the fisheries to which it gives rise were repeated during the past year in accordance with the same plan and on practically the same basis. The capricious habits of the species, its fluctuating abundance as indicated by the size of catch, its wide distribution and far-reaching movements make it one of the most difficult of all the commercial fishes to study or to comprehend. It is thought, however, that the series of investigations which has been in progress for several years and which is still to be continued will throw much new light upon the practical questions connected with its history, and will aid in determining to what extent, if any, the supply may be affected by the several methods employed for its capture.

At the beginning of the fiscal year the schooner *Grampus*, E. E. Hahn, master, and W. C. Kendall, naturalist, was investigating the offshore mackerel fisheries in the Gulf of Maine, with headquarters at Gloucester, Mass. The latter part of July and the first half of August, 1894, were spent in cruising in the Gulf of St. Lawrence, the season's work terminating at Gloucester the last of August. In the spring of 1895 the *Grampus* was again detailed to the study of this species and continued to be so employed until the end of the fiscal year. The inquiries were of the same character as in previous seasons, being designed to secure as complete a history as possible of the early movements of the mackerel as they approach and work up the coast on the way to their several spawning and summer schooling grounds. The cruise began on April 12. Lewes, Del., was made the headquarters until May 10, when, the body of fish having left southern waters, the *Grampus* proceeded to the region off New York and thence eastward over Georges and Browns banks to the coast of Nova Scotia. Here the schools of fish were closely followed to Cape North, Cape Breton Island, and a short cruise made into the Gulf of St. Lawrence. The schooner returned the last of June to Gloucester, where preparations were made to continue the inquiries during the summer in the Gulf of Maine.

Shore parties were at work at all seasons of the year during which the mackerel were present on the coast. During July and August, 1894, Capt. A. C. Adams and Dr. W. E. Wolhaupter, with the assistance of the steamer *Fish Hawk*, were engaged on the coast of Maine, their investigations extending eastward from Portland as far as Jonesport. All important fishing localities were visited, the nets and catch inspected, and the fishermen interviewed. Subsequently and until late in the fall, Captain Adams was occupied mainly with the study of the fishery from the ports of Gloucester, Boston, and Portland, while Dr. Wolhaupter returned to the southern coast of New England to complete his observations begun there the previous spring. Both of these assistants again took up the field work in April, 1895. Captain Adams's

inquiries during the spring season were restricted to the coast of Massachusetts north of and including the waters about Cape Cod. Dr. Wolhaupter began at Virginia Beach, Va., which is nearly as far south as the mackerel strike the shore, and proceeded thence northward along the coast as far as Cape Cod, visiting in succession nearly all localities where mackerel are taken in shore nets. For a short period in the course of his trip he was stationed in New York City, and then continued to the important spawning region off Rhode Island and southeastern Massachusetts, where most of the month of June was spent.

Mr. B. L. Hardin was detailed, as heretofore, to conduct the customary inquiries at Fulton Market, New York City, his observations being mainly supplemental to those made on board the schooner *Grampus* and designed to complete the records bearing upon the offshore fishery. Every fare landed by the purse-seiners, which were then at work exclusively on the southern grounds, and also all catches marketed there from the shore fisheries were carefully inspected, and all information that could be obtained relating to the capture and condition of the fish, etc., was fully noted. Through the courtesy of Hon. E. G. Blackford, convenient office and laboratory accommodations were provided, and to him as well as to the other prominent fish-dealers of New York Mr. Hardin was indebted for the means of carrying on his work successfully. Mr. Hardin reached New York about the middle of April and continued there until the end of the first week in May, when he was replaced by Dr. Wolhaupter, who remained until the close of that month.

Some of the observations made this year at Fulton Market relative to the spawning season and habits of the mackerel were especially interesting. The first fish received were two individuals caught in shad nets on the coast of North Carolina on April 6 and 8. The first fare brought in from the offshore grounds consisted of 7,700 mackerel taken in a purse seine on April 17, about 65 miles southeast of Cape Henry. They measured from 10 to 17½ inches long. In some of the larger of these fish the reproductive organs were found to be spent, indicating that they had already spawned, and giving an earlier date for the beginning of the spawning season, at least in some years, than had previously been supposed. The location where the spawning had taken place could not, of course, be told, but that it was not situated close to the shore would seem to be shown by the fact that never more than small quantities of mackerel are ever taken so far south in the shore apparatus. In several subsequent purse-seine catches made off the Virginia coast up to the last of April, and even into May, the same conditions were observed, more or less of the fish having apparently spawned, while in others the eggs were approaching maturity, but in no case did the fish seem actually to have been spawning at the time when taken. It should be explained, in this connection, however, that only a relatively small number of the fish from each fare marketed could be obtained for examination, and are the basis for the facts above mentioned.

About May 1 the shore nets on Long Island and along the southern coast of New England began to take their first mackerel, which appeared latest and continued longest at the eastern end. The fish which reached New York from this region were either in spawning condition or nearly ripe.

MENHADEN.

On November 1, 1894, a number of menhaden, which were evidently very nearly in spawning condition, were received at Washington from Cape Charles City, Va., having been captured outside of the capes of Chesapeake Bay. Evidence had previously been obtained pointing quite conclusively to the occurrence of a late fall spawning season for this species in at least part of the area covered by its distribution. These specimens furnished additional testimony to the same effect, and called attention to what seemed an excellent opportunity to secure more definite information on the subject. Dr. W. E. Wolhaupter was accordingly detailed to investigate the matter, and proceeded at once to Cape Charles City, where he was joined by the launch *Petrel*, which was fully equipped to carry on whatever inquiries might be suggested by the circumstances. The work was continued in the lower Chesapeake Bay until near the middle of December and was vigorously prosecuted during all of that time, the examinations covering both shores of the bay and including an inspection of the fish brought in by the menhaden steamers. Subsequently Dr. Wolhaupter's observations were extended to the coast of North Carolina in the neighborhood of Beaufort. Although unsuccessful in obtaining spawning fish or in locating the spawning-grounds at this season, he was able to add many important facts to our knowledge of the habits of the species.

Dr. Wolhaupter is led to conclude that during at least the latter part of October, all of November, and the early part of December no large body of menhaden enters Chesapeake Bay for spawning or other purposes. During more or less of this period, however, large numbers are present on the outer coast between the capes of the Delaware and Cape Lookout, North Carolina, evidently making their way southward. At times, owing to weather conditions, the presence of enemies possibly, and other causes, small quantities may be driven a short distance into the bay, where they are sometimes caught a few miles inside of the capes. A thorough examination, however, of a number of the creeks and rivers emptying into the bay to which the menhaden resort in the spring failed to disclose any, and only a few scattered ones, of relatively small size, were found along the bay shores. All the large specimens seen came from outside the bay and were obtained from the steamers. In the majority of the larger females dissected the ovaries contained large and well-defined eggs, round and free, but opaque. No milt could be secured by ordinary pressure on the body of the males, but the handling of these fish, as a rule, generally caused some milt to ooze out. Most of the fish measuring 10½ inches long seemed nearly ready to spawn, but there was no way of measuring the length of time which

must still elapse before they became actually ripe. Those examined toward the end of the runs were apparently no further developed than those obtained in the beginning, but it might well happen that in passing down the coast the fish of each successive school or body attained practically the same stage of development upon reaching corresponding latitudes. On this point, however, nothing positive can be said.

Dr. Wolhaupter's observations, therefore, although confined to a single season as regards the fall run of fish, would appear to indicate that the large schools of menhaden which pass down the coast during the latter half of the fall, and in which the mature sizes contain nearly ripe eggs and milt, do not enter Chesapeake Bay except as they may be driven in momentarily to a slight extent by outside influences. The fish composing this fall run differ from those taken in the bay in that they are apparently shorter and thicker in build and have a brighter and more silvery look. Of the specimens examined by Dr. Wolhaupter not one contained the peculiar isopod parasite lodged in the mouth, which is so characteristic of the bay schools. This run, moreover, does not resort to the inlets of North Carolina in the neighborhood of Beaufort, and apparently not elsewhere. Does it find its spawning-grounds in the open sea or in more southern rivers and bays?

During the following winter and spring the menhaden inquiries, with special reference to the spawning habits of the species, were continued in the lower Chesapeake Bay by the steamer *Fish Hawk* under the direction of her commanding officer, Lieut. Robert Platt, U. S. N. These investigations were begun on January 19 and terminated on May 1. The west shore of the bay, just below the mouth of the Potomac River, was selected as the principal seat of operations, as the creeks in this vicinity were known to teem with young menhaden during the spring and summer months. During most of the time headquarters were maintained in Cockrell Creek, from which place trips were made to neighboring localities, and occasionally to more distant ones. Fishing was carried on by means of fyke-nets, seines, and gill nets in the inclosed waters, as circumstances permitted, and after the opening of the spring season the trap-net catches of the regular fishermen were inspected daily. The work was greatly interfered with by ice until about March 1, previous to which date but little fishing could be done. The first menhaden secured in the vicinity of Cockrell Creek was a single individual taken in the *Fish Hawk's* seine on March 11. Traps were first set in this region about March 5, but they were not extensively fished until some time later. Two small menhaden were caught by this means on March 23, and about 50 on the 25th. On the 26th the *Fish Hawk* made its first catch in the upper part of any of the creeks, namely, 30 individuals, measuring from $2\frac{1}{2}$ to 5 inches long each. Around Hampton a few small menhaden had been taken in the traps as early as March 8.

About April 9 the menhaden struck in more abundantly between Wicomico and Smith Point, and from this time the trap nets made

larger catches, but they never became very abundant at any time during this month. The *Fish Hawk* continued to take small quantities of the younger sizes, finding them almost exclusively in the upper parts of the creek. Although comparatively large numbers of the adults were examined, no positive evidence was obtained, based upon the condition of their reproductive organs, as to the time at which they spawn. No further light, moreover, was thrown upon the location of their spawning-grounds, but the continued finding of the young fish in the brackish streams adds weight to the supposition expressed in former reports that to some extent at least the species spawns in such situations.

OYSTER INVESTIGATIONS AND EXPERIMENTS.

Willapa Bay, formerly known as Shoalwater Bay, abounds in the native oyster of the Pacific Coast, the *Ostrea lurida*, which has there been cultivated to a greater extent than in any other locality. This bay has been a source of supply of this species for the San Francisco market during many years, dating back to the period before the introduction of the eastern variety in Californian waters, and its principal fishery now consists in the rearing of this mollusk. The primary source of supply consists of the natural deposits from which the oysters are tonged, and, being sorted or culled, the largest are marketed at once and the rest transplanted to suitable bottoms for further growth, requiring from two to three years. In 1895 over 2,000 acres were under cultivation in Willapa Bay, the output in that year having been valued at over $66,000, and the number of persons employed about 350.

It has for some time been the desire of the inhabitants of this region to attempt the introduction and cultivation of the Atlantic Coast species, the belief being strong that Willapa Bay was well adapted to this purpose, as indicated by the richness of its native stock. Large quantities of small eastern oysters or seed oysters have been transported annually across the continent for planting in San Francisco Bay, where they attain a suitable size for the market in the course of three or four years. It has generally been supposed until recently, however, that the eastern stock did not propagate in San Francisco Bay, and the industry has been restricted to the transplanting and growing of the seed. Investigations made within a few years show quite conclusively that this species is capable of reproducing in Californian waters to some extent at least, and that a natural growth has there been taking place for some time, practically unnoticed. One of the principal reasons for the slow progress apparent in this natural increase is probably the limited extent of bottom suitable for the attachment of the spat, although the low temperature of the water, as has always been claimed, as well as other causes, may also have some effect.

The establishment of the fact that the eastern oyster will propagate on at least some parts of the Pacific Coast, leading to the supposition that the formation of self-sustaining beds is a possibility, has greatly stimulated the interest in this mollusk and has led to renewed demands

for practical experiments in that line. During a visit to Willapa Bay in 1893, the Commissioner of Fisheries was much impressed with the advantages which that locality seemed to offer in respect to oyster-culture, and arranged for investigations to determine the most favorable site for making a preliminary planting of the eastern species. This examination was made in October, 1894, by Mr. C. H. Townsend.

Willapa Bay, which indents the southern part of the coast of Washington, is about 25 miles long, with an average width of about 5 miles. It contains extensive shoals and tide flats, but deep channels make navigation possible through most of its extent. There are several tributary streams, none of which are navigable for more than a few miles above their mouths and some not at all. The natural oyster deposits occur along the channels, from the mouth of the Willapa River in the north to the extreme head of the bay in the south, but the cultivated beds are confined to the northern half of the bay. Many places apparently favorable to the experiment were found in different parts of the bay, but the importance of placing the introduced oysters where they could be constantly under surveillance led to the selection of a site in Palux Channel, close by the village of Bay Center. The conditions here seem to be as favorable as in any part of the bay. The channel lies well back of extensive flats, which would have a tendency to increase the summer temperature, which is desirable, and it has a depth of 8 feet at low water, sufficient security against the winter frosts that injure oysters on shallow, transplanted beds. The bottom is firm, and is well supplied with native oysters, while starfishes are reported to be less abundant here than elsewhere. The stingrays, so destructive to oysters in Californian waters, are not found on the coast of Washington, and the placing of a fence of closely driven stakes about the beds, so essential in San Francisco Bay, will not be necessary here. The most uncertainty arises in regard to the question of temperature, and this matter can only be settled by actual experiment in the manner now to be done.

The planting was made in the fall of 1894, under the supervision of Mr. Townsend and with the cooperation of the State fish commissioner of Washington, Mr. James Crawford, a large number of the oystermen of the region being also present. The oysters were shipped from New York City on October 26, making up a carload of 80 barrels, representing the following well-known oyster localities, namely: East River, 13 barrels; Princess Bay, 14 barrels; Newark Bay, 8 barrels (seed oysters); Raritan Bay, 10 barrels (natural growth); Keyport, 23 barrels; Chesapeake Bay, 12 barrels. They were planted seventeen days later, an examination of each barrel as it was opened showing the oysters to be in good condition, only a very small number of dead ones being found. The entire lot was massed in one locality, covering an area of about 3 acres, thereby increasing the chances of fertilization and making it more convenient to keep track of and protect the bed.

Early in the spring of 1895 Mr. N. B. Miller, of the steamer *Albatross*,

was detailed to make an extended series of observations relative to the densities and temperature of the water in different parts of Willapa Bay. This work was begun on March 18 and was continued until April 5. Observations were made hourly in each locality visited, and while the temperature was naturally low in all places, owing to the season of the year, the density generally was found to come within the limits considered favorable to oyster growth. In the channel of Palux River, where the oyster deposit had recently been made, the density ranged from 1.00968 to 1.01746, according to the state of the tide. Ninety of the introduced oysters were tongued up by Mr. Miller, and of these 83 were living, the remainder being empty shells.

In October, 1895, the bed was again inspected by State Commissioner Crawford, who examined a sufficient number of specimens to ascertain that the oysters were doing well and that the general condition of the plant was excellent. A few that were opened were found to be fat and well flavored. It will be advisable to arrange for the placing of a quantity of cultch or spat-collectors in proximity to the bed at the proper season. The legislature of the State of Washington has passed an act for the protection of this oyster bed.

INVESTIGATIONS OF INTERIOR WATERS.

COLUMBIA RIVER BASIN.

The investigations begun in the Columbia River basin in the spring of 1894 by Dr. Charles H. Gilbert and three assistants from Leland Stanford Junior University were continued by the same party during the entire succeeding summer. The primary object of these inquiries, as explained in previous reports, was the study of the life-history of the quinnat and other species of salmon which ascend the Columbia River for spawning purposes, and respecting which more definite information is required in order to provide for the better protection and maintenance of the supply. The salmon were followed in their movements upstream and their location was noted from time to time. The waters examined were the main Columbia River, the Snake River between its mouth and Upper Salmon Falls, and several of the smaller tributaries. Attention was also paid to fishes other than the salmon whenever favorable opportunities occurred, and suitable collections representing all the species observed were preserved for future study.

Dr. Gilbert was obliged to resume his college duties the 1st of September, when the field work was taken up by Prof. B. W. Evermann, of the Fish Commission, assisted by Dr. J. T. Scovell, of Terre Haute, Ind. It was continued into the early part of October. During this period the observations related chiefly to the three following regions: The streams and lakes constituting the headwaters of Salmon River in Idaho, the streams and lakes at headwaters of Payette River in Idaho, and that part of Snake River lying between the Great Shoshone Falls and Huntington, Oreg. Though less than five weeks were given to

this part of the work, a number of new and important facts were discovered respecting the habits of the three principal species of *Salmonidæ* which spawn in these upper waters, namely, the chinook or quinnat salmon (*Oncorhynchus tschawytscha*), the blueback salmon or redfish of Idaho (*Oncorhynchus nerka*), and the steelhead trout or salmon trout (*Salmo gairdneri*). A preliminary report upon the investigations made in Idaho has been published.*

Important spawning-beds of the chinook salmon were found in Salmon River and Alturas Creek near Sawtooth, in Payette River just below Big Payette Lake, and in Snake River at Upper Salmon Falls, while less important ones occur in the different tributaries of Weiser River. It is also believed that large numbers of this species spawn in other parts of Snake River and in other of its tributaries, but the location of such grounds has not been definitely determined. The spawning time of the chinook salmon which ascend to the colder waters was found to be considerably earlier than in the case of those which spawn in the Snake River. In the upper Salmon River it was over by September 12, and in Payette River by September 27, but at Salmon Falls it did not terminate until about November 1. This difference is supposed to depend upon differences in the temperature of the water.

The steelhead trout spawns extensively in the headwaters of Salmon River, Payette River, and Weiser River, and in Snake River, but as its spawning season is in the early spring nothing definite was learned regarding its habits or abundance in the region examined. In September and October it was not found in any of the waters named except the Snake River, in which it was quite common at Weiser during September, and a few were also seen at Upper Salmon Falls.

The most interesting salmon which occurs in Idaho waters is the blueback, known locally as the redfish. It was observed spawning in September in the inlet of Alturas Lake near Sawtooth, and in that of Big Payette Lake. The inhabitants of the region have long been acquainted with these spawning-grounds, but they had never been visited by a naturalist until this year. The examinations were made on September 12 and 13 at the inlets of Alturas and Pettit lakes, and on September 27 at the inlet of Big Payette Lake, and individuals were seen upon the beds on each of those dates. Many dead fish were found at each lake and the spawning season of the species in these places was evidently about over. Nearly all the live fish observed were more or less covered with sores, and their fins were frayed out. It is probable that the redfish which spawn in these waters never return to the sea, and that all die after accomplishing their reproductive functions.

Two forms of the redfish are known to spawn in the inlets of the lakes mentioned. One of these, known as the little redfish, measures 10 to 13 inches long and weighs almost invariably about half a pound apiece. The other is very much larger, being from 20 to 25 inches

* A preliminary report upon salmon investigations in Idaho in 1894, by Barton W. Evermann, Bull. U. S. Fish Comm., xv, for 1895, pp. 253–284.

long and weighing from 3¼ to 6 pounds apiece. Whether two distinct species are here represented or not is an unsettled question. The larger form agrees with the blueback salmon caught in such great numbers in the lower Columbia River, and is doubtless the same fish. Individuals corresponding to the smaller form, however, have never been taken in the lower Columbia, and some maintain that it represents a landlocked variety which does not ascend from the sea. The absence of important structural differences and our present knowledge of the habits of the two forms render doubtful the correctness of this opinion, and further study is required to determine the matter satisfactorily.

The bulk of the fish caught in connection with the extensive fisheries of the lower Columbia River is made up of the three species of salmon above referred to. The important questions which have been raised in respect to their decrease and the necessity for active measures to secure the maintenance of the supply of each have stimulated the comprehensive and detailed observations which have been carried on during the past three years. Substantial progress has been made toward determining the movements of the several forms throughout the basin, their general habits, and times and places of their spawning, information necessary as a firm foundation for legislative action on fish-cultural operations; but the wide extent of this river system precludes the early completion of the work. It is proposed to continue the investigation until more decisive results have been accomplished.

ARKANSAS.

During August, 1894, Prof. Seth E. Meek, of the Arkansas Industrial University, spent a short time in the service of the Fish Commission making a study of the fishes of the St. Francis River, in northeastern Arkansas. This river was remarkably rich in fish life as regards the number, both of species and of individuals. A total of 61 species was obtained, including no fewer than 20 important food varieties. In his report upon the investigation,* Professor Meek states:

> It was a comparatively easy matter, with a collecting seine, to catch pickerel and black bass weighing from 1 to 3 pounds. The water was quite clear, and large gars, buffalo, pickerel, black bass, and sunfishes could be seen in abundance. The usual method of catching black bass (the favorite food-fish) was trolling. The parts of two days I spent on Old River I saw many black bass taken this way. Two men would be out one or two hours and return with a dozen or more black bass weighing from 2 to 5 pounds. In all of my collecting I have never seen another stream that seemed to contain the enormous amount of fish life found in Old and St. Francis rivers.

THE GREAT LAKES.

Extensive investigations were carried on during the season of 1894 throughout the entire chain of the Great Lakes, except Lake Michigan, and also on the Lake of the Woods, as explained in connection with the work of the Joint Fisheries Commission.

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*A list of fishes and mollusks collected in Arkansas and Indian Territory in 1894 by Seth Eugene Meek. Bull. U. S. Fish. Comm., xv, 1895, pp. 341–349.

WOODS HOLE LABORATORY.

The Woods Hole laboratory of the Commission was opened as usual during the summer of 1894 for the prosecution of scientific researches bearing upon the marine animals and plants of the region, and advantage was taken of the excellent facilities there afforded for that purpose by twenty-three investigators, representing thirteen prominent educational institutions. Several of these workers arrived during the latter half of June, but the greater number were present during July and August only, a few, however, remaining into September. Less work was undertaken here this year than last in the direct interest of the Commission, as its scientific assistants, both permanent and temporary, were mostly employed in other places.

The Commissioner made Woods Hole his headquarters during the greater part of the summer, and, as usual, gave much of his time to the scientific problems which were in course of study, aiding and promoting the inquiries by suggestion and by active participation in certain branches of the work. As in 1893, Mr. J. Percy Moore, instructor in biology in the University of Pennsylvania, was in charge of the laboratory, reaching there on June 4 and remaining until September 14. The other naturalists in attendance were the following: Prof. F. H. Herrick, of Adelbert College; Dr. James I. Peck and Mr. N. R. Harrington, of Williams College; Dr. William Patten, Mr. W. A. Redinbaugh, and Mr. Herbert Tetlow, of Dartmouth College; Mr. F. S. Conant, Mr. H. McE. Knower, and Mr. George Lefevre, of Johns Hopkins University; Dr. Charles McClure and Mr. Ulric Dahlgren, of Princeton College; Dr. Jacques Loeb, of the University of Chicago; Dr. Ira van Gieson, of Columbia University; Mr. W. E. Castle, of Harvard University; Dr. W. S. Nickerson, of the University of Colorado; Dr. John A. Ryder and Mr. Philip P. Calvert, of the University of Pennsylvania; Mr. Maurice A. Bigelow and Mr. Edgar A. Bedford, of the Ohio Wesleyan University; Mr. Warren H. Everett, of Hamilton College; Mr. Howard A. Ross and Mr. William Frye White, of Bowdoin College; Dr. W. E. Wolhaupter, of the Fish Commission.

It was hoped that the opportunity would be afforded for the study of the embryology of the mackerel by Mr. Moore, but unfortunately the circumstances did not permit. During June he cooperated with Mr. Vinal N. Edwards and Dr. W. E. Wolhaupter, who were engaged in making observations respecting the habits of the mackerel and the mackerel fisheries in the important breeding region along the southern coast of New England, but the practical failure of the fishermen to obtain fares at the proper season made it impossible for him to secure the material required for his special researches.

During the remainder of the season Mr. Moore was chiefly occupied, under the direction of the Commissioner, in reorganizing the type collection of local marine animals, being assisted at different times by Messrs. Bedford, Ross, and White. This collection has gradually

been brought together, partly as a result of the summer investigations during many years past, and partly through the active exertions of Mr. V. N. Edwards, whose collecting work at all seasons during a long period has been productive of many important discoveries and has furnished a practically complete history of the fishes of the region. The series is most perfect as regards the fishes, but it also contains a very large representation of the groups of invertebrates, illustrating the fauna of both the littoral zone and of the adjacent deeper waters.

The collection is especially valuable to the investigators studying at Woods Hole, who are thereby enabled to identify, with little trouble, the material on which they are at work, and as the basis of a local check list it must prove of great assistance. One of the small rooms on the second floor of the building has all along been assigned to the purposes of a museum, but the limited space, as well as the open board shelving provided, have not been adequate to the safe-keeping and appropriate display of the specimens. At the close of the World's Columbian Exposition, a number of substantial and ornamental cases used there were transported to Woods Hole, and those have afforded the means for the new arrangement consummated during the summer of 1894. They have been placed in the north hall on the main floor, where there is ample space and where they can conveniently be reached by the public. It is proposed to make up the desiderata in the collection as opportunities occur. The marine aquaria have also been rearranged in an artistic manner in a room adjacent to the above, where they will better serve the purpose of both the student and the general visitor.

Experiments were also carried on under Mr. Moore's direction in the use of the new preservative, formalin, which is now attracting much attention, and the most satisfactory results were obtained. It was found to be admirably suited to the preparation both of museum specimens and of those intended for future study, whether of delicate organization, like the polyps, or of more hardy texture, like the fishes. The contraction and distortion is much less than with alcohol; the specimens retain a strikingly life-like appearance and the colors are preserved to a considerable extent.

Dr. James I. Peck, assistant professor of biology in Williams College, continued for the Commission his interesting observations on the food of marine fishes, begun in 1893, with the menhaden as his subject. These consisted, in part, of the determination of the stomach contents of specimens of several of the important fishes and in part of plankton studies. The fishes examined were the squeteague, bluefish, sea bass, scup, and tautog, which exhibit considerable differences in feeding habit, although all are carnivorous. Of the squeteague, 570 individuals were opened, much more than in the case of any of the other species. The character and quantity of each kind of food were accurately determined, and the resulting tables are of great interest. The studies were carried much further, however, in the direction of tracing back the food of fishes, through successive stages, to its primary basis, leading to the

more novel of Dr. Peck's inquiries. In the report upon the results of his work this season he explains, as follows, the purpose and general plan of his observations on the fundamental food elements contained in the coastal waters:*

In order to contribute toward a knowledge of the quality, quantity, life-history, and conditions of environment of this primary food supply, consisting of Protozoa, Protophyta, free-swimming larvæ, and the like, many observations were made during the earlier part of the summer of 1894 with respect to the surface water in the larger harbor at Woods Hole, where collections of the organisms were systematically obtained from measured quantities of the water at different times of the day and tide, and under different conditions of temperature. Likewise, by means of the steamer *Fish Hawk*, which was provided with suitable apparatus for the purpose, I was enabled to collect many samples from the waters of Buzzards Bay, not only at the surface, but also at mid-depth and at the bottom. A definite section was laid out across the bay and another running longitudinally through the same body of water some distance out to sea. These lines of section were divided into equal intervals with definite stations established, in order that a rigid system of representative localities might be followed, by a study of which a knowledge of the bay as a whole might be increased.

After describing briefly the variety, nature, and habits of the microscopic plants and animals occurring under these conditions, Dr. Peck proceeds to discuss the details of his investigation, which consisted chiefly in determining quantitatively the relations of the more prominent groups of these pelagic organisms at different levels and at different times of the tide and day along the two sections in Buzzards Bay above referred to. At the several stations at the time of each observation samples were taken from the surface, mid-depth, and bottom—from the two latter by means of hose operated by the vessel's pump, which permitted of the rapid collecting of any quantity desired under the most favorable conditions. The solid organic contents of each of these samples, which measured 5 liters apiece, was isolated by filtration through a bed of fine-washed sand resting on a screen at the lower end of the stem of a large glass funnel. The examinations under the microscope were made in a graduated cell prepared especially for the purpose, which insured the same amount of material being contained in each sample.

The object of these investigations, of which the work accomplished during the season of 1894 is to be considered only as the initiatory step in what it is hoped will be a long-continued series, is to determine the quantity of available "pasturage" or primitive food-supply in any given region, under the varying conditions of seasons, temperature, salinity, etc., as establishing the relative value of its waters for originating, so to speak, and for maintaining a stock of fishery products. Both Mr. Conant and Mr. Harrington rendered assistance to Dr. Peck in connection with his inquiries.

Dr. Herrick continued his researches on the American lobster, and, before the close of the year, had nearly completed the important mono-

*The Sources of Marine Food, by James I. Peck, assistant professor of biology in Williams College. Bull. U. S. Fish Comm., xv, for 1895, pp. 351-368, plates 64-71.

graph on this subject which he has had in preparation for some time. The rest of the investigators were occupied with special studies of their own selection, some of which have a more or less direct bearing upon fishery topics, and in course of time will undoubtedly be found useful in arriving at practical deductions.

Mr. Vinal N. Edwards, the permanent collector of the Fish Commission at Woods Hole, kept up during the entire year his customary daily observations on the fishes of the region and on the temperature of the water. During the summer he also assisted in obtaining material required for the laboratory.

The steamer *Fish Hawk*, Lieut. Robert Platt, U. S. N., commanding, was at Woods Hole from August 25 to October 2, and during that period was utilized mainly in running the lines of observing stations in connection with the investigations of Dr. James I. Peck on the food of fishes. During the week preceding her arrival at Woods Hole she was placed by the Commissioner at the service of the biological section of the American Association for the Advancement of Science, which was then meeting at Brooklyn, N. Y., and made two dredging trips from that point.

TEMPERATURE OBSERVATIONS.

The Fish Commission has continued to receive, through the courtesy of the Light-House Board and of the Southern Pacific Company, the daily records of water-temperature observations taken at the following seacoast and inland stations:

Temperature stations on the Atlantic Coast.

Stations of the Light-House Board:
- Coast of Maine: Petit Manan Island, Mount Desert Rock, Matinicus Rock, Seguin Island, Boon Island.
- Coast of Massachusetts: Race Point, Pollock Rip light-ship, Great Round Shoal light-ship, Nantucket New South Shoal light-ship, Vineyard Sound light-ship.
- Coast of Rhode Island: Brenton Reef light-ship, Block Island southeast light.
- Long Island Sound: Bartlett Reef light-ship.
- Coast of New Jersey: Absecon Inlet, Five Fathom Bank light-ship.
- Delaware Bay: Fourteen Foot Bank light-ship.
- Coast of Virginia: Winter Quarter Shoal light-ship.
- Chesapeake Bay: Windmill Point, Stingray Point, York Spit.
- Coast of North Carolina: Cape Lookout, Frying Pan Shoal light-ship.
- Coast of South Carolina: Rattlesnake Shoal light-ship, Martins Industry Shoal light-ship.
- Coast of Florida: Fowey Rocks, Carysfort Reef, Dry Tortugas.

Temperature stations on the Pacific Slope.

Stations of the Southern Pacific Company:
- Sacramento River at Tehama and Yolo bridges and Knight's Landing, California.
- Feather River at Feather River Bridge, California.
- American River at American River Bridge, California.
- Mokelumne River at Lodi, Cal.
- Tuolumne River at Modesto, Cal.
- San Joaquin River at the upper and lower railroad crossings.
- King River at Kingsburg, Cal.
- Colorado River at Yuma, Ariz.

REPORT OF THE DIVISION OF STATISTICS AND METHODS OF THE FISHERIES.

By HUGH M. SMITH, *Assistant in Charge.*

The work accomplished by the office and field forces of the Division of Statistics and Methods of the Fisheries during the year ending June 30, 1895, is outlined in the accompanying report. The subjects noticed are the general field investigations, certain special inquiries, reports issued, and a number of minor topics.

The available field force consisted of five regular agents and three office assistants who were detailed for field duty. In the special inquiry on the menhaden industry two temporary aids were employed for several months.

The regular appropriation for carrying on the field inquiries and other work of the division was $3,500. This sum was supplemented by an allotment of $110.02 from the general appropriation of the Commission. The cost of the field investigations was $3,243.50; salaries of temporary assistants aggregated $207, and incidental expenses amounted to $159.52.

THE GREAT LAKES.

In my previous report reference was made to the inauguration of a canvass of the fishing industry of the Great Lakes. The completion of this investigation was the principal field work carried on by the division during the year. Six agents were at one time or another employed in the field. The canvass was brought to a close in November. The assignment of agents to the various lakes was as follows: W. A. Wilcox and T. M. Cogswell to Lake Superior; Ansley Hall and C. H. Stevenson to Lake Michigan; W. A. Wilcox, T. M. Cogswell, and C. H. Stevenson to Lake Huron; W. A. Wilcox and T. M. Cogswell to Lake St. Clair, St. Clair and Detroit rivers; E. E. Race and Ansley Hall to Lake Erie; W. A. Wilcox and C. E. Ingersoll to Lake Ontario and St. Lawrence River.

The inquiries related primarily to the calendar year 1893, for which detailed statistics were obtained; but much information was also secured regarding the condition of the industry in the years intervening between the two investigations. The returns submitted by the field agents have been compiled, and the following data show the general results of the canvass.

EXTENT OF GREAT LAKES FISHERIES IN 1893.

The fishing industry of this region, as shown by the inquiries of this division, in 1893 gave employment to 10,180 persons, of whom 1,156 were engaged on vessels, 7,465 in shore and boat fishing, and 1,559 in various other capacities.

The aggregate investment in fishing property was $5,899,270. This represented 197 vessels, 3,853 boats, 104,988 gill nets, 3,743 pound and trap nets, 2,449 fyke nets, and 117 seines. The value of the vessels was $855,729; of boats, $299,041; of gill nets, $670,572; of pound and trap nets, $802,078; of fyke nets, $43,668; of seines, $10,735; other apparatus, $17,492. The shore and accessory property connected with the industry was worth $2,087,455; the cash capital was $1,112,500.

The catch amounted to 96,619,671 pounds of fish, having a first value of $2,270,618. The quantity and value of the yield of the principal species were as follows: Lake herring, 35,740,916 pounds, $536,238; other whitefishes, 10,327,093 pounds, $393,511; lake trout, 16,279,953 pounds, $603,789; sturgeon, 1,426,584 pounds, $50,438; pike and pike perch, 14,943,948 pounds, $410,103; yellow perch, 8,641,311 pounds, $130,970; suckers, 5,224,663 pounds, $58,607; black bass, 215,031 pounds, $12,395; catfish, 1,063,134 pounds, $31,525; carp, 659,347 pounds, $16,980.

The condition of the industry in each lake is given with some detail in the accompanying series of tables. Lake Michigan is shown to have had the most extensive fisheries in 1893; in the items of persons employed, value of apparatus and number of boats used, and value of catch, it surpassed any other lake; in the yield of whitefish, trout, yellow perch, and several other fish this lake holds the first rank. Lake Erie, which heretofore had ranked first in all major particulars, still precedes Lake Michigan in the total amount of capital invested and quantity of products taken; the catch of lake herring, black bass, carp, catfish, wall-eyed pike, saugers, and sturgeon is larger than any other lake. Lake Huron has the third position in the matter of fishing population and quantity and value of products, but is led by Lake Superior in investment. More suckers are taken in Huron than elsewhere, and in the yield of trout and catfish it has second place. The order of rank of the other lakes is Superior, St. Clair (and tributaries), and Ontario.

Table showing by lakes the number of persons employed in the fisheries of the Great Lakes in 1893.

How employed.	Superior.	Michigan.	Huron.	St. Clair.	Erie.	Ontario.	Total.
On vessels fishing	64	421	74	8	406	.....	1,063
On vessels transporting	26	15	8	.....	38	6	93
In shore fisheries	663	2,901	757	454	2,469	221	7,465
On shore, in fish-houses, etc	133	591	105	67	649	14	1,559
Total	916	3,928	944	529	3,622	241	10,180

Table showing by lakes the apparatus and capital employed in the fisheries of the Great Lakes in 1893.

Items.	Superior.		Michigan.		Huron.		St. Clair.	
	No.	Value.	No.	Value.	No.	Value.	No.	Value.
Vessels fishing	13	$64,530	73	$273,970	11	$54,150	1	$7,000
Tonnage	300.13	.....	1,331.09	.....	193.43	.....	11.23	.....
Outfit	.....	15,502	.....	49,044	.....	14,259	.....	2,645
Vessels transporting	3	40,500	5	9,400	4	2,150	.....	.....
Tonnage	448.98	.....	46.71	.....	47.55	.....	.....	.....
Outfit	.....	11,815	.....	395	.....	50	.....	.....
Boats	431	34,005	1,471	74,617	505	31,345	210	6,728
Apparatus, vessel fisheries:								
Gill nets	2,847	37,840	30,932	238,856	2,304	30,713	380	4,260
Set lines	.....	.....	66	1,125	.....	.....	.....	.....
Apparatus, shore fisheries:								
Gill nets	6,052	49,840	23,300	113,228	2,619	22,358	.....	.....
Seines	14	500	28	2,520	1	75	20	3,025
Pound nets and trap nets	276	63,415	785	181,385	731	108,508	91	7,400
Fyke nets	11	120	1,458	17,970	195	3,348	60	1,590
Lines and spears	.....	1,445	.....	2,880	.....	459	.....	750
Crawfish traps	.....	.....	1,484	711	.....	.....	.....	.....
Dip nets	.....	.....	969	5,177	.....	.....	.....	.....
Shore property	.....	150,512	.....	778,719	.....	193,785	.....	135,672
Cash capital	.....	59,000	.....	313,500	.....	42,500	.....	71,000
Total	.....	529,024	.....	2,063,497	.....	503,700	.....	240,070

Items.	Erie.		Ontario.		Total	
	No.	Value.	No.	Value.	No.	Value.
Vessels fishing	78	$252,800	.....	.....	176	$652,450
Tonnage	958.54	.....	.....	.....	2,794.42	.....
Outfit	.....	26,506	.....	.....	.....	107,956
Vessels transporting	7	26,400	2	$2,300	21	80,750
Tonnage	139.56	.....	21.68	.....	704.38	.....
Outfit	.....	1,570	.....	743	.....	14,573
Boats	1,061	145,027	175	7,319	3,853	299,041
Apparatus, vessel fisheries:						
Gill nets	20,584	98,566	.....	.....	57,047	410,235
Set lines	.....	.....	.....	.....	66	1,125
Apparatus, shore fisheries:						
Gill nets	14,785	66,117	1,185	8,794	47,941	260,337
Seines	47	4,440	7	175	117	10,735
Pound nets and trap nets	1,783	439,060	77	2,310	3,743	802,078
Fyke nets	586	19,250	139	1,300	2,449	43,668
Lines and spears	.....	4,089	.....	850	.....	10,479
Crawfish traps	.....	.....	.....	.....	1,484	711
Dip nets	.....	.....	.....	.....	969	5,177
Shore property	.....	808,517	.....	20,250	.....	2,087,455
Cash capital	.....	614,500	.....	12,000	.....	1,112,500
Total	.....	2,506,842	.....	56,131	.....	5,890,270

Table showing by lakes and species the yield of the fisheries of the Great Lakes in 1893.

Species.	Superior.		Michigan.		Huron.		St. Clair.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Bass	45	$5	45,393	$2,100	28,168	$997	29,631	$1,029
Carp	.....	.....	2,200	88	.....	.....	21,564	411
Catfish	.....	.....	77,439	1,761	109,476	2,246	29,510	1,144
Herring	660,272	7,701	11,198,717	217,430	2,758,628	47,462	140,112	1,821
Ling or lawyers	11,000	321	149,503	2,079	.....	.....	.....	.....
Perch	.....	.....	3,451,563	66,203	1,758,470	15,600	704,992	10,931
Pike and pike perch	133,903	4,620	711,647	28,362	827,819	33,852	524,319	22,243
Sturgeon	62,052	1,167	311,780	8,570	79,553	2,045	54,106	2,197
Suckers	118,445	2,150	1,690,769	15,004	1,824,919	23,995	182,022	1,858
Trout	3,735,519	122,380	8,216,920	316,871	3,439,575	133,194	72,000	2,400
Trout, siscowet	606,603	18,675	.....	.....	.....	.....	.....	.....
Whitefish, common	2,732,270	93,672	2,330,060	98,432	1,178,271	45,607	50,950	1,925
Whitefish, bluefin	36,818	1,326	1,698,130	45,126	.....	.....	.....	.....
Whitefish, longjaw	.....	.....	382,178	10,273	.....	.....	.....	.....
Whitefish, menominee	.....	.....	423,323	11,437	44,416	1,219	.....	.....
Other fish	.....	.....	58,133	4,875	15,043	104	5,105	71
Total	8,096,927	252,107	30,747,755	828,611	12,064,338	306,381	1,814,311	46,030

Table showing by lakes and species the yield of the fisheries, etc.—Continued.

Species.	Erie.		Ontario.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Bass	312,188	$11,864	59,223	$2,405	474,648	$18,400
Carp	635,583	16,481			659,347	16,980
Catfish	776,993	23,609	69,716	2,765	1,063,134	31,525
Herring	20,931,076	260,268	52,111	1,466	35,740,916	536,238
Ling or lawyers	32,127	384			102,630	2,784
Perch	2,504,933	35,595	131,353	2,641	8,641,311	130,970
Pike and pike perch	12,529,515	312,769	216,745	8,317	14,943,948	410,163
Sturgeon	793,800	31,472	125,293	4,987	1,426,584	50,438
Suckers	1,360,857	14,855	47,651	745	5,224,663	58,607
Trout	203,132	9,994	6,204	275	15,673,350	585,114
Trout, siscowet					606,603	18,675
Whitefish, common	1,292,410	78,730	45,380	2,787	7,629,341	321,153
Whitefish, bluefin					1,734,948	46,452
Whitefish, longjaw			112,887	2,977	495,065	13,250
Whitefish, menominee					467,730	12,656
Other fish	*1,505,711	9,958	61,452	2,145	1,645,444	17,213
Total	42,968,325	805,979	928,015	31,510	96,619,671	2,270,618

* No weights shown for turtles and frogs.

COMPARATIVE STATISTICS OF THE GREAT LAKES FISHERIES.

The information collected in this canvass makes it possible to show by detailed statistics the extent of the Great Lakes fisheries at four different periods, viz, 1880, 1885, 1890, and 1893. In the following condensed table the prominent features of the fishing industry of this region are shown by lakes for each of the years named.

The aggregate statistics show that in 1893 more persons were employed in this branch than in 1880 or 1890, but less than in 1885; the capital invested was greater than in any previous year; the quantity of fish taken and the value of the catch were more than in 1880, but less than in 1885 or 1890.

Comparative table showing the extent of the fisheries of the Great Lakes in 1880, 1885, 1890, and 1893.

Lakes.	Persons employed.				Capital invested.			
	1880.	1885.	1890.	1893.	1880.	1885.	1890.	1893.
Superior	414	914	653	916	$81,380	$427,933	$366,682	$529,024
Michigan	1,578	3,379	2,877	3,928	551,135	1,757,831	1,437,224	2,063,497
Huron	470	892	726	944	103,730	385,349	408,858	503,700
St. Clair	356	272	611	529	40,580	251,081	210,145	240,076
Erie	1,620	4,298	4,482	3,622	515,100	1,502,138	2,816,302	2,506,842
Ontario	612	600	389	241	54,050	135,749	123,533	56,131
Total	5,050	10,355	9,738	10,180	1,345,975	4,520,081	5,362,744	5,899,270

Lakes.	Products.							
	1880.		1885.		1890.		1893.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Superior	3,816,625	$118,370	8,825,980	$291,523	6,115,992	$220,968	8,096,927	$252,107
Michigan	23,141,875	668,400	23,518,148	878,788	26,434,266	830,465	30,747,755	828,611
Huron	7,205,273	195,277	11,457,170	276,397	10,056,381	221,067	12,004,338	306,381
St. Clair	1,850,927	36,273	2,185,795	40,193	2,994,571	73,577	1,814,311	46,030
Erie	29,087,300	474,880	51,456,517	1,199,096	64,850,873	1,000,905	42,968,325	805,979
Ontario	3,640,000	159,700	2,398,466	95,869	3,446,448	124,786	928,015	31,510
Total	68,742,000	1,652,900	99,842,076	2,691,866	113,898,531	2,471,768	96,619,671	2,270,618

The figures giving the catch of the principal fishes show marked variations in the different years, and are very suggestive when interpreted in connection with the methods employed and the kinds and quantities of apparatus used. It appears that in 1880 the whitefish (*Coregonus clupeiformis*) constituted nearly one-third of the catch, and was by far the most important fish taken. Each subsequent year showed a marked decrease in the yield, until in 1893 the fish constituted little more than one-tenth of the output and was surpassed in quantity by several other species. In 1880 the lake herring (*Coregonus artedi*) ranked next to the whitefish in quantity; in 1885 it was the most abundant fish caught, and in 1890 and 1893 maintained the same position. The catch in 1890 was larger than in any other year, being nearly double that in 1885 and more than a third greater than in 1893. The sturgeon (*Acipenser rubicundus*) was more important in 1880 than in any subsequent year; from more than 7,500,000 pounds in 1880, the catch fell to less than 1,500,000 in 1893, this being one of the most noteworthy changes in abundance that has occurred in the fisheries of this region. The output of lake trout (*Salvelinus namaycush*) increased from 6,800,000 pounds in 1880 to nearly 16,300,000 pounds in 1893; the catch in the last three years for which figures are available has shown no marked change. No separate statistics for such fish as wall-eyed pike, yellow perch, pickerel, suckers, and black bass are at hand for all the years in question; the aggregate catch of these and all other species was about 17,000,000 pounds in 1880, and over 32,800,000 pounds in the subsequent years, the yield in 1893 being about 2,800,000 pounds less than in 1885 and 1890. The following table shows the fluctuations in the fish product of the Great Lakes in the four years named:

Comparison of the yield of the fisheries of the Great Lakes in 1880, 1885, 1890, and 1893.

Species.	1880.	1885.	1890.	1893.
	Pounds.	Pounds.	Pounds.	Pounds.
Herring	15,967,517	25,869,458	48,753,349	35,740,916
Sturgeon	7,557,383	7,147,642	4,289,759	1,426,584
Trout	6,804,600	12,586,665	12,890,441	16,279,953
Whitefish	21,463,900	18,344,004	12,401,335	10,327,093
Other fish	16,948,600	35,894,307	35,563,047	32,845,125
Total	68,742,000	99,842,676	113,898,531	96,619,671

The following table, based on the preceding, shows by percentages the different ranks occupied by the several species at different times. The decline of the whitefish and sturgeon and the rise of the lake herring, trout, and minor species are clearly exhibited.

Species.	1880.	1885.	1890.	1895.
Herring	23.23	25.91	42.80	36.99
Sturgeon	10.99	7.16	3.77	1.48
Trout	9.90	12.61	11.32	16.85
Whitefish	31.22	18.37	10.89	10.69
Other fish	24.66	35.95	31.22	33.99
Total	100.00	100.00	100.00	100.00

LAKE SUPERIOR.

The importance of the fisheries of this lake depends on the catch of lake trout and its deep-water variety, the siscowet. These fish in 1893 constituted 54 per cent of the quantity and 56 per cent of the value of the yield. The only other species of noteworthy consequence is the common whitefish. Superior is the only lake except Huron the fisheries of which have undergone a general advance since the last investigation. Further developments may be expected with the increase in population and transportation facilities.

The run of trout in 1893 was very good, and the catch largely exceeded that in 1890. The increase was in part due to the more general utilization of the siscowet, which had previously been neglected on account of its extreme fatness. The whitefish fishery seems to have reached its height in 1885; since that time the product of the fish has diminished, and in 1893 was smaller than in any of the previous years (except 1880) for which figures are available. The fishermen in 1893 devoted considerable attention to the capture of species almost wholly neglected ten years before, such as herring, suckers, and ling. In 1880 the catch of all species other than trout and whitefish was only 3 per cent of the product, while in 1893 it constituted 12 per cent. Sturgeon, while never specially abundant in this lake, are getting scarcer, and between 1885 and 1893 the catch decreased nearly two-thirds.

The following comparison shows the results of the Lake Superior fisheries during four years:

Comparison of the yield of the fisheries of Lake Superior in 1880, 1885, 1890, and 1893.

Species.	1880.	1885.	1890.	1893.
	Pounds.	Pounds.	Pounds.	Pounds.
Herring	34,000	324,680	199,121	660,272
Sturgeon	.....	182,760	47,482	62,052
Trout	1,464,750	3,488,177	2,613,378	4,342,122
Whitefish	2,257,000	4,571,947	3,213,176	2,769,088
Other fish	60,875	258,416	42,835	263,393
Total	3,816,625	8,825,980	6,115,992	8,096,927
Total value	$118,370	$291,523	$220,968	$252,107

LAKE MICHIGAN.

The most prominent features of the fishing industry of Lake Michigan are the large fleet of vessels engaged in the gill-net fishery, the extensive pound-net and shore gill-net fisheries, and the very large yield of lake trout.

The trout constituted more than one-fourth the total catch of all species, and its value was nearly two-fifths that of the aggregate output. More trout were taken in Lake Michigan in 1893 than in all the other lakes combined, and the value of the trout here caught was nearly one-seventh that of the entire lake fisheries. This fish was obtained in

slightly smaller quantities in 1893 than in 1890, but the run in the former year was much larger than in 1880 and 1885. The whitefish catch was about 11 per cent less in 1893 than in 1890. The common whitefish appears to be rapidly decreasing in this lake and its place is being supplied by other species of the same family, more especially the longjaw, the bluefin or blackfin, the menominee, and the herring or cisco. The latter underwent a noteworthy increase in commercial importance between 1890 and 1893, the output increasing 84 per cent (from about 6,000,000 pounds to over 11,000,000 pounds). Sturgeon were taken in only one-tenth the quantity in 1893 that they were in 1880. The diminution in abundance of this valuable fish in the past few years has also been marked in this lake as in other members of the chain.

The general condition of the Lake Michigan fisheries in 1893 was good as compared with 1890. The increase in the production was over 4,250,000 pounds, while the value of the catch decreased about $1,800; but, as has been shown, this was accompanied by a large increase in fishing population and apparatus. The following comparison shows the results of the fisheries of the lake during four years:

Comparison of the yield of the fisheries of Lake Michigan in 1880, 1885, 1890, and 1893.

Species.	1880.	1885.	1890.	1893.
	Pounds.	Pounds.	Pounds.	Pounds.
Herring	3,050,400	3,312,493	6,082,082	11,198,717
Sturgeon	3,839,600	1,406,678	946,897	311,780
Trout	2,659,450	6,431,208	8,364,167	8,216,920
Whitefish*	12,030,400	8,682,986	5,455,079	4,833,691
Other fish	1,562,025	3,684,693	5,586,041	6,186,647
Total	23,141,875	23,518,148	26,434,266	30,747,755
Total value	$668,400	$878,788	$830,465	$828,611

* Includes common whitefish, longjaws, blackfins, and menominees.

LAKE HURON.

The fisheries of Lake Huron in 1893 showed a larger general increase over 1890 than those of any other lake; the advance occurred in the fishing population, the quantity of apparatus used, the quantity and value of the catch. That the augmented yield was not due solely to the increases in fishermen and appliances but represented a development of latent resources is indicated by the fact that the average quantity and value of the catch per man and per apparatus was practically the same each year. This is in marked contrast with the conditions in some other parts of the Great Lakes basin where the maintenance of the yield has been due wholly to the employment of more persons and apparatus.

The principal changes in the condition of the fisheries of this lake in 1893, as compared with 1890, were the increased number of vessels used in fishing and transporting (7 in 1890, 15 in 1893), the more extensive employment of pound and trap nets (731 against 551), the marked increase in the yield of trout, amounting to 128 per cent, and the large

decrease in the sturgeon and pike catch. Whitefish, herring, and other species showed little variation in abundance. The average price of fish in 1893 was about half a cent per pound more than in 1890.

The product of this lake in each of the four years for which statistics are available was as follows:

Comparison of the yield of the fisheries of Lake Huron in 1880, 1885, 1890, and 1893.

Species.	1880.	1885.	1890.	1893.
	Pounds.	Pounds.	Pounds.	Pounds.
Herring	246,800	1,265,650	2,514,551	2,758,628
Sturgeon	204,000	215,500	365,718	79,553
Trout	2,084,500	2,539,780	1,505,619	3,439,575
Whitefish	2,700,778	1,425,380	1,004,094	1,222,687
Other fish	1,969,195	6,010,860	4,666,309	4,563,895
Total	7,205,273	11,457,170	10,056,381	12,064,338
Total value	$195,277	$276,397	$221,067	$306,381

LAKE ST. CLAIR.

At one time the fisheries of this lake and the rivers connected with it yielded comparatively large quantities of sturgeon, whitefish, and lake herring, but in 1893 the catch of all these fishes was very small, and such minor species as perch and suckers constituted a prominent part of the catch. As compared with 1890, the fisheries have undergone a decline in all principal items. The number of persons engaged in actual fishing dropped from 517 to 454. The number of pound nets, the principal form of apparatus, decreased from 34 to 27; this decrease, however, was more than compensated for by the employment of a large number (64) of trap nets similar to those fished in Lake Erie. Seines numbered 28 in 1890 and 20 in 1893. The total capital invested, however, was larger in the latter year, owing to the expansion of the wholesale trade. A comparative summary of the output of the Lake St. Clair, St. Clair River, and Detroit River fisheries in 1880, 1885, 1890, and 1893 is given:

Comparison of the yield of the fisheries of Lake St. Clair and tributaries in 1880, 1885, 1890, and 1893.

Species.	1880.	1885.	1890.	1893.
	Pounds.	Pounds.	Pounds.	Pounds.
Herring	250,700	1,208,150	490,334	140,112
Sturgeon	998,500	227,780	309,003	54,106
Trout			244,847	72,000
Whitefish	77,922	41,125	238,764	50,950
Other fish	523,805	708,740	1,711,623	1,497,143
Total	1,850,927	2,185,795	2,994,571	1,814,311
Total value	$36,273	$40,193	$73,577	$46,030

NOTE.—Included in the figures for 1890 is the catch of several vessels that belonged in this section but took fish in Lakes Huron and Erie, as follows: Lake Huron, 244,847 pounds of trout and 26,064 pounds of whitefish; Lake Erie, 29,243 pounds of perch, 297,934 pounds of herring, and 46,276 pounds of wall-eyed pike. In 1893 one vessel, similarly owned and operated, took the following fish, which are embraced in the above table: Lake Huron, 72,000 pounds of trout and 12,000 pounds of whitefish; Lake Erie, 130,787 pounds of herring.

LAKE ERIE.

In 1890 the fisheries of this lake surpassed in extent those of any other members of the chain, and in 1893, notwithstanding a serious decline in almost every important branch, they still maintained first position in the matter of capital invested and quantity of products taken.

The prominent features of the fishing industry of Lake Erie are the numerous fleet of fishing steamers; the extensive employment of gill nets in the vessel and boat fisheries; the large number of pound and trap nets operated; the enormous catch of herring, wall-eyed pike, saugers, and whitefish, and the extensive wholesale trade in fresh-water fish centered at Sandusky, Cleveland, Buffalo, and other cities on the lake.

In 1893 nearly half the product of the Lake Erie fisheries consisted of herring; the catch, amounting to over 20,900,000 pounds, was obtained chiefly with gill nets. In 1890 the output of this fish was 38,868,000 pounds, and in 1885 it was 19,355,000 pounds. The abundance of herring determines, in a large measure, the condition of the fisheries in a given year, and the rise and decline of the industry have depended chiefly on the catch of this fish, whose importance is illustrated in the accompanying comparative summary.

Ranking next to the herring in quantity and value is the blue pike, a fish taken in large numbers with both pound nets and gill nets. The aggregate catch in 1893—6,656,341 pounds, valued at $175,392—was less than in 1890, when 7,488,903 pounds, worth $148,201, were taken. An interesting point about this fish is that in 1893 the pound-net catch was very much larger and the gill-net yield much less than in 1890.

The whitefish output in 1890 was only two-thirds that in 1885; in 1893 it was only half that in 1890, the decline being more marked in the gill-net returns; in the pound-net fishery a decrease of 6 per cent in number of nets set was attended with a decrease of 49 per cent in catch, while in the gill-net fishery a decrease of 28 per cent in number of nets used resulted in a diminution in yield amounting to 19 per cent.

Among the other fishes of special prominence in this lake, sturgeon, catfish, perch, black bass, and wall-eyed pike showed a diminished abundance in 1893 as compared with 1890, while saugers, sheepshead, and carp were taken in larger quantities. Especially worthy of note is the output in 1893 of over 635,000 pounds of carp, valued at $16,481.

Comparative table showing the yield of the fisheries of Lake Erie in 1880, 1885, 1890, and 1893.

Species.	1880.	1885.	1890.	1893.
	Pounds.	Pounds.	Pounds.	Pounds.
Herring	11,774,400	19,354,900	38,868,283	20,931,076
Sturgeon	1,970,000	4,727,950	2,078,907	793,800
Trout	26,200	106,900	121,420	203,132
Whitefish	3,333,800	3,531,855	2,341,451	1,292,410
Other fish	11,982,900	23,734,912	21,440,812	19,747,907
Total	29,087,300	51,456,517	64,850,873	42,968,325
Total value	$474,880	$1,109,096	$1,000,905	$805,970

LAKE ONTARIO.

The condition of the Lake Ontario fisheries in 1893 was very poor, the decline noticed in previous reports continuing. In every important item a marked decrease has occurred, and general and special comparisons with previous years probably disclose more pronounced changes than have characterized the fisheries of any other body of water in the United States. While restrictive legislation has had some effect on the fisheries, there is little reason to doubt that the most potent factor in the decline has been the depletion of the lake's fishery resources. The following summary shows the catch of the principal fishes in 1880, 1885, 1890, and 1893, and is to be considered in conjunction with the comparative figures for persons employed and capital invested. The number of fishermen was 361 in 1890 and 221 in 1893. The decrease in the apparatus used in the two years was as follows: Gill nets, from 2,345 to 1,185; trap nets, from 288 to 77; fyke nets, from 684 to 139; seines, from 27 to 7; boats, from 373 to 175.

The yield of the Lake Ontario fisheries in 1893 was less than one-third that in 1890, two-fifths that in 1885, and one-fourth that in 1880. Between 1880 and 1893 the decrease in whitefish was 96 per cent; in trout, 99 per cent; in sturgeon, 77 per cent; in herring, 73 per cent; and in other fish, 31 per cent. In the three years intervening between the last two investigations the quantity and value of the catch decreased 73 per cent. The yield of trout and whitefish, which had already reached a remarkably low point in 1890, was further reduced 85 per cent and 69 per cent, respectively.

Comparative table showing the yield of the fisheries of Lake Ontario in 1880, 1885, 1890, and 1893.

Species.	1880.	1885.	1890.	1893.
	Pounds.	Pounds.	Pounds.	Pounds.
Herring (including longjaws)	611,217	403,585	598,978	164,998
Sturgeon	545,283	386,974	541,752	125,293
Trout	569,700	20,510	41,010	6,204
Whitefish	1,064,000	90,711	148,771	45,380
Other fish	849,800	1,496,686	2,115,937	586,140
Total	3,640,000	2,398,466	3,446,448	928,015
Total value	$159,700	$95,869	$124,786	$31,510

BISCAYNE BAY, FLORIDA.

In February, 1895, the writer visited this bay, located on the southern part of the east coast of Florida, for the purpose of gathering information as to its physical features, animal resources, and fisheries. The U. S. Commissioner of Fish and Fisheries had under consideration the establishment of a marine hatching and experiment station at some point on the Florida coast, and was desirous of ascertaining the advantages afforded by Biscayne Bay for fish-cultural and biological work, this region having been favorably mentioned in this connection. A report on the results of the examination was submitted to the Commissioner

on March 20, 1895; in it the topics considered are the geographical features, the animal resources, the commercial fishing, and the available sites for a station. Accompanying the report are an interesting account of sponge-cultural experiments in Biscayne Bay, furnished by Mr. Ralph M. Munroe, of Cocoanut Grove, and a report on an examination of the bay by Maj. T. H. Handbury, of the Engineer Corps, United States Army.

FISHERIES OF MINOR INTERIOR WATERS.

A canvass of the fishing industry of the interior waters was begun in February, 1895. This work had been contemplated for several years, but other demands on the division prevented the undertaking of the inquiry until this time. The season when the condition of the division affairs permitted the inauguration of this work necessitated the placing of the field force in the southern part of the country, and the lower section of the Mississippi Valley was selected. The investigation, which was carried on during the months of February, March, and part of April, was suspended in April on account of lack of funds, after the completion of the work in Louisiana and Alabama, and with a large part of the fishing in Arkansas, Mississippi, and Tennessee covered. The remaining territory in this region was canvassed early in the latter part of 1895, and it seems desirable to refer to the results of the completed investigation rather than consider only the work that was done in the fiscal year proper. The agents participating in this canvass were Messrs. Ansley Hall, W. A. Wilcox, E. F. Locke, and T. M. Cogswell. Mr. Hall covered the whole of Alabama and all of Mississippi and Tennessee, with the exceptions of those portions on or near the Mississippi River. Mr. Wilcox and Mr. Cogswell conjointly canvassed parts of Louisiana, Mississippi, Arkansas, and Tennessee. Mr. Locke's inquiries were restricted to Louisiana. The statistical data collected related to the calendar year 1894 and included all fishing that partook of an economic character.

The commercial fisheries of these States were found to have the following extent:

Persons engaged	3,294
Capital invested	$173,162
Pounds of products taken	16,678,722
Value of products taken	$519,118

The most prominent fishes of these States are buffalo-fish, catfish, and sheepshead, or fresh-water drum. The quantity and value of each of these were as follows: Buffalo-fish, 5,520,516 pounds, $111,848; catfish, 7,632,238 pounds, $232,494; sheepshead, 1,217,070 pounds, $38,216. From these figures it appears that these three fish constitute about seven-eighths the quantity and three-fourths the value of the entire yield of the fresh-water fisheries. A brief statement of the extent of the fishing found in each of these States will be given. In the report embodying the results of the investigation a full discussion of the history, methods, apparatus, etc., will appear.

LOUISIANA.

The fresh-water fisheries of Louisiana are more extensive than those of any of the other States bordering on the Gulf Coast or in the Lower Mississippi basin. The State is bountifully supplied with rivers, lakes, and bayous containing an abundance of fish. In addition to the Mississippi River, which traverses the southern half of the State and forms the eastern boundary of the northern part, and the Sabine River, which marks most of the western boundary, the Red, Atchafalaya, Ouachita, and Calcasieu are the most important streams. The principal lakes are Catahoula, Grand, Salvadore, Calcasieu, Bastineau, des Allemands, Maurepas, and Cross, besides Lakes Pontchartrain and Borgne, which are salt or brackish. The waters in which most of the fishing is done are the Atchafalaya River and tributary bayous, the Mississippi River, and the Red River. Considerable fishing is also done in the Ouachita, Sabine, and Nementou rivers, Lakes Calcasieu, Salvadore, and des Allemands, and in Bayou James.

The number of persons ascertained to be employed in the fisheries of this State in 1894 was 1,263, of whom 137 were on the Mississippi and 756 on the Atchafalaya. More than half the fishermen, namely, 677, used set lines; 358 operated fyke nets; 290 hunted alligators; 124 trapped otters; 77 fished seines, no allowance being made in these figures for the persons who were engaged in two or more fisheries.

The investment in boats, apparatus, and other fishing property was $77,339, of which $51,873 represented the value of 1,282 boats. The set line or trawl line was the most important means of capture; 2,484 lines, with an aggregate length of 1,545,055 feet and with 483,140 hooks, were used. The number of seines was 33, of fyke nets 939, of guns 200, of steel traps 9,912, and of cast nets 61. The total value of the apparatus was $24,501. Shore and accessory property of the value of $965 was in use. Most of the seines and set lines were operated in the Atchafalaya River, where also the cast nets and many of the fyke nets were used. Set lines were also prominently used in Red and Mississippi rivers and in Lakes Calcasieu, des Allemands, and Salvadore. In Ouachita and Red rivers fyke nets were comparatively numerous.

The output of the fresh-water fisheries of Louisiana in 1894 consisted of 6,274,103 pounds of fish, crawfish, shrimp, turtles, and terrapin, 53,267 alligator hides, and 1,935 otter skins, the whole having a value of $192,012. The number of species of fish of prominence commercially is limited and includes only catfish, buffalo-fish, fresh-water drum, and crappie. By far the most valuable of the Louisiana fresh-water fishes is the catfish, which constitutes much more than half the quantity and value of the catch; over 4,900,000 pounds, worth $126,550, were taken. The buffalo-fish ranks after the catfish; the catch was over 956,000 pounds, for which the fishermen received $14,500. Of fresh-water drum, nearly 160,000 pounds were taken, which yielded the fishermen $4,280. The value of some of the other products was as

follows: Black bass, $1,355; crappie, $2,048; shrimp, $1,716; terrapin and turtles, $6,108; alligators, $23,334; otters, $9,254.

The catch in the Atchafalaya basin was larger than in all the other waters of the State combined. Catfish was the most important product, amounting to over 3,890,000 pounds, valued at $87,000; other prominent species were buffalo-fish (559,000 pounds, $5,850), terrapin (51,500 pounds, $4,635), alligators (25,070 hides, $12,535). The aggregate yield of this region was about 4,567,900 pounds of edible products, the value of which, with alligator and otter skins, was $126,620. In the Mississippi River the output was 283,000 pounds, valued at $16,140, and in the Red River 565,000 pounds, worth $14,530.

MISSISSIPPI.

The Mississippi River, which forms the western boundary of this State, is the principal fishing-ground, as would naturally be expected from its size and length. In its principal tributaries, the Homachitto, Yazoo, and Big Black rivers, considerable fishing is also done. In that section of the State having a frontage on the Gulf of Mexico, commercial fishing is prosecuted in the Pascagoula, Big Biloxi, Jordan, Wolf, and other streams. In the northeastern part of Mississippi there is some fishing in the Tombigbee River, the principal part of which stream is in Alabama. Several lakes along the Mississippi River, which represent the former channel of that stream, have economic fishing; among these are Louis, Wolf, and Horn lakes. The Pearl River, which is a stream of considerable size flowing south through the south-central part of the State, has no fishing of noteworthy importance.

As compared with the adjoining State of Louisiana the fishing industry of Mississippi is of small proportions; it is, however, greater in extent than in Alabama.

The persons engaged in taking fishery products for market in 1894 numbered 380; of these, 129 were on the Mississippi River and 70 on the Pascagoula River. The number of fishermen using set lines was 120, trammel nets 104, cast nets 85, hand lines 68, shrimp traps 57, fyke nets 43, and seines 36, many of the men engaging in two or more branches and being duplicated to that extent in these figures.

Only $10,093 was invested in the fisheries of Mississippi in 1894. This sum represented the value of 154 boats, 19 seines, 39 trammel nets, 187 fyke nets, 87 cast nets, 472 set and hand lines, 775 small traps, and various shore and accessory property.

The most prominent commercial fishes in the fresh waters of Mississippi are the catfishes, which constitute about half the quantity and value of the yield. The buffalo-fishes rank next in amount and value. Other important species are black bass, fresh-water drum, sunfishes, and shrimp. The aggregate catch in 1894 was 1,500,745 pounds, for which the fishermen received $40,484. Set lines and seines together took about four-fifths the total quantity of products.

The Mississippi River fisheries yielded over 1,030,000 pounds, valued

at $24,000. The results in some of the other waters were as follows: Pascagoula River, 70,000 pounds, $1,750; Yazoo River, 102,000 pounds, $2,540; Big Biloxi River and tributaries, 144,100 pounds, $6,800.

ALABAMA.

The principal fresh-water fisheries of this State are prosecuted in those streams having Mobile Bay as their outlet, namely, the Mobile River; its tributaries, the Alabama and Tombigbee rivers; and the chief tributary of the latter, the Black Warrior River. The Tennessee River, which traverses the northern part of the State, also has comparatively important fisheries. In the matter of persons engaged and value of the catch, Alabama has precedence over Mississippi, although the quantity of fish taken in the latter State is somewhat greater; the investment in the two States is about the same.

The number of persons ascertained to be engaged in the commercial fisheries of this State was 407, of whom 123 were on Mobile River and Bay, 100 on Alabama River, 67 on Tennessee River, 64 on Black Warrior River, and 53 on Tombigbee River. The trammel-net, fyke-net, and set-line fisheries gave employment to 115, 194, and 188 persons, respectively, some of the men being in two or more branches and duplicated in these figures.

The capital invested in the Alabama fisheries was about $14,500. The most prominent items in the investment were fyke nets ($6,560), boats ($3,433), and trammel nets ($2,900). The boats numbered 287, the fyke nets 970, the trammel nets 116, the set lines 690. The fyke nets and set lines were most numerous on the Tennessee River; the trammel nets were confined to Mobile Bay and River.

The buffalo-fishes are the most important economic fishes of this State; more than 1,000,000 pounds of these, having a value of over $25,000, were taken. Catfish rank next in quantity and value, the yield being over 300,000 pounds, worth $15,700. Other prominent species are fresh-water drum, sunfish, and warmouth bass. The aggregate output of the fisheries was 1,869,400 pounds, with a value to the fishermen of $72,500. Much more than half the catch was obtained with fyke nets.

More fish were taken in the Alabama River than in any other water, although the value of the catch was greatest in Mobile Bay and River. In the former stream the yield was 482,650 pounds, for which the fishermen received $19,500. In the Tombigbee River 462,300 pounds of fish were secured, valued at $10,150. The results of the fishing in Mobile Bay and River were 396,900 pounds, worth $21,520.

ARKANSAS.

The fresh-water fisheries of Arkansas are more important than those of any other State in this region, with the exception of Louisiana. Besides the Mississippi River, which borders the eastern side of the State, there are several important streams, tributary to the Mississippi, which traverse the State. Among these are the Arkansas, the White,

the St. Francis, and Ouachita, in all of which commercial fishing is carried on. In a number of lakes representing former beds of rivers considerable fishing is also done.

In 1894, 750 persons were engaged in the fisheries of Arkansas. Of these, 566 used set lines, 286 fyke nets, 129 seines, and 114 trammel nets, some fishermen being in two or more fisheries. The number on the different rivers was as follows: 302 on the Arkansas, 81 on the White, 73 on the St. Francis, 158 on the Ouachita, 61 on the Mississippi, and 75 on various minor waters.

The fyke net is the most prominent means of capture in this State, representing nearly one third the investment in the fishing industry. It is used in almost every river and lake having commercial fisheries, the largest numbers being set in the Mississippi, White, and St. Francis rivers. The total number of fykes in use in 1894 was 1,590, valued at $11,040. Set lines are also very generally employed. Their number was 1,615, valued at $1,914. The lines contained over 79,000 hooks and were 328,000 feet in length. The number and value of the other important forms of apparatus were as follows: Seines, 41, $5,470; trammel nets, 72, $2,670. An interesting feature of the fisheries of the State is the use of 8 pound nets in Crittenden County, on the Mississippi River, this type of net being very seldom met with in the interior waters. The 561 boats employed had a value of $7,917. The aggregate amount of capital invested in the industry was $36,564.

The yield of the fisheries of Arkansas was 3,875,860 pounds, having a value to the fishermen of $116,010. In point of quantity the buffalo-fishes are the most important in the State; about 1,626,000 pounds, valued at $30,800, were taken. The value of the catfishes was greater, being $38,000, but the quantity was only 904,500 pounds. Next in importance is the fresh-water drum, or sheepshead; of this, nearly 580,000 pounds, worth $15,000, were obtained. Other comparatively prominent species are crappy, black bass, and paddle-fish. The output of the Mississippi River fisheries was larger than that of any other stream, although the value of the catch was less than in several other waters. The yield and value of the catch in the principal waters were as follows: Mississippi River, 882,500 pounds, $18,800; St. Francis River, 772,600 pounds, $19,700; White River, 605,600 pounds, $23,580; Arkansas River, 594,000 pounds, $22,800; Horseshoe Lake, 376,000 pounds, $10,300; Ouachita River, 248,000 pounds, $10,000.

TENNESSEE.

This State has comparatively important fisheries in the Tennessee, Cumberland, and Mississippi rivers, and in Reelfoot Lake. The most extensive interests are in the first-named stream and the lake. The principal features are the extent of the fyke-net and set-line fisheries and the preponderance of buffalo-fish and catfish in the catch.

The number of persons engaged in the commercial fisheries of Tennessee in 1894 was 520. Of these, 45 were on the Cumberland River,

235 on the Tennessee River, 75 on the Mississippi River, and 165 on Reelfoot and Open lakes. Without taking into consideration the duplications arising from the employment of two or more kinds of apparatus, 17 fishermen used seines, 87 trammel nets, 293 fyke nets, 364 set lines, and 80 hand lines; 17 persons were specially engaged in the preparation of products.

The number and value of the boats and apparatus employed in the Tennessee fisheries were as follows: 446 boats, $4,879; 2 seines, $525; 46 trammel nets, $1,640; 1 trap, $1,500; 1,619 fyke nets, $13,190; 1,830 set lines, $1,897; 200 hand lines, $150; shore and accessory property, valued at $6,422, the total investment being $30,203. Two-thirds of the fyke nets were set in the Tennessee River and Reelfoot Lake. The trammel nets and hand lines were confined to the lakes; the set lines were used principally in the Mississippi and Tennessee rivers. The single trap net reported was a very large appliance built in the bed of the Tennessee River in Knox County.

The economic fisheries of Tennessee in 1894 yielded over 2,445,000 pounds of fishery products, having a value of $82,500. In the value of its catch, as in persons employed and capital invested, Tennessee ranks third among the five States of this region now under consideration. Buffalo-fish constituted nearly one-half the output, 1,057,000 pounds, valued at $25,950, being taken. The catch of catfish was about 670,000 pounds, having a value of $28,400. The next important fish was the drum, or sheepshead, the yield being 254,000 pounds, worth $10,255.

The products of the fisheries of Reelfoot Lake were greater than of all the other waters combined. They consisted of 626,000 pounds of buffalo-fish, 305,000 pounds of catfish, 107,000 pounds of drum, 85,000 pounds of crappy, and 250,200 pounds of other fish, the aggregate being 1,373,200 pounds, for which the fishermen received $36,182. The Tennessee River fisheries produced 524,200 pounds, valued at $28,688, of which buffalo-fish constituted 124,560 pounds, catfish 233,500 pounds, and drum 112,410 pounds. The fishermen on the Mississippi River took 370,500 pounds having a value of $9,454, and those on the Cumberland River 86,000 pounds, worth $5,953. In Open Lake, a catch of 91,285 pounds brought $2,225.

More than one-third of the fishery products of Tennessee are taken on set lines; in 1894 the yield was 935,848 pounds, valued at $31,666. The fyke-net catch was 787,536 pounds, worth $31,628. The trammel nets took over 575,000 pounds of fish, which sold for $12,765. The yield of other forms of apparatus was comparatively unimportant.

THE MENHADEN FISHERY.

The inauguration of an investigation of some of the features of the menhaden industry was referred to in the division report for 1894; the desirability of making this inquiry and suggestions as to its scope and character were stated in the report of the division for 1892. The work of the field agents, which began in May, 1894, was carried on

continuously until the suspension of the fishery in December. A report embodying the results of the investigation was submitted to the Commissioner in May, 1895.

The menhaden is probably the most abundant fish found on the Atlantic coast of the United States, and its capture constitutes one of the principal fisheries of the country. The fishery is prosecuted from Maine to North Carolina, inclusive, and in almost every State between those limits an important shore industry is dependent on the fishery. In recent years over 50 establishments for the making of menhaden oil and fertilizer have been operated annually. The business on land and water has given employment to about 3,400 men. The steam and sail vessels used, numbering about 135, have a value, with their seines and equipment, of nearly $1,000,000. The other property devoted to the industry brings the investment up to over $2,500,000. The annual catch has been from 400,000,000 to 600,000,000 fish, which have yielded manufactured products having an average annual value of over $1,000,000.

The menhaden fishery has been and still is the subject of much opposition, because of its supposed effects on the abundance of other fish. The grounds on which those opposed to the fishery base their complaints may be summarized as follows: (1) Large numbers of desirable food and game fish are taken, which are landed at the factories to serve the same purpose as the menhaden; (2) the supply of food-fish on the coast has been greatly reduced on account of the menhaden fishing, fishing-grounds once productive having been destroyed; (3) food-fish, when not actually caught, have been driven off the coast or have been prevented from reaching their spawning-grounds in the inshore waters.

Those pecuniarily interested in the menhaden fishery deny the foregoing points. They contend that only comparatively few food-fish are taken in the fishery, and those only incidentally or unavoidably; that they are not sufficient to keep the vessels' crews regularly supplied with fresh fish food; that the thousands of sharks and other predaceous fishes destroyed in fishing for menhaden would do infinitely more damage to the food-fish fisheries than the menhaden fishery does; and that there is no evidence to show that this fishery is in any way responsible for the real or apparent scarcity of certain food-fish.

It was with a view to gathering information bearing on some of these disputed questions that the Commission conducted a special investigation in 1894. The original plan of the inquiry was to place the entire available force of the division on menhaden vessels having headquarters on various parts of the coast, and to have each agent continue his observations on a given vessel throughout the fishing season. Owing, however, to the necessity for carrying on other work, it was found impracticable to utilize all the field force in the menhaden inquiry, and it was finally determined to restrict the studies to two vessels.

The agents were instructed to use the greatest care in obtaining information and to refrain from the expression of any opinion as to the

results of the inquiry or the general menhaden question. On specially prepared forms they were required to record, for each haul of the seine, the following data: Date, hour, fishing-ground, number of menhaden taken, number of each kind of other fish taken, disposition made of fish, and physical observations on the air, water, etc. The position of each seine haul was indicated on a chart. Notes on the fishery and on the abundance, size, movements, and spawning condition of menhaden were also obtained.

The vessels selected for the purposes of the investigation were the steamers *Quickstep*, of New London, Conn., and *J. W. Hawkins*, Harborton, Va. The accommodations on the *Quickstep* proving insufficient, on June 22 the observations were transferred to the steamer *Arizona*, of New London, for the remainder of the season. The *Arizona* is a screw steamer of 103 net tons having a value, with outfit, of $25,000. The crew consists of 30 fishermen, 2 captains, 2 mates, and 8 other persons. Two purse seines, each about 1,400 feet long, are used, the vessel being what is known as a "double-gang" steamer. The tonnage of the *J. W. Hawkins* was 125; her value was about $20,000; her crew consisted of 18 fishermen and 8 other persons, and her regular seine was 900 feet long, although at times a seine 1,500 feet long was employed.

The representatives of the Commission on these vessels were as follows: Mr. C. E. Latimer, Mr. W. P. Hay, and Mr. A. E. Marschalk, on the *Quickstep* and *Arizona*; Mr. E. F. Locke and Mr. E. E. Race, on the *J. W. Hawkins*. On June 22 Mr. Latimer was relieved by Mr. Hay, who was connected with the inquiry until August 1, when Mr. Marschalk took his place and continued the work until the suspension of fishing. Mr. Locke was on the *J. W. Hawkins* during the entire season, with the exception of the month of October, when he was relieved by Mr. Race.

The vessels fished from Maine to North Carolina, and their operations were sufficiently extensive to warrant conclusions as to some of the questions in dispute. Fish were fairly abundant along the entire coast, and the season was an average one for the general menhaden industry. The observations of the agents covered fishing operations in which nearly 28,000,000 menhaden were taken, or about one-twentieth of the total catch in 1894. The *Arizona* took 22,000,000 menhaden during the year and 18,706,800 while agents of the Commission were aboard; this was the second largest yield in the history of the vessel. During the observations on the *Quickstep* that vessel took 2,532,000 fish. The catch of the *J. W. Hawkins* was 9,301,955 menhaden, a number considerably less than the average in recent years.

Two-thirds of the menhaden taken by the *Arizona* (and *Quickstep*) were obtained in Delaware Bay and off the New Jersey coast. Of the 619 seine-hauls of these vessels, 370 were in those regions. More than two-thirds of the fish caught by the *J. W. Hawkins* were in Chesapeake Bay, where 315 seine-hauls in a total of 459 were made.

About 60 species of fishes were represented in the catch of the

steamers. Those most conspicuous for their numbers are those which, like menhaden, swim at or near the surface; among these are bluefish, butter-fish, mackerel, shad, and alewives. Deep-water bottom species, like cod, haddock, etc., were obtained in only small quantities, but the bottom fishes inhabiting shallow water, like skates and flounders, were taken in comparatively large quantities. Many of the species were represented by only a single specimen, and of most of the others only a few individuals were caught.

The total number of fish taken with the menhaden was 94,795, of which 93,893 may be classed as food-fish, although over 86,000 of one kind belonged to the menhaden family and are considered suitable for the manufacture of oil and guano. Omitting these, the number of food-fish obtained was 6,990, an average of less than 7 fish to a set; including them, the average was about 87 food-fish to a seine haul.

The most numerous fish, next to the menhaden, were the alewives, or river herring; these were usually taken among schools of menhaden. Of the 86,898 reported by the agents, nearly half were caught at one haul in Boston Harbor, and most of the others were taken by the same vessel on the coast of New England.

Bluefish were taken on numerous occasions, and the aggregate catch was 2,274. The largest number taken at one haul of the seine was 140, in Chesapeake Bay. Shad, which figure rather prominently in the returns, were mostly caught in a few hauls on the Maine coast, in company with alewives and other fish; the records show a catch of 1,816 fish. Among other fish taken in noteworthy numbers were butter-fish, mackerel, squeteague, sharks, flounders, skates and rays, Spanish mackerel, and croakers, of which from 100 to 800 were taken. The sharks destroyed numbered 388, of which the dogfish and dusky shark were most numerous. Following is a statement of the quantities of different kinds of fish taken and the average number obtained at each successful haul of the seine:

Species.	Total number taken.	Average number of fish at each haul.
Menhaden	27,965,755	29,562.11
Alewives, or river herring	86,898	91.86
Bluefish	2,274	2.40
Shad	1,816	1.92
Butter-fish	811	.86
Mackerel	631	.67
Squeteague	498	.53
Sharks	401	.42
Skates and rays	372	.39
Flounders	369	.39
Spanish mackerel	150	.16
All others	590	.62
Total	28,060,565	29,662.33

The prohibition of menhaden fishing within certain distances of the shore is a prominent feature of the legislation advocated by some who believe in restriction of the industry by governmental or State authority.

The interdiction of seining within 1, 2, or 3 miles of the mainland has been urged, the 3-mile protected zone being the one most generally favored. In the investigation of the fishery, full data were obtained showing the distances from shore at which fish were taken, and the information recorded on this point for the two vessels may be regarded as entirely typical of the fleet. It is well known that the menhaden is found comparatively close to land, during both the migrations and the intervening season; and those financially interested in the industry have contended that to limit the fishery to the water beyond 3 miles from land would result in the destruction of the business.

The following summary of the operations of the vessels in question shows that 18,387,370 menhaden, or about two-thirds the aggregate catch, were taken under 3 miles from shore, and 6,089,104 fish, or less than two-ninths of the total yield, were obtained 5 miles or more from land. A conspicuous part of the fishing done beyond 3 miles from the shore was in Delaware, Chesapeake, and other bays.

Distances from shore.	Number of menhaden taken.	Percentage.
Under 1 mile	5,850,131	21
Between 1 and (under) 2 miles	9,164,889	33
Between 2 and (under) 3 miles	3,372,350	12
Between 3 and (under) 5 miles	3,489,281	12
5 miles and over	6,089,104	22
Total	27,965,755	100

The daily record of the observations of the Commission's agents shows that, as a rule, not enough desirable food-fish were taken by the steamers to keep the crews supplied with fresh fish, and that only rarely were more edible fish taken than could be consumed on the vessels or by the men employed at the factories. In the case of shad and bluefish, the comparatively large numbers seined on a few occasions were more than could be utilized, and the records show that 266 of the former and 410 of the latter taken by one vessel shared the fate of the menhaden; none of these fish caught by the other vessel was so disposed of. Of the other fish made into oil and guano, there were 356 butter-fish (mostly too small to eat), 246 flounders (many being the worthless hogchoker), 36 scup, 44 croakers, 15 haddock, 28 hake, 20 spots, 31 squeteague, and 22 whiting.

The percentage of food-fish catch not eaten was about 20, excluding alewives. All but 13 of the sharks and 4 of the skates were landed at the factories. The crews salted, for their personal use, 25,000 menhaden and 1,607 bluefish, bonito, butter-fish, flounders, shad, and squeteague. The fish sold for bait consisted of 199,900 menhaden and 10,000 alewives. The fish dumped overboard, given away, or otherwise disposed of, numbered 8,232; of these 2,500 menhaden and 5,000 alewives were thrown away and 675 shad were released alive.

INQUIRIES AT BOSTON AND GLOUCESTER, MASS.

The local agents of the Commission at these important fishing ports have continued their efficient service along the lines indicated in previous reports. Their returns show the extent of the fisheries centering at these places, and afford an accurate idea of the general condition of the vessel fisheries of New England.

The receipts at Gloucester in 1894 of fish caught by United States fishing vessels aggregated nearly 80,000,000 pounds, having a value of over $2,229,000. Following is a comparison of the receipts in the calendar years 1889, 1891, 1892, 1893, and 1894, from which it will be seen that the quantity of fish landed in 1894 was nearly 5,000,000 pounds greater than in the previous year, and more than 3,000,000 pounds greater than the average for the five years in question.

Year.	Pounds.	Value.
1889	68,997,717	.....
1891	76,949,347	.....
1892	82,154,995	$2,735,655
1893	74,801,159	2,503,945
1894	79,651,606	2,229,653

The number of separate fares of fish which entered Gloucester in 1894 was 3,583; of these, 776 were from the fishing-grounds located to the east of the sixty-sixth meridian, and 2,807 from the grounds off the New England coast. Of the arrivals from the eastern grounds, 177 were from La Have Bank, 148 from Grand Bank, 122 from Western Bank, 120 from Quereau Bank, and 100 from Cape Shore. Of the more western grounds, Georges Bank contributed 782 fares, Cashes Bank 225 fares, Nantucket Shoals and South Channel 99 fares, and the general shore grounds off the New England coast 1,587 fares.

Cod constituted more than half the catch. The quantity of cod landed was over 35,800,000 pounds of salt fish, valued at more than $1,000,000, and about 6,000,000 pounds of dressed fresh fish, valued at $100,000. The aggregate quantity, 41,900,000 pounds, exceeded the receipts in 1893 by 3,351,600 pounds. The Grand Banks yielded more than all the other grounds combined; upward of 18,000,000 pounds of salt cod, worth nearly $450,000, are credited to these famous banks. The catch was 358,000 pounds less than in 1893, but this decrease was more than counterbalanced by the noteworthy increase in the production of other offshore grounds, especially La Have and Western banks, so that the aggregate receipts of cod from the eastern banks were greater in 1894 than in 1893 by over 400,000 pounds. Georges Bank, the most productive of the western grounds, yielded 13,600,000 pounds of fresh and salted cod, having a value of nearly $400,000, an increase of 2,295,000 pounds over the previous year. All the other grounds off the New England coast produced less than 5,000,000 pounds.

The quantity and value of the receipts of other members of the cod family are as follows: Cusk, 4,804,840 pounds, $63,508; haddock, 6,109,406 pounds, $44,149; hake, 8,480,715 pounds, $57,126; pollock, 1,258,621 pounds, $8,277, a total of 20,653,582 pounds and $173,060. The principal part of the cusk and hake were taken on Cashes Bank, of the haddock on Georges Bank, and of the pollock on the inshore grounds. The total receipts of these species in 1894 differed little from those in 1893; the catch of cusk and pollock was somewhat less, that of hake was about the same, while that of haddock was considerably more, the increase amounting to nearly 3,500,000 pounds.

Grand, Quereau, Western, and Georges banks contributed the principal part of the fresh halibut landed in Gloucester, while Greenland and Iceland grounds produced practically all of the salt halibut. The receipts of fresh fish were 7,707,787 pounds, valued at $599,538, and of salt fish 1,527,480 pounds, worth $91,898. As compared with 1893 these figures show an increase of 1,118,000 pounds of fresh halibut and a decrease of 301,500 pounds of salt halibut.

The Gloucester mackerel fishery in 1894 was a great disappointment. The early fishing on the Cape Shore was reported to be the best ever known, and many fishermen were led to believe that the mackerel had returned in their former abundance and that the season would show a very large catch. The subsequent fishing, however, was poor, and the aggregate receipts were very much less than in the previous year.

The fresh mackerel landed amounted to 80,662 pounds, valued at $6,259, against 48,420 pounds, worth $3,205, in 1893. The quantity of salt fish brought in was 28,705 barrels, having a value of $236,849, against 38,335 barrels, valued at $500,682, in the preceding year. The receipts from the different grounds in 1894 were as follows: Cape Shore, 19,763½ barrels, $124,490; Gulf of St. Lawrence, 4,185 barrels, $58,822; New England shore, 4,756½ barrels, $53,537. As compared with 1893, there was an increased catch on the Cape Shore and in the Gulf of St. Lawrence of 6,081 barrels and a decrease on the New England coast of 15,711 barrels.

A detailed summary of the Gloucester receipts, specified by species and fishing-grounds, is contained in the following table. In the case of vessels that fished on more than one ground during a single trip, their operations are credited to those grounds on which the bulk of the fish were taken.

Summary by fishing-grounds of certain fishery products landed at Gloucester, Mass., in 1894 by American fishing vessels.

Fishing-grounds.	No. of trips from each ground.	Cod.				Cusk.			
		Fresh.		Salted.		Fresh.		Salted.	
		Lbs.	Value.	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
East of 66° W. longitude:									
La Have Bank	177	497,700	$7,497	2,805,673	$99,616	649,000	$7,115	.....	.....
Western Bank	122	60,000	973	638,120	16,937	.....	.....	.....	.....
Quereau Bank	120	2,000	40	558,630	15,472	.....	.....	.....	.....
St. Peters Bank	20	.....	.....	87,900	2,313	.....	.....	.....	.....
Green Bank	35	.....	.....	102,800	3,096	.....	.....	.....	.....
Grand Bank	148	.....	.....	17,663,320	445,165	.....	.....	.....	.....
Canso Bank	6	55,800	830	194,130	5,172	.....	.....	.....	.....
Cape Shore	100	132,000	1,957	213,100	6,546	151,500	1,970	.....	.....
Cape North	1	.....	.....	85,000	1,800	.....	.....	.....	.....
Gulf of St. Lawrence	27	.....	.....	345,000	7,193	.....	.....	.....	.....
Iceland and Greenland	14	.....	.....	9,500	264	.....	.....	.....	.....
Off Newfoundland	6	.....	.....	25,000	663	.....	.....	.....	.....
Total	776	747,500	11,306	22,728,173	604,237	800,500	9,085	.....	.....
West of 66° W. longitude:									
Browns Bank	42	398,500	5,492	247,270	7,195	294,000	3,913	3,000	$68
German Bank	3	20,000	280	21,000	525	3,000	38	4,000	80
Georges Bank	782	1,807,720	20,121	11,791,775	364,512	292,000	3,643	179,480	3,922
Cashes Bank	225	1,289,800	19,214	3,000	75	2,360,160	31,419	.....	.....
Fippenies Bank	1	.....	.....	.....	.....	20,000	300	.....	.....
Jeffreys Ledge	48	23,500	408	.....	.....	74,000	1,066	.....	.....
Middle Bank	17	33,180	690	.....	.....	50,000	675	.....	.....
Off Highland Light	2	14,000	200	.....	.....	.....	.....	.....	.....
Off Chatham	1	.....	.....	.....	.....	8,000	80	.....	.....
South Channel	68	158,500	2,312	.....	.....	611,100	7,780	.....	.....
Nantucket Shoals	31	3,000	45	1,013,000	24,321	2,000	25	.....	.....
Shore, general	1,587	1,578,582	32,380	25,090	745	98,600	1,308	5,000	100
Total	2,807	5,326,782	90,142	13,101,045	397,373	3,812,860	50,247	191,480	4,170
Grand total	3,583	6,074,282	101,448	35,829,218	1,001,610	4,613,360	59,332	191,480	4,170

Fishing-grounds.	Haddock.				Hake.				Pollock.			
	Fresh.		Salted.		Fresh.		Salted.		Fresh.		Salted.	
	Lbs.	Val.	Lbs.	Val.	Lbs.	Val.	Lbs.	Val.	Lbs.	Val.	Lbs.	Val.
East of 66° west longitude:												
La Have Bank	306,300	$1,860	.....	.....	1,491,100	$10,167	3,000	$26	10,000	$125	.....	.....
Western Bank	35,000	210	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cape Shore	77,200	494	.....	.....	286,500	2,020	.....	.....	1,000	7	.....	.....
Gulf of St. Lawrence	.....	.....	.....	.....	.....	.....	20,000	250	.....	.....	.....	.....
Total	418,500	2,564	.....	.....	1,777,600	12,187	23,000	276	11,000	132	.....	.....
West of 66° west longitude:												
Browns Bank	449,000	2,686	.....	.....	313,500	1,779	.....	.....	.....	.....	6,000	$60
German Bank	5,000	30	4,000	$50	10,000	60	10,000	125	.....	.....	.....	.....
Georges Bank	4,223,645	31,308	.....	.....	541,500	3,604	.....	.....	.....	.....	.....	.....
Cashes Bank	615,500	4,430	.....	.....	4,902,800	27,158	.....	.....	.....	.....	.....	.....
Fippenies Bank	3,000	19	.....	.....	8,000	48	.....	.....	.....	.....	.....	.....
Jeffreys Ledge	21,500	196	.....	.....	147,000	1,146	.....	.....	188,900	1,174	.....	.....
Middle Bank	16,900	185	.....	.....	79,000	546	.....	.....	1,000	6	.....	.....
Off Highland Light	20,000	120	.....	.....	5,000	38	.....	.....	.....	.....	.....	.....
Off Chatham	10,000	50	.....	.....	5,000	20	.....	.....	.....	.....	.....	.....
South Channel	226,100	1,426	.....	.....	1,178,100	7,580	.....	.....	2,000	15	.....	.....
Nantucket Shoals	15,000	90	.....	.....	3,000	15	.....	.....	.....	.....	.....	.....
Shore, general	81,261	995	.....	.....	371,215	2,484	6,000	60	1,049,721	6,890	.....	.....
Total	5,686,906	41,535	4,000	50	6,604,115	44,478	16,000	185	1,241,621	8,085	6,000	60
Grand total	6,105,406	44,099	4,000	50	8,441,715	56,665	39,000	461	1,252,621	8,217	6,000	60

Summary by fishing-grounds of certain fishery products, etc.—Continued.

Fishing-grounds.	Halibut.				Mackerel.*			
	Fresh.		Salted.		Fresh.		Salted.	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
East of 66° W. longitude:								
La Have Bank	349,174	$33,050						
Western Bank	2,004,018	155,742	11,500	$615				
Quereau Bank	1,821,303	149,968	300	19				
St. Peters Bank	403,990	29,847						
Green Bank	789,387	64,599	6,000	330				
Grand Bank	1,061,360	73,109	124,180	7,519				
Canso Bank	11,500	918						
Cape Shore	3,800	322	300	20			3,952,700	$124,490
Cape North			2,200	132				
Gulf of St. Lawrence							837,000	58,822
Iceland and Greenland			1,383,000	83,263				
Off Newfoundland	239,620	14,704						
Total	6,684,152	522,259	1,527,480	91,898			4,789,700	183,312
West of 66° W. longitude:								
Browns Bank	5,400	320						
Georges Bank	1,012,915	76,576						
Cashes Bank	2,500	180						
Jeffreys Ledge	300	24						
Middle Bank	1,700	119						
Nantucket Shoals	820	60			1,432	$108		
Shore, general					79,230	6,151	951,300	53,537
Total	1,023,635	77,279			80,662	6,259	951,300	53,537
Grand total	7,707,787	599,538	1,527,480	91,898	80,662	6,259	5,741,000	236,849

Fishing-grounds.	Other fish.†				Total.	
	Fresh.		Salted.			
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
East of 66° W. longitude:						
La Have Bank					6,111,947	$159,456
Western Bank	885	$35			2,749,523	174,512
Quereau Bank	800	60			2,383,033	165,559
St. Peters Bank					491,890	32,160
Green Bank					898,187	68,025
Grand Bank					18,848,860	525,793
Canso Bank					261,430	6,929
Cape Shore			4,000	$38	4,822,100	137,864
Cape North					87,200	1,932
Gulf of St. Lawrence					1,202,000	66,265
Iceland and Greenland			98,000	1,225	1,490,500	84,752
Off Newfoundland					264,620	15,367
Total	1,685	95	102,000	1,263	39,611,290	1,438,614
West of 66° W. longitude:						
Browns Bank					1,716,670	21,513
German Bank					77,000	1,188
Georges Bank	1,000	80			19,850,035	512,766
Cashes Bank					8,273,760	82,476
Flippenies Bank					31,000	367
Jeffreys Ledge					455,200	4,014
Middle Bank					183,212	2,329
Off Highland Light					39,000	358
Off Chatham					23,000	150
South Channel					2,175,800	19,113
Nantucket Shoals					1,036,820	24,556
Shore, general	711,310	5,277	1,221,600	12,276	6,178,819	122,209
Total	712,310	5,357	1,221,600	12,276	40,040,316	791,039
Grand total	713,995	5,452	1,323,600	13,539	79,651,606	2,229,653

*The mackerel shown in the table were landed in 320 fares, as follows: 221 from New England shore, 74 from Cape Shore, 24 from Gulf of St. Lawrence, 1 from Middle Bank.

†Under this head are included 5,845 pounds of swordfish, $436; 10,000 pounds of menhaden, $100; 98,000 pounds of ling, $1,225; 699,500 pounds of fresh herring, $4,986; and 1,224,200 pounds of salt herring, $12,244. All of these fish except the herring were taken incidentally while fishing for other fish; the ling were caught on the Iceland halibut grounds; the swordfish on Western, Quereau, and Georges banks and the New England shore; the menhaden on shore grounds. The herring were landed in 96 trips, all from the New England shore.

The quantity of fish landed at Boston by American fishing vessels was nearly 87,500,000 pounds, with a value of over $1,600,000. The apparent inconsistency in the figures for Gloucester and Boston (the larger receipts at the latter place having much less value) is explained by the condition in which the fish were brought, a large percentage of the Gloucester fish being salted, while practically the entire receipts at Boston consisted of fresh fish.

The aggregate quantity of ground fish, mackerel, and other fish brought into Boston by American fishing vessels in 1894 was larger than for any previous year. The growth of the market fisheries centering at Boston is one of the most noteworthy features of the New England fisheries in recent years. The expansion of this branch has been largely at the expense of the salt-fish business. The following table shows the extent of the ground-fish trade during the six years ending in 1894. The receipts in the last-named year are seen to have exceeded by over 13,000,000 pounds those for 1892, the next highest year, and to have been over 19,000,000 pounds more than the average for the six years.

Years.	Pounds.
1889	46,319,693
1890	55,805,615
1891	68,026,517
1892	71,756,181
1893	65,396,342
1894	84,486,135

The number of trips of fish brought into Boston in 1894 was 4,537. The arrivals from the grounds east of the sixty-sixth meridian numbered only 289, while 4,248 were from the grounds adjacent to the New England coast, this being in marked contrast to Gloucester, where more than one-fifth of the fares were from the far eastern grounds. The number of trips from La Have Bank was 135, from Western Bank 86, from Cape Shore 66, and from Grand Bank only 1. Georges Bank, Middle Bank, and Jeffreys Ledge each contributed between 500 and 600 fares, South Channel over 650 fares, and general shore grounds over 800 trips.

Of the fishes which enter into the fish trade of Boston the haddock is preeminent. The quantity brought in during 1894 was over 39,500,000 pounds, valued at $640,000. The receipts exceeded those of the previous year by over 8,000,000 pounds. The quantity taken on Georges Bank was over 13,000,000 pounds, and in South Channel nearly 10,000,000 pounds. The catch on these two grounds was 5,000,000 pounds greater than in 1893. Of the remaining grounds the most important as regards the haddock catch were Middle Bank, Jeffreys Ledge, Cashes Bank, Browns Bank, and off Highland Light.

Cod ranks next to haddock in importance. The receipts at Boston were over 21,500,000 pounds, having a value of nearly $500,000.

Georges Bank and South Channel contributed nearly half the catch, Georges alone being credited with 5,250,000 pounds. La Have Bank, Cashes Bank, Browns Bank, and Nantucket Shoals are also important grounds. The quantity of cod landed in 1894 was 5,600,000 pounds greater than in 1893, the increase being shared by all the banks named.

The quantity of hake brought to Boston was nearly 15,000,000 pounds, valued at $135,000. The South Channel yielded more hake than any other grounds, although Georges, La Have, Cashes, and Middle banks and Jeffreys Ledge were also very productive grounds. The receipts of hake were over 3,000,000 pounds larger than in 1893, the increase being chiefly in the catch on La Have and South Channel.

The cusk landed amounted to 5,840,000 pounds, with a market value of $75,000. Cashes and La Have banks contributed more than any other grounds. The catch in 1894 was 1,600,000 pounds more than in the previous year. Of pollock, 900,000 pounds, valued at $12,000, were taken, principally on La Have, Cashes, and Jeffreys. The halibut receipts were 1,669,000 pounds, worth $158,000; three-fourths of this quantity came from Western, La Have, and Georges banks.

The mackerel receipts at Boston in 1894 consisted of 855,000 pounds of fresh fish and 1,335,000 pounds, or 6,675 barrels, of salt fish. The grounds off Race Point and the Cape Shore yielded the principal part of the fresh and salt fish, respectively. In 1893 the quantity of both fresh and salted mackerel brought to Boston was less than in 1894.

In the following table the receipts of the different fish from the various fishing-grounds are shown:

Summary by fishing-grounds of certain fishery products landed at Boston, Mass., in 1894 by American fishing vessels.

Fishing-grounds.	No. of trips from each ground.	Cod.		Cusk.		Haddock.	
		Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
East of 66° W. longitude:							
La Have Bank	135	2,342,500	$52,539	1,000,000	$12,499	1,450,500	$20,700
Western Bank	86	985,400	20,165	301,300	3,752	158,400	2,754
Grand Bank	1	275,000	6,875				
Cape Shore	66	749,400	21,702	198,000	2,641	583,300	8,891
Cape North	1						
West of 66° W. longitude:							
Browns Bank	79	986,000	18,390	282,800	3,483	1,392,500	17,452
Georges Bank	528	5,259,900	112,884	700,500	9,532	13,121,800	195,026
Cashes Bank	202	1,440,900	33,318	1,683,400	21,066	1,481,700	24,901
Fippenies Bank	21	72,200	2,010	74,000	943	110,700	2,020
Tillies Bank	18	53,800	1,436	9,500	124	71,600	1,725
Clark Bank	13	73,500	1,528	1,200	14	155,500	2,263
Ipswich Bay	42	252,600	5,068	3,000	38	144,600	2,248
Jeffreys Ledge	517	885,200	23,125	157,000	2,185	2,736,250	53,311
Middle Bank	577	873,750	21,029	113,600	1,472	2,994,900	56,187
Off Race Point	220	237,600	6,157			257,700	5,460
Off Highland Light	323	847,600	20,498	138,000	1,759	1,979,500	35,643
Off Chatham	111	368,000	8,525	53,800	700	1,072,000	19,554
South Channel	657	4,090,700	95,212	847,600	10,686	9,754,700	155,342
Nantucket Shoals	111	1,095,300	28,776	2,000	25	554,600	8,087
Shore, general	829	797,980	19,606	280,100	3,381	1,482,200	27,502
Total	4,537	21,687,330	498,843	5,840,800	75,200	39,502,450	639,726

Summary by fishing-grounds of certain fishery products, etc.—Continued.

Fishing-grounds.	Hake.		Pollock.		Halibut.	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
East of 66° W. longitude:						
La Have Bank	1,721,100	$15,491	117,100	$1,695	315,700	$29,236
Western Bank	253,600	2,694	12,200	179	734,300	71,165
Cape Shore	312,500	2,491	24,400	397	40,700	3,434
Cape North					8,000	480
West of 66° W. longitude:						
Browns Bank	220,500	2,112	13,700	203	172,500	15,392
Georges Bank	1,261,800	13,140	98,300	1,563	223,850	21,347
Cashes Bank	2,308,700	20,235	138,100	1,925	19,200	1,906
Fippenies Bank	126,500	1,083	5,100	62	1,000	145
Tillies Bank	118,500	992				
Clark Bank	18,200	144	1,000	10	14,400	1,126
Ipswich Bay	7,900	72	4,300	45		
Jeffreys Ledge	1,152,100	11,681	177,500	2,401	3,230	352
Middle Bank	987,200	9,978	98,000	1,249	8,700	851
Off Race Point	6,200	54	7,000	70	500	80
Off Highland Light	771,900	6,923	28,600	360	8,175	997
Off Chatham	313,500	2,700	8,200	70	1,900	237
South Channel	4,131,000	34,902	79,100	938	109,400	10,686
Nantucket Shoals	43,600	353	36,600	415	6,700	564
Shore, general	1,108,300	9,723	73,400	907	1,600	152
Total	14,863,100	134,774	922,600	12,489	1,669,855	158,150

Fishing-grounds.	Mackerel.*				Other fish.†		Total.	
	Fresh.		Salted.					
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
East of 66° W. longitude:								
La Have Bank					1,550	$70	6,948,450	$132,230
Western Bank							2,445,200	100,709
Grand Bank							275,000	6,875
Cape Shore	54,203	$3,431	820,400	$24,482	250	14	2,783,153	67,483
Cape North							8,000	480
West of 66° W. longitude:								
Browns Bank							3,068,000	57,032
Georges Bank					103,600	6,837	20,769,750	360,929
Cashes Bank					500	50	7,072,500	104,301
Fippenies Bank							389,500	6,263
Tillies Bank							253,400	4,277
Clark Bank							263,800	5,085
Ipswich Bay							412,400	7,471
Jeffreys Ledge	1,604	126			6,700	230	5,119,584	93,411
Middle Bank	24,697	2,051			12,050	803	5,112,897	93,620
Off Race Point	418,625	27,562	178,500	8,890	5,188	36	1,111,313	48,309
Off Highland Light	25,410	2,085	7,000	315	4,900	98	3,806,085	68,678
Off Chatham					1,000	5	1,818,400	31,707
South Channel					61,470	3,261	19,073,970	311,027
Nantucket Shoals							1,738,800	38,220
Shore, general	331,309	24,014	329,900	18,084	590,130	26,392	4,995,009	129,821
Total	855,938	59,269	1,335,800	51,771	787,338	37,796	87,465,211	1,662,018

*The fares of mackerel numbered 249, of which 132 were from the general shore grounds of New England, 92 from off Race Point, 14 from Cape Shore, 6 from Middle Bank, 4 from off Highland Light, and 1 from Jeffreys Ledge.

†"Other fish" includes 411,600 pounds of swordfish, $33,883; 249,300 pounds of menhaden, $2,605; 99,100 pounds of herring, $974; 16,400 pounds of sea catfish, or wolf-fish, $230; 8,000 pounds of whiting, $40; 1,688 pounds of shad, $14; 1,250 pounds of bluefish, $50. The swordfish fares numbered 54, as follows: 35 from shore grounds, 236,480 pounds, $22,728; 14 from Georges Bank, 103,600 pounds, $6,837; 2 from South Channel, 59,470 pounds, $3,251; 2 from Middle Bank, 9,050 pounds, $738; 1 from Jeffreys Ledge, 1,700 pounds, $205; 1,300 pounds, $124, were brought in with other fish from La Have, Georges, and Cape Shore. Of herring, menhaden, and bluefish, 10, 27, and 1 fares, respectively, were landed from shore grounds. The shad, which came from off Race Point, and the whiting, from Jeffreys Ledge and shore grounds, were taken incidentally and landed with other fish.

Considering the combined fish trade of Boston and Gloucester in 1894, it appears that 8,120 fares of fish were brought in, which aggregated 167,116,817 pounds, and were valued at $3,897,671. It should be understood that in addition to the foregoing, very large quantities of fishery products are landed by merchant vessels from United States and Canadian ports and that the receipts by rail are also important. The number

of trips in 1894 exceeded that in 1893 by over 1,100. The increase in receipts was nearly 25,000,000 pounds, but the value of products decreased over $200,000, the value of the augmented yield of cod, haddock, etc., not compensating for that of the diminution in the mackerel catch. The following table is a recapitulatory comparison, by fishing-grounds, of the fish receipts in 1893 and 1894. For a more detailed exhibition of the changes in the two years, the foregoing tables may be compared with similar tables in the previous report of this division.

Grounds.	No. of trips.		Pounds.		Value.	
	1893.	1894.	1893.	1894.	1893.	1894.
La Have Bank	193	312	7,081,405	13,060,397	$189,934	$291,686
Western Bank	141	208	4,140,169	5,194,723	217,859	275,221
Quereau Bank	164	120	3,071,980	2,383,033	237,871	165,559
St. Peters Bank	7	20	223,980	491,890	14,805	32,160
Green Bank	2	35	48,400	898,187	4,542	68,025
Grand Banks	148	149	19,041,180	19,123,860	572,591	532,668
Canso Bank	9	6	867,480	261,430	24,361	6,929
Cape Shore	147	166	5,668,380	7,605,253	240,947	205,347
Cape North	.....	2	.....	95,200	.....	2,412
Gulf of St. Lawrence	37	27	1,724,730	1,202,000	84,301	66,265
Iceland and Greenland	11	14	1,845,900	1,490,500	103,327	84,752
Off Newfoundland	4	6	137,250	264,620	7,732	15,367
Browns Bank	71	121	2,665,900	4,784,670	54,951	78,545
German Bank	1	3	30,000	77,000	255	1,188
Georges Bank	1,210	1,310	31,202,772	40,610,785	900,849	873,695
Cashes Bank	476	427	18,427,090	15,346,260	244,866	186,717
Fippenies Bank	15	22	241,200	420,500	5,287	6,630
Tillies Bank	7	18	66,000	253,400	1,382	4,277
Clark Bank	7	13	220,000	263,800	4,718	5,085
Jeffreys Ledge	538	565	5,053,365	5,574,784	104,650	97,425
Middle Bank	571	594	4,967,530	5,296,109	108,507	95,949
Off Highland Light	215	325	2,633,785	3,845,085	52,411	69,036
Off Chatham	90	112	1,502,132	1,841,400	28,205	31,947
South Channel	556	725	14,082,550	21,249,770	285,244	331,140
Nantucket Shoals	119	142	2,533,800	2,775,620	69,892	62,776
Shore, general	2,194	2,678	13,986,070	12,697,541	526,013	307,810
Total	7,014	8,120	142,396,448	167,116,817	4,099,847	3,897,671

The following statement is a summary comparison of the aggregate receipts at Boston and Gloucester in 1893 and 1894, each of the prominent fishes being shown separately:

Species.	Pounds.		Value.	
	1893.	1894.	1893.	1894.
Cod	54,627,104	63,590,830	$1,596,010	$1,601,901
Haddock	33,908,780	45,611,856	685,500	683,875
Hake	19,991,600	23,343,815	193,043	191,000
Cusk	9,283,370	10,045,640	140,400	138,708
Pollock	3,614,626	2,181,221	33,632	20,766
Halibut	9,702,911	10,905,122	795,258	849,586
Mackerel	9,296,220	8,013,400	612,505	351,148
Other fish	1,881,837	2,824,033	43,499	56,787

RÉSUMÉ OF REPORTS ISSUED.

The printed articles emanating from this division in 1895 consisted of statistical and descriptive reports on the fisheries of the Great Lakes and Middle Atlantic States, a general paper on the statistical aspects of the United States fisheries, and several reports treating of special subjects. An outline of the nature and scope of these papersis given.

In August, 1894, a report of the Commissioner of Fish and Fisheries on the salmon industry of the Columbia River basin was made to Congress, and issued as a Senate miscellaneous document. The report is based largely on data gathered by Mr. W. A. Wilcox, field agent of this division.

Statistics of the Fisheries of the United States. (Bulletin 1893, pp. 389–417.)

This is a brief but comprehensive summary of the fisheries in 1890, 1891, and 1892, but principally in 1892, based on the inquiries of the statistical agents of the division. The statistics cover the fishing industries of all States bordering on the coasts and Great Lakes, and show the condition of the fisheries of each State, the quantity and value of the yield of each principal product, the catch with each major form of apparatus, the actual and relative importance of United States fisheries as compared with those of other countries, and the changes in the principal phases of the industry as compared with 1880.

The report shows the number of persons employed in the fishery industries of the coastal and Great Lakes States to have been 182,376; the amount of capital invested, $58,245,406; the value of products to the fishermen, $45,312,818. The most valuable products were oysters, worth $16,152,257; Pacific salmon, $3,710,250; Atlantic cod, $2,856,225; whalebone, oil, etc., $2,141,738; shad, $1,879,688; clams, $1,690,536; mackerel, $1,102,651; lobster, $1,050,677, and haddock, $1,045,814.

This paper was primarily prepared for presentation to the World's Fishery Congress at Chicago in 1893, and is referred to in the last report of the division.

Report on the Fisheries of the Great Lakes. (Report 1892, pp. 361–462.)

This report represents the results of an investigation of the economic fisheries of the Great Lakes conducted by this division during the fiscal year 1892, and illustrates the condition and extent of the industry during the year ending December 31, 1890. It is a detailed statistical presentation of the various phases of the lake fisheries. The statistical matter and the accompanying text are arranged with a view to show, (1) the general extent of the lake fisheries and their condition as compared with 1880 and 1885; (2) the fisheries considered by lakes; (3) the fisheries considered by States, and (4) the extent and results of artificial propagation. A feature of this paper which has not appeared in any previous report on the Great Lakes fisheries is the presentation of statistics showing the quantity of each principal fish taken with each kind of apparatus. A basis is thus furnished for determining the existence of augmentation or diminution in the supply of the various fishes, the extent of the increase or decrease, and the form of fishery in which it has occurred.

The extent of the fisheries of the Great Lakes in 1890, as indicated by this report, was as follows: Persons employed, 9,738; capital invested, $5,362,744; pounds of fish taken, 113,898,531; value of the catch to the fishermen, $2,471,768.

Notes on the Oyster Industry of New Jersey. (Report 1892, pp. 463-528.)

The importance of the oyster industry of New Jersey and the examples there afforded for the prosecution of oyster-culture in localities possessed of similar physical conditions make this paper timely and valuable. It is based on original inquiries by Mr. Ansley Hall, field agent of the division, during 1892, in the course of which all parts of the State having oyster interests were visited and a careful study made of the conditions, special attention being given to the methods of planting and cultivation. New Jersey now ranks fourth among the oyster-producing States, being surpassed only by Maryland, New York, and Virginia, this high rank being largely the result of advanced methods of oyster-culture.

While the New Jersey Agricultural Experiment Station has devoted considerable attention to the embryology and natural history of the oyster, no comprehensive account of the economic conditions of the industry in that State had appeared since 1880.

The report discusses the history and present condition of the industry in each of the three important oyster regions, viz: (1) The northern coast of New Jersey, (2) the ocean side of New Jersey, and (3) the New Jersey side of Delaware Bay (Maurice River Cove). The methods and conditions here prevailing are, in many respects, dissimilar to those in any other State, and there are many phases of the subject which afford suggestive information of great value, not only to States in which the artificial production of oysters has but recently been undertaken, but those in which successful cultivation has long been practiced.

The most recent data contained in the report relate to the calendar year 1892, during which 4,351 persons were directly engaged in the oyster industry of the State, $1,393,892 was invested, and 1,097,228 bushels of marketable oysters were obtained, for which the producers received $1,220,878.

A Bibliography of Publications in the English Language relative to Oysters and the Oyster Industries. (Report 1892, pp. 305-359.)

Although the literature relative to the oyster and the oyster industries is very rich and comprehensive, yet it is so widely distributed through publications and periodicals of almost every description that the casual inquirer has difficulty in finding references to reports of any special branch of the oyster business. This compilation is intended to supply the need experienced by many persons interested in the literature of this important subject. The paper gives the titles and descriptions of 546 separate publications, the work of 278 authors. Of these articles, 294 were issued in the United States, 26 in Canada, 176 in England, 25 in Scotland, 10 in Ireland, and 15 in various other countries. Of the American publications, 73 were printed by the United States Fish Commission; of these, 25 were translations and 48 original articles. A brief account of the scope of most of the publications is given, and abstracts of important or interesting statements occurring in some of the papers enhance the value of the article. A subject index

and an index of authors facilitate the finding of works on special topics and the papers of individual writers.

Notes on a Reconnoissance of the Fisheries of the Pacific Coast of the United States in 1894. (Bulletin 1894, pp. 223-288.)

The inquiry on which this paper is based was made in May and June, 1894, and is referred to in the previous report of the division. The article embodies the results of observations on the condition of the salmon industry of the different sections that it was deemed advisable to visit; the development of the market fishery and the sardine industry; the history, growth, and present extent of the sturgeon fishery of the Columbia River; and notes on several other branches of the fisheries that possess special interest. A special feature of the paper is the presentation of detailed statistical data showing for certain apparatus, fishermen, and years the fluctuations in the catch of different kinds of salmon in various parts of the Columbia River.

A Statistical Report on the Fisheries of the Middle Atlantic States. (Bulletin 1894, pp. 339-467.)

This completes the series of papers on the economic fisheries of the different geographical coast sections, the regions for which reports have been previously issued being the New England States, the Pacific States, the Gulf States, and the South Atlantic States, in the order named. The present paper is based entirely on original field investigations carried on by agents of this division during parts of the fiscal years 1891, 1892, and 1893; and the statistics and other information obtained relate to the calendar years 1889, 1890, 1891, and 1892. The statistical matter consists of (1) general condensed tables showing by States the extent of the fishery industry in the entire region, (2) detailed data for each State by counties, (3) a series of tables giving the extent of some of the more important fisheries, and (4) comparisons with 1880.

In the items of persons engaged and the value of the products the commercial fisheries of the Middle Atlantic States are more important than those of any other geographical section of the United States; but the amount of capital invested is much less than in the New England States. The returns show that during the last year covered by the statistics 90,923 persons were engaged in the various branches of the industry; $19,318,664 was invested in the vessels, boats, apparatus, and other property employed; and the value of the products at first hands amounted to $19,023,474. This represents an increase since 1880 of 51.91 per cent in the number of persons employed, 32.35 per cent in value of investment, and 13 per cent in the value of the yield.

The branches that are noticeably important and surpass in value those of all other regions combined are the fisheries for oysters, clams, shad, menhaden, bluefish, squeteague, crabs, alewives, striped bass, sea bass, white perch, yellow perch, Spanish mackerel, and terrapin. During the last year reported the value of the oysters taken was $12,402,925; clams, $1,222,495; shad, $1,216,589; menhaden, $615,829; bluefish, $591,479, and squeteague, $480,887.

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1.—REPORT UPON THE INVESTIGATIONS OF THE U. S. FISH COMMISSION STEAMER ALBATROSS FOR THE YEAR ENDING JUNE 30, 1895. (ABSTRACT.)

By Lieut. Commander F. J. Drake, U. S. N., *Commanding.*

On July 1, 1894, the *Albatross* was in latitude 57° 22′ N., longitude 167° 36′ W., 86 miles ENE. from St. Paul Island, Bering Sea, in search of sealers and pelagic sealing vessels. A few seals were observed in that locality, playing about the ship, jumping and diving. The weather was cloudy, low overcast, settling into a fog during the evening. The course was laid for Shaw Bay, and the run made in a dense fog with light northerly wind. The coast of Unimak Island was sighted the afternoon of the 2d about 9 miles west of Cape Lapin, after running in by soundings to 10 fathoms, as the fog hung low, obscuring the bluffs, and the shore only a few feet above the surf could be distinguished. Feeling our way along the shore to the northward and eastward, Cape Lapin was rounded with the intention of entering Shaw Bay. The fog shutting down thick, prevented search for sealers in Shaw Bay, and the *Albatross* was therefore put offshore in the vicinity of Unimak Pass for the night. The current around Cape Lapin was found to have a velocity of 2½ to 3 knots per hour, setting to the westward.

The next morning, July 3, we stood in for Akutan. The fog lifting gave the outline of the island in relief against a bank to the southward. Approaching that island from the north two currents are encountered, an offshore current 20 miles from the island setting in an opposite direction to the inshore current, east and west. Entering Akutan Bay, on a SSE. (magnetic) course, at a distance of 2 miles from Akun Island, opens out the bay between these islands and discloses the entrance of Akutan Harbor by a bold, black bluff facing the southeast point of the island. When abreast of a prominent pinnacle rock on the Akun shore, 4 miles from the entrance, stand across the bay on a SSW. (magnetic) course. Rounding the bluff, at a distance of half a mile on the starboard hand, opens the bay, disclosing the settlement on the north shore, situated on a projecting spit, which is steep. Steer a midchannel course and anchor close to the shore abreast of the village in 18 fathoms, or proceed to the head of the bay, 1¼ miles above the village, and select anchorage in 5 to 7 fathoms.

Owing to the short stay of the *Albatross*, we anchored off the village in 18 fathoms, soft bottom, two ship's lengths from the beach, with the Greek church bearing NW. ½ N. (magnetic). The bay is about 3

miles in length, ¾ to 1¼ miles in width, and free from outlying rocks except at the bluff, north entrance, which it is well to give a berth of one-fourth mile at least. A Greek frame church and 6 frame houses belonging to the Alaska Commercial Company, and 14 barabaras, constitute the village. The population numbers 66 all told, 33 males and 33 females. Fishing and fox and sea-otter hunting are their only employments. At the time of our visit the men were away on the Sannak Islands engaged in otter-hunting for the company. Fishing is pursued only as a means of subsistence. The seining and fishing parties sent out from the ship were not successful, owing to the limited space over which they were able to work. With sufficient time to make an examination of Akutan Harbor favorable results would probably be obtained relative to its fishery resources. A late spring had somewhat retarded the verdure, yet the snow was fast disappearing from the base of the hills, and wild flowers were budding forth. A prominent landmark, looking up the valley at the head of the bay, is the lofty peak of Akutan Volcano, skirted by an unbroken snow-belt and sending out clouds of smoke and steam. On leaving Akutan Harbor we ran into a dense fog at the entrance, which was carried until our arrival in Dutch Harbor.

The course was laid 4 miles off the north shore of Akutan, SW. ½ S. In a run of 18 miles on this course a set SSE. of 8 miles was experienced, which brought us up in Kalekhta Bay, east of Cape Kalekhta, at 8 p. m. A course was then laid NW. ½ W. 20 miles, then SW. ½ S. 20 miles, then SE. ½ E., picking up Unalaska Island at 9 a. m. July 4, and running in by the lead to 8½ fathoms a good anchorage was found on a little plateau in one of the small bays which indent this coast. A dense fog prevailing, the boats were sent out and made a reconnoissance, which located us 7 miles west of Wislow Bay. The ship was dressed at each masthead and a salute of 21 guns fired at noon in honor of the day. Getting under way at 1 p. m. we picked our way along the coast, rounded Cape Cheerful, and anchored in Dutch Harbor at 4.10 p. m. Found the U. S. S. *Mohican* and *Petrel* in port; also the coal ship *Iroquois*, steam collier *Willamette*, and whaling bark *C. H. Bailey*.

Orders were received from the commander in chief "to proceed to the Pribilofs for the purpose of landing Messrs. Townsend and Miller, to communicate with the senior naval officer, then to further proceed to the southern entrance of Isanotski Strait, and there report to the commanding officer of the *Petrel* for such instructions as he might give in regard to the examination to be made of the anchorages to which small vessels resort in and around the Sannak Islands. When the duty is completed return to the Isanotski Pass, anchor in it where sealing vessels that may attempt to pass through can be intercepted, then proceed with the repairs upon the boilers and engines that were interrupted. Complete them within six days, and then return to Unalaska."

Accordingly, the *Albatross* was coaled on the 7th and sailed at 6 a. m. the 8th. Mr. J. Stanley-Brown, the agent of the North American Commercial Company, desiring passage to the Pribilofs, came on board as

my guest. The evening of the 8th closed with every indication of approaching bad weather. On the 9th, 10th, and 11th it blew a stiff gale from the SW., was overcast and rainy, moderating by noon of the 12th. St. George was made, running in by soundings, on the morning of the 9th. A good anchorage was found off the village, north side, in 9½ fathoms, where the *Albatross* rode out the gale in company with the U. S. S. *Alert* until the 12th. A heavy surf prevented any communication with the shore. The appearance of the weather not indicating a settled condition, with the barometer fluctuating between 30.26 and 29.70, and a heavy fog hanging over the island, and no immediate prospect of landing Messrs. Townsend and Miller with their outfit in order to photograph the rookeries on St. George, it was therefore decided to try St. Paul, and to return to St. George at a later date.

Accordingly, the *Albatross* got under way at 11 a. m. on the 12th and anchored at 8.30 p. m. on the north side of St. Paul, where the U. S. S. *Ranger* was still at anchor riding out the gale. Messrs. Brown, Townsend, and Miller were safely landed with their outfit, when the *Albatross* left at 11 p. m. for Isanotski Strait.

The next day we were obliged to stop the engines for several hours in order to replace two dowel pins which had suddenly broken off, but were under way again at 4.40 p. m. In latitude 56° 35′ N., longitude 168° 18′ W., St. George bearing WSW. ¼ W. (magnetic), distant 44 miles, we sounded in 59 fathoms, green mud and sand. During our wait a fishing trial of thirty minutes with an average of 13 lines revealed a fair fishing station, Hyd. No. 3502. The catch consisted of 76 cod; average weight, 10⅜ pounds; average length, 30 inches.

Off Unimak Pass, in Bering Sea, we overhauled and boarded the *Uranus*, fisherman, ninety-three days out from San Francisco. She is a three-masted schooner owned by C. G. Jorgensen, carries a crew of 14 men, and is equipped with 9 dories and 1 ordinary boat. She had been fishing along the south shore and islands of the Alaska Peninsula, but with small success, and was on the way to Baird Bank, cod fishing.

Sunday, July 15, we arrived at the mouth of Isanotski Strait, Ikatan Bay, and anchored, having run a line of soundings from Cape Lazareff, 18 miles west of Cape Pankof, to Ikatan Bay, at an average distance of 1 mile from shore. The shelf appears to slope gradually from 25 fathoms off Cape Pankof to 60 fathoms off Cape Lazareff, the bottom being composed of dark and gray sand and gravel.

A short reconnoissance was made of Ikatan Bay on the 16th, to locate headlands. In the afternoon we entered the pass at high water and steamed up to Morzhovoi village, a distance of 8 miles. Found an anchorage in the middle of the cove off the village, in 4½ fathoms, with the Greek church bearing S. ¼ E. (magnetic), muddy bottom, and good holding-ground. A high bluff on the north side forms a good protection from northerly winds, which, however, are drawn through the cove with much force at times from the eastward. The harbor is landlocked and is a safe anchorage in all winds except from the southwest.

Fishing, hunting, and seining parties were sent out. Flounders, sculpins, small cod, salmon, salmon trout, sea trout, and clams were found here. On certain week days during the salmon season the seine is hauled by the native women, who wade into the water up to their shoulders while the men stand on the shore and direct their movements.

The settlement of Morzhovoi village consists of 34 males and 40 females, of native blood, and 6 whites. Several low frame houses, the property of the Alaska Commercial Company, a Greek frame church, and a number of barabaras constitute the dwellings. The village is situated on a low sloping bluff, terminating in a rocky and gravelly spit on the south shore of the cove. Bear, fox, and otter hunting are the principal occupations.

Our stay of three days at this port gave us the first opportunity in the cruise to overhaul the engines and make some repairs which were absolutely necessary. In the meantime the officers of the ship made a reconnoissance of the harbor (Traders Cove), and Isanotski Strait, or False Pass, as it is commonly known, running lines of soundings and correcting the shore line, which was much out, thereby doing some valuable work in developing this locality for future navigation.

From careful inquiry and statements made by the traders and natives at this port, I found that during a brief period of about twelve days in the first part of June, fur-seals are observed to pass into Bering Sea by this route. Then all traces of them disappear as suddenly as they came. The tides in Traders Cove are much influenced by the prevailing winds. A backset, however, is observed in the ebb tide, making a long and short tidal interval of $15^h\ 30^m$ flood and $8^h\ 30^m$ ebb.

Leaving Morzhovoi on the morning of July 20, the *Albatross* passed out of Isanotski Strait with a strong ebb tide and dense fog, making about 16 knots over the ground. At 10.20 a. m. anchored in Ikutan Bay near the U. S. S. *Petrel*, which was waiting our arrival in order to proceed to the Sannak Islands. In Ikutan Bay good holding-ground is found in a small cove immediately west of Ikatok Point, on the south side of the bay, which offers good protection from southeasterly, southerly, and southwesterly winds and sea. For northeasterly, northerly, and northwesterly weather, a safe anchorage is found on the north side of the bay west of Sankin Island, close to and under the bluff east of the entrance to the strait. Both anchorages are free from the rush of tide, which has a velocity of 7 to 9 knots in the pass.

In this bay were found young salmon, salmon trout, tomcod, sand lance, flounders, and sea trout. Cod and halibut were caught in large numbers with hand lines.

On July 22 got under way in company with the U. S. S. *Petrel*, and stood over for the Sannaks. Commenced a line of soundings abreast of Cape Pankof, bearing SW. ¼ S., distant 1 mile, and continued same with 3-mile intervals to Acherk Harbor, Sannak Island. The deepest water between Cape Pankof and Acherk Harbor was found 1½ miles ESE. from Cape Pankof, where it reaches 50 fathoms. It shoals gradually

to 14 fathoms at the entrance to Acherk Harbor, one-fourth mile from the shore. A thick fog shutting down prevented a continuation of the line of soundings along the north shore of the Sannaks. We therefore anchored in the entrance to Acherk Harbor in 11 fathoms, soft bottom. The steam cutter was lowered and equipped for a two-days' run, in order to make an examination of the harbors and shore line of the north and east sides of these islands. Taking the whaleboat of the *Petrel* in tow, the cutter left the ship, in charge of Ensign W. R. Shoemaker, U. S. Navy, assisted by Ensign M. L. Bristol, U. S. Navy, from the *Petrel*. The cruise of the cutter was successful as far as searching the coast line and harbors for the presence of seals and sealers is concerned. They covered a distance of 40 miles, and returned without accident, having run the greater portion of the distance in a dense fog, working in and out among the reefs, which are numerous around the harbors of these islands.

The following day, July 23, it blew fresh from the SW., with thick fog, and heavy sea breaking on the reefs half a mile to the westward of our anchorage. These reefs form a good breakwater to vessels lying at anchor in the entrance to Acherk Harbor in 10 or 12 fathoms of water. As the weather did not improve, it therefore became impossible to make an examination of the bottom on the north side of the islands within the limited space of time allowed. Hence the *Albatross* left Acherk Harbor in the forenoon of July 24 to return to Dutch Harbor, Unalaska. A dense fog was carried to Unimak Pass, when it lifted sufficiently to lay a course through the pass. The next morning fell in with the American bark *J. D. Peters*, of San Francisco, returning from Port Clarence. Sent officer on board to warn him. Came to anchor at 11 a. m. Found the U. S. S. *Mohican* and *Alert* in port. The *Petrel* arrived the same evening, and the *Concord* on the 29th.

Coaled on the 27th and 28th, and sailed on the 30th to cruise to the westward and northwestward of the Pribilof Islands, outside of the 60-mile zone. A detour was made to the westward of Dutch Harbor for a distance of 164 miles, which placed us in the SW. quadrant, 100 miles from St. George, at noon of the 31st of July. Having sighted none of the sealers which had cleared for Bering Sea on the 28th, the course was then laid for St. George in order to pick up the naturalists, who had been left at the Pribilofs on our previous visit.

We arrived off St. George and anchored off the village on the morning of August 1; found the U. S. S. *Adams* there. Left mail for St. George, and got under way for St. Paul Island, where we arrived at 6 p. m., and found Messrs. Townsend and Miller, who came on board. We sailed that evening for a cruise to the northwest of the Pribilofs. On August 3 and 4 a line of soundings was run in order to develop the platform in this region. The line terminated in latitude 60° 25′ N., longitude 178° 49′ W., 125 miles from Cape Nazarin, eastern Siberia, bearing N. 29° W. true. The appearance of bad weather approaching, together with a limited coal supply, prevented further continuation of the line

of soundings to the 100-fathom curve, which was probably within a distance of 45 miles north of our position. A summer gale, common to this section, set in and blew for 36 hours from the southward and eastward, compelling us to lay a course to the northward and eastward. Accordingly, we worked over to the vicinity of St. Matthew Island, and then shaped a course to the southward and westward in order to ascertain presence of seals and sealers in this region.

August 7 and 8 were days of fair sealing weather, with comparatively smooth sea and light airs from the southward. Passing to the southwest through this quadrant, at an average distance of 75 to 90 miles from St. Paul, many seals were observed. Outside of 200 miles from St. Paul, northwest, no seals were visible. By stopping the engines and allowing the ship to lie passive in the water, as many as 20 seals were counted alongside within a few feet of the ship, some playing and jumping, apparently young seals, from their smaller size, while the larger size were principally sleeping. By sending out a boat with Mr. Townsend and a camera several photographs were obtained of seals, both asleep and playing. Over 30 were counted by the boat's crew within the space of one hour at a distance of less than half a mile from the ship. A fishing trial was made at this place, latitude 58° 2′ N., longitude 172° 57′ W., in 61 fathoms, which resulted in a catch of 37 cod; average weight 15 pounds, average length 28 inches; 19 males, 18 females. An analysis of the contents of the stomachs showed this to be a rich feeding-ground. Cruising on the 9th in the southwest sealing belt, numerous seals were seen going to and coming from the islands at a distance of 20 miles outside of the 60-mile limit.

The 10th of August was a perfect sealing day, smooth sea, with long swell from the SW. and light airs from east. At 5.20 a. m., latitude 55° 55′ N., longitude 171° 45′ W., St. George Island bearing NE. ¼ N. (magnetic), distant 91 miles, we encountered large schools of seals of different sizes, some playing and jumping, others sleeping. The beating of the propellers would awake the sleeping seals at a distance of 150 to 200 yards, when they would dive and disappear. Surface and intermediate tow-nets were put over twice, the latter at a depth of 50 fathoms. The surface net showed numerous larval crabs, small crustaceans, and fish eggs. The intermediate net contained numerous small crustaceans and sagitta. The surface temperature was 44°; at 5 fathoms 43.5°; 10 fathoms 43° F. Large schools of seals have been observed within a radius of 75 miles of the Pribilofs in an arc extending from NW. to SW. and S. By stopping the ship, and thereby the noise of the propellers in the water, seals soon appear upon the surface and approach within a few feet of the vessel. In this way numerous schools have been counted, whereas with the ship under way only an occasional seal would be seen at a distance.

Falling in with the British sealer *Mascot*, of Victoria, I placed on board a tank of alcohol, in which stomach specimens of seals were to be placed, to be forwarded to Mare Island, thus obtaining additional data

of interest in determining the nature of pelagic species upon which seals feed, and the locality of the same.

Running short of coal, a return was made to Dutch Harbor, where we arrived on the 11th instant, having steamed 2,032.8 miles since our departure. After coaling, the *Albatross* proceeded on the 17th to continue the cruise among the sealers in the northwest, west, and southwest quadrants outside the prohibited zone. On August 19 called at St. George and left orders for vessels at the islands; then continued our cruise to NW. The evening of the 19th, 20th, and 21st we were hove to in a strong gale, which proved to be a circular storm commencing in the SE., hauling to the southward and then to NW., from which point it blew itself out on the third day. The 22d and 23d were hardly days for sealing, as the sea was still rough and irregular, with fresh breezes from the northward.

We stood across the sealing belt 150 miles to the westward of St. Paul and back to the 60-mile limit, zigzagging our course as circumstances dictated, in order to intercept sealers in this locality. Only two, however, were encountered, the *Mary Ellen* and the *Rosie Olsen*, both of Victoria. They had both returned from the Japan coast, and had taken to date in Bering Sea 67 and 42 fur seals, respectively. During the 24th we encountered another strong gale and heavy sea from the southward and eastward, which compelled us to lie to until the the 25th. We then stood away to the southward and eastward for purpose of intercepting any sealers in this portion of the sealing belt which had been blown off their ground during the late gales. Only one vessel was boarded, the *Walter A. Earle*, of Victoria, 95 miles SW. ½ S. (magnetic) from St. Paul Island. His catch at this time was 238 seals. A traverse course was then made, crossing and recrossing the sealing belt in the southern region, in which several seals were seen, but no sealers. During the gales a great many seals were seen making their way, as a rule, toward the islands.

During the ten days passed in cruising in the NW. and SW. quadrants, only one day was found in which sealers would lower boats. The captains of sealers were of the opinion that favorable sealing weather for the season had ended, and conditions pointed to an early close of the sealing season by the middle of September, as the few remaining days in which seals could be taken would not cover the expense of delay in the sea. The sealers all reported that five days out of seven were not sealing days on account of the numerous gales and strong winds which had occurred during the season. Hence, they looked for worse conditions in September. Moreover, the Indian hunters were becoming restless, and would not do good work except there was a prospect of an early return for the home port in September. From interviews with sealers, I found that the great majority had planned to leave the sea about the 10th of September; a few vessels which had white hunters might remain until later in the season. We continued cruising in the same quadrants of the sealing belt on the 26th, and at 3 p. m. of the 27th August were again at anchor in Dutch Harbor.

Referring to the use in this paper of the terms "sealing belt," and certain "quadrants" of the same, I quote here an extract from a letter addressed by me to the Commissioner, under date of August 27, 1894, which will explain the subject:

From a careful examination of the ground passed over by the *Albatross* during this summer's work in Bering Sea, in connection with the reports thus far obtained from sealers boarded and the locality in which seals have been taken in the sealing belt surrounding the prohibited zone, it appears that the sealing-ground for this year has been confined to the western, southern, and southeastern portions of the belt circumscribing the prohibited zone, and which is defined by two radii from St. Paul Island: one N. 51° W. true, the other S. 81° E., covering an arc of 210°. The southeastern and southern belts average 50 miles in width. The western belt varies from 50 to 75 miles, owing to the nature of the plateau in this locality as outlined by the 100-fathom curve. It is to be observed that a strong northerly set occurs in this locality which is not materially affected by northerly winds, but more properly by the topographical features of the bed of this portion of Bering Sea, connecting with the Aleutian chain of islands to the southward, which undoubtedly control the surface, subsurface, and warmer currents of the Japan stream passing into the sea. There is a possibility that this could bring with it certain pelagic species which would be sustained at or near the surface by the warmer subsurface currents rising as they approach the plateau, thereby making this a favorite feeding ground, for in this locality some of the largest catches have already occurred, reaching as high as 250 per diem per sealer.

The area of the western belt is 10,938 square miles. On the northwestern plateau of this belt 2,536 square miles are inside of the 100-fathom curve, in which its northeastern border commences in 65 fathoms; it then slopes gradually to the 100-fathom curve. The remaining portion of this belt, 8,402 square miles (77 per cent of the western belt), occupies the slope of the southwestern face of this plateau, varying in depth from the 100-fathom curve to 1,800 fathoms at its western limit.

The area of the southern belt is 6,700 square miles. Its eastern border commences at the 100-fathom curve on the southeastern plateau and slopes gradually to 1,700 fathoms at its western border connecting with the western belt.

The area of the southeastern belt is 4,950 square miles. Its northeastern border commences in 54 fathoms; it then slopes gradually to the 100-fathom curve, connecting with the southern belt.

	Square miles.
Total area of sealing belt	22,588
Area of sealing belt on plateau	7,486

Sixty-seven per cent of the sealing belt is therefore in deep water, outside of the 100-fathom curve.

We remained in Dutch Harbor, undergoing minor repairs and taking coal, until the morning of September 4, when we went to sea under orders from the commander in chief. Off the entrance to Unalaska Bay we fell in with and spoke the British schooner *Kilmeny*, of Victoria, with 600 seal skins, and the American schooner *Deeahks*, of Port Townsend, with 850 skins. They were both bound for Unalaska for water and provisions, and expected to leave the sea between the 10th and 15th of September. The same afternoon, off Akun Island, we boarded the American schooner *Jane Grey*, of San Francisco, with 138 seal skins. She had entered the sea from the Japan coast by way of Attu and was now bound home. The 5th and 6th were occupied in cruising to the southward of the 60-mile zone, and at noon of the latter date we fell in with and boarded the British schooner *Walter L. Rich*, of Victoria, with a catch in Bering Sea of 1,738 seals. This vessel was

bound home also. Leaving her off the entrance to Unimak Pass, the course was set for Dutch Harbor, where we arrived at 8.30 p. m.

The *Albatross* was coaled, and again went to sea at noon of the 8th, for a cruise around the Pribilofs. In order to expedite matters and avoid possible delays, I transferred Messrs. Townsend and Miller to the revenue cutter *Corwin* before leaving port, arrangements having been made for that vessel to convey them to the islands. On the evening of the 8th we fell in with and boarded the American schooner *Allie I. Alger*, of Seattle, bound to Unalaska for water and provisions, and thence home. She had been in the sea thirty-four days, and had taken 327 seals. The following morning spoke the British schooner *Triumph*, of Victoria. This sealer was to leave the sea for home in two days; had been in the sea forty days, and had taken 3,014 seals.

A traverse was run inside the 60-mile circle, touching a 40-mile circle around the Pribilofs, between the 9th and 11th of September, in which only a moderate blow was encountered on the night of the 10th. On the morning of the 11th it was decided to make a lee of St. George, then 40 miles distant, and verify our position. The island was picked up in a dense fog, and the course then shaped for St. Paul, making a run for Otter Island in a moderate cross sea. The latter island was not seen, owing to the dense fog, but was located by the heavy surf pounding on the beach. Then the course was changed for Village Cove anchorage, where we came to off Rocky Point reef in 17 fathoms, after making three attempts to find our way inside in the dense fog prevailing. The fog lifting the next morning revealed our position to be inside of the reef, bearing east (magnetic), and 3 miles from the anchorage in the cove. We got under way at 6 a. m., steamed in, and anchored near the revenue cutter *Corwin*. Messrs. Townsend and Miller came on board and reported their work finished on both St. George and St. Paul islands in counting the dead pups on the rookeries.

We left St. Paul at early daylight on September 13, with weather moderately clear. Passed St. George at 11 a. m., on the starboard beam 3 miles distant, and shaped course to finish traverse where it was suspended on the 11th. Running this out, with moderate weather prevailing, we returned to Dutch Harbor, coaled, and sailed again on the 17th for a short cruise between Unimak Pass and the Pribilofs in search of sealers. Found a rough cross sea running from the northward and westward during the two days we were out, the result of one of the numerous gales passing along the chain of islands at this season of the year. It was evident that most of the sealers had left the sea within a short time, owing to the steadily unfavorable weather prevailing.

We returned to Dutch Harbor again on the evening of the 18th, coaled, and received final orders to return to Mare Island via Sitka and Port Townsend. We left Dutch Harbor on the 20th at 11 a. m., with threatening weather, and passed out of Bering Sea through Unimak Pass that evening. A westerly wind kept the fog banked in Bering Sea, which enabled us to lay a course for Cape Pankof, passing to the northward of the Sannak Islands and reefs. The night being clear, we

were treated to an exceptionally fine view of Shishaldine Volcano in active operation, sending forth a constant flame, with occasional belching, which presented a fine panoramic view of the heavily snow-capped peaks and intervening ranges. In fact, bearings were frequently taken of the volcano, which served in a measure as a light-house, although only approximately located.

The morning of the 21st found us entering the inside passage of the chain of islands between the Sannaks and the Shumagin group. At 7 p. m. we passed out of Gorman Strait and laid course for Sitka. On the 23d we were compelled to lay to for an easterly gale. The remainder of the passage to Sitka was made against a head wind and sea. Mount Edgecomb was sighted at noon of the 26th, distant 60 miles; at 7.40 p. m. we came to an anchor under Mount Edgecomb in 18½ fathoms, soft bottom, with St. Lazaria Island bearing SSW. (magnetic), distant three-fourths of a mile. This anchorage was found to be apparently unaffected by the change of tide, as we lay all night heading on the beach, north (magnetic). The morning of the 27th we steamed into Sitka Harbor, going alongside the dock to coal. A photograph was taken of the Government storehouse and coal pile, which was forwarded to the Bureau of Equipment at their request. A southerly gale set in on the 28th, with a slowly falling barometer, giving indications of a spell of bad weather off the coast. It was therefore decided to take the inland passage from Sitka to Port Townsend, where we arrived on the morning of October 7. After receiving our mail, we steamed to New Whatcom for coal, finding the U. S. S. *Monterey* there. We coaled and sailed for San Francisco on the 10th, stopping en route at Victoria, to land Messrs. Townsend and Alexander, in order that they might continue their investigation of the seal catch for the season.

A fair run was made to San Francisco, without unusual events. A heavy fog set in off Point Reyes, compelling us to proceed with caution. The whistling buoy in the fairway off the bar was picked up at 1.25 a. m., and course laid inside with a strong ebb running. At 3.12 a. m., October 14, came to anchor in Sausalito Bay, having steamed, since April 11, 17,206.3 miles. October 17 the *Albatross* steamed to Mare Island for repairs and general overhauling. On the 20th the Navy Department telegraphed "The services of the *Albatross* are no longer required by the Navy Department." The *Albatross* accordingly returned to duty under the Fish Commission, and was so reported to the Commissioner.

Extensive repairs and changes in the hull of the vessel and her equipment were at once begun, and occupied something over four months, the Commissioner being telegraphed on May 11 that the *Albatross* would be ready to sail by May 20. We left Mare Island at 7.20 a. m., May 18, for Sausalito anchorage preparatory to going to sea. On the way down the bay adjusted new standard and steering compasses, besides visiting several establishments located on the north shore of San Pablo Bay (near Brothers Islands), which are engaged in catching and drying large quantities of fish for the market and exportation.

This industry is apparently fast depleting the waters of this bay, owing to the small size of the smelt, whitefish, and herring which are caught and dried.

The *Albatross* anchored in Sausalito at 1.20 p. m. In addition to the complement allowed by the Navy Department, the authorization of the Commissioner for the enlistment of ten men (five seamen and five ordinary seamen) and one machinist for the cruise, in order to bring the force up to the required cruising complement, was complied with.

General instructions outlining the summer's work in Bering Sea were received on the 2d of May, being classed under the four heads: "Sealing investigations at sea," "Observations on the Pribilof Islands," "Fishery investigations," and "Hydrographic inquiries." The *Albatross* sailed from Sausalito, passing out of the Golden Gate on the afternoon of the 21st of May, taking the Bonito Channel in order to avoid the heavy sea on the bar, which prevented sailing on the 20th instant. Point Reyes was rounded at 11 p. m., when we encountered a heavy head sea and wind. This was carried until the 23d, when it moderated. The 24th set in with a SE. gale, which we carried to anchorage in Neah Bay on the evening of May 25. Observations with regard to pelagic sealing and sealers were commenced here, as set forth in instructions.

On May 26, 6 a. m., we got under way, stood up the Strait of Juan de Fuca, and at 2.03 p. m. anchored off Victoria, where additional information was obtained relative to the number and class of sealers which will enter Bering Sea this summer. On May 28 the *Albatross* proceeded to Port Townsend, where a list of the Puget Sound fleet of Bering Sea sealers was obtained. Additional instructions were received here by which the *Albatross* was enabled to pursue sealing investigations at sea, among them being an executive order giving the commanding officer of the steamer *Albatross* authority to board sealing vessels, and defining the status of this ship with regard to the patrol fleet under the management of the Treasury Department.

Mr. Frederick W. True, curator of mammals in the United States National Museum, and Mr. D. W. Prentiss, jr., also from the National Museum staff, reported on board for passage to the Pribilof Islands for the purpose of making a study of the fur-seals on those islands. Mr. A. B. Alexander also joined the ship here.

On May 31, at 9.30 a. m., we left Port Townsend, passed through Haro Strait to Pender Island, where we anchored for the night in Otter Bay. An early departure was made the next morning, standing on through Active Pass and up the Strait of Georgia for Comox, Union Bay, where we coaled ship on June 3. At 7 a. m. of the 4th we took our departure from Comox and stood out of Baynes Sound, through Lambert Channel, and up Georgia Strait, and entered Discovery Passage, steaming through Seymour Narrows at high water. A heavy SW. gale blowing off the coast, with low overcast, producing strong winds in Johnstone Strait, made it advisable to anchor in Blinkinsop Bay for the night, where we rounded to under the North Bluff, after entering the bay, letting go the anchor at 7.12 p. m. in 6½ fathoms. A

table flat of sand and clay covers one-half the area of this bay. It is dry at low water and is to be avoided in choosing an anchorage, as the shoal is abrupt, going from 6 fathoms to 6 feet. It extends along the north shore of the bay within 200 yards of a white bluff, then curves to the SE., with a short projecting spit in the middle of the bay, to a small island on the south shore. A good landing on the north shore will be found at high water. The holding-ground is good, with smooth water and good protection from heavy SW. winds.

Although the SW. blow had not decreased during the night, we got under way the next morning and stood on through Johnstone Strait to Alert Bay, Cormorant Island. Seining and fishing parties were sent out here, but nothing new was developed. Mr. Spencer, the owner of the cannery at this port, informed me that the canning industry in these waters is rapidly increasing. Leaving Alert Bay on the morning of June 6, we passed out to sea through Goletas Channel, clearing the latter at noon, and shaped a course for the Shumagin Islands.

June 7 was ushered in with heavy swell and seas from the southward and westward, the weather becoming boisterous, ending up with a SW. gale, which shifted around to a southeaster, with much rain and mist, making it impossible to distinguish objects at a distance of half a mile. Under these conditions, however, the Shumagins were sighted on the 13th, and, passing through Gorman Strait, we anchored at Sand Point that evening in order to intercept the mail steamer from Unalaska, which was scheduled to leave on this date. This port has practically been deserted by sealers, only one having put in here this season, the *Mary Taylor*, of Victoria.

Leaving Sand Point on the morning of June 15, the run was made to Unalaska, taking the inside passage north of the Shumagin and Sannak islands, a gale still blowing outside, with fog and rain. We arrived at Unalaska at 11.30 a. m. on the 16th and found the following vessels of the patrol fleet in port, viz: *Rush*, *Bear*, *Corwin*, and *Grant*. The *Perry* was at the Pribilofs.

Dr. Leonhard Stejneger, curator in the United States National Museum, arrived in the Alaska Commercial Company's steamer *Bertha* on the 17th and reported on board for passage to the Commander Islands. We steamed out of Dutch Harbor on the morning of the 23d of June, Mr. J. Stanley-Brown, manager and representative of the North American Commercial Company, taking passage with us to St. Paul. We arrived at Village Cove anchorage at 5 p. m. on the 24th, picking up the islands in a dense fog which prevailed throughout the day. Messrs. True, Prentiss, and Miller were landed on the 25th to pursue their work upon the islands. I called upon the chief Treasury agent, Mr. J. B. Crowley, and made satisfactory arrangements with regard to seal investigations upon the Pribilof Islands. I am pleased to say that Mr. Crowley fully entered into the spirit of the work, and facilitated its execution, all of which was materially aided by the cooperation of Mr. J. Stanley-Brown, of the North American Commercial Company.

A drive from Polavina rookery to Stony Point, a distance of 3 miles, was made on the morning of the 26th for the benefit of Dr. Stejneger's investigations. The abnormal ice limit around the islands this year has retarded the arrival of the seals upon the rookeries at least two weeks. Large quantities of floating ice were drifting about the islands on the 15th day of June. Innumerable snow patches extend to the water line throughout the Aleutian chain and the Pribilofs, and are remarked by all the natives as exceeding any previous record within the last fifteen years.

Dr. Stejneger returned on board on the morning of June 26, and we steamed out of Village Cove at 1.30 p. m., shaping our course to the nearest point on the fifty-sixth parallel, in order to connect with original soundings made by this vessel in 1893. Accordingly we took up the line of soundings in latitude 56° N., longitude 177° 30′ W., at 9.02 p. m. June 27. No bottom specimen was brought up, as the cup failed to work, owing to a defect in the spiral valve spring which did not show itself upon previous examination. The interval was set at 40 miles for this portion of Bering Sea. On the 28th we were compelled to lay to for fourteen hours under fore and aft sail, with banked fires, owing to a strong gale blowing from the SW., which was accompanied with rain, mist, and sleet, and against which we could not make suitable headway that would in any way have compensated for the amount of coal it would have been necessary to burn or the extra wear and strain it would have placed upon the engines. At 2.20 a. m. on the 29th we went ahead on our course, taking up the line of soundings on the original parallel of 56° N. A comparatively uniform depth was found, ranging between 2,056 and 2,105 fathoms. Brown mud and ooze defined this portion of the Bering Sea basin.

A constant and vigilant outlook was kept both day and night for seals from the time the *Albatross* passed to the northward of Cape Mendocino. One seal was seen while at anchor off Port Townsend, which afforded considerable amusement to all hands. The dingey was laying at the port lower boom, secured for the night. About 9 p. m. the barking of a seal was heard around the ship. It proved to be a male fur-seal between 3 and 4 years old. After swimming several times around the ship it approached the dingey on the outboard side, away from the ship, and having satisfied itself that the dingey was not occupied, proceeded to get in, and, locating itself in the stern, remained for the night. Several attempts were made to capture this seal, but without avail. A few seals were observed approaching the passes east of Unalaska. None were seen on the passage to the Pribilofs until within 1 or 2 miles of the islands, and these were yearlings and bachelors, which were few in numbers. Leaving the islands, one or two seals were seen at a distance of 5 miles.

On the morning of the 29th the *Albatross* crossed the 180th meridian at 7 o'clock, changing the date to June 30; hence the end of the fiscal year finds us engaged in running a line of soundings from St. Paul Island to Bering Island.

There have been a great many changes in the officers attached to the *Albatross* during the past year, as follows:

August 17, 1894, Ensign C. M. Fahs, U. S. Navy, detached; Ensign N. C. Twining, U. S. Navy, reported.

October 22, 1894, Lieut. A. F. Fechteler, U. S. Navy, executive and navigating officer, detached.

November 1, 1894, Ensign N. C. Twining, U. S. Navy, detached; Ensign Philip Williams, U. S. Navy, detached.

November 13, 1894, Lieut. F. S. Carter, U. S. Navy, reported as executive officer.

November 19, 1894, Ensign W. R. Shoemaker, U. S. Navy, detached.

November 21, 1894, Ensign Edward Moale, jr., reported.

January 23, 1895, P. A. Engineer Howard Gage, U. S. Navy, detached; P. A. Engineer J. M. Pickrell, U. S. Navy, reported.

March 1, 1895, Lieut. Houston Eldredge, U. S. Navy, detached; Ensign Harry George, U. S. Navy, reported; Ensign W. G. Miller, U. S. Navy, reported.

March 27, 1895, P. A. Engineer J. M. Pickrell, U. S. Navy, detached.

March 28, 1895, Ensign Harry George, U. S. Navy, detached.

April 2, 1895, Ensign Benjamin Wright, U. S. Navy, reported.

April 29, 1895, Ensign Edward Moale, U. S. Navy, detached.

May 13, 1895, P. A. Engineer Emil Theiss, U. S. Navy, reported.

May 17, 1895, Lieut. F. S. Carter, executive officer, detached; Lieut. B. O. Scott, U. S. Navy, reported as executive officer; Ensign R. H. Leigh, U. S. Navy, reported.

May 28, 1895, Ensign C. F. Hughes, U. S. Navy, reported.

List of officers, June 30, 1895.—Lieut. Commander F. J. Drake, U. S. Navy, commanding; Lieut. Bernard O. Scott, U. S. Navy, executive officer; Ensign W. G. Miller, U. S. Navy; Ensign Benjamin Wright, U. S. Navy; Ensign C. F. Hughes, U. S. Navy; Ensign R. H. Leigh, U. S. Navy; P. A. Surg. E. S. Bogert, jr., U. S. Navy; P. A. Paymaster Eugene D. Ryan, U. S. Navy; P. A. Engineer Emil Theiss, U. S. Navy; captain's clerk, Harry Clifford Fassett, U. S. Fish Commission.

Scientific staff.—C. H. Townsend, resident naturalist; A. B. Alexander, fishery expert; N. B. Miller, general assistant.

The Commission is indebted to Capt. H. L. Howison, U. S. Navy, commandant of the Mare Island navy-yard, and the officers under his command for the uniform courtesy to the officers of this vessel and the facilities of the yard which were given us during the period of repairs and refitting. For taking care of and forwarding our mails we are indebted to the Navy pay-office at San Francisco, which we fully appreciate, under the conditions of a cruise in Bering Sea. We are also indebted to the Alaska Commercial Company for material aid and forwarding mail. To Mr. J. Stanley-Brown, manager of the North American Commercial Company, we are under obligations for subsisting Messrs. True, Prentiss, Townsend, and Miller, who were landed from this vessel in the interest of the Commission; also for subsistence, quarters, and medical attention for two of our sick whom we were compelled to leave upon the island of St. Paul while making the trip to Bering Island and return.

To Mr. J. B. Crowley, chief Treasury agent, the Commission is also indebted for his unvarying courtesy, both in granting permission for the landing of our patients and in the spirit shown in placing all con-

veniences and much valuable information at our disposal while engaged in making a survey of the rookeries on St. Paul and St. George.

During the year just ended the cruising-ground of the *Albatross* has been between the 38th and 60th parallels of north latitude and the 122d and 180th meridians of west longitude. She has been under way and steaming 112 days and has made 13,181.3 nautical miles.

NOTES ON FISHERY INVESTIGATIONS FROM JULY 1 TO 26, 1894.

By A. B. Alexander, *Fishery Expert.*

As the *Albatross* was engaged on sealing patrol duty during the summer of 1894, comparatively little time was available for fishing trials. The data herein set forth were gathered while the writer was attached to the ship before his transfer to the sealing schooner *Louis Olsen.*

On July 1 a trial was made with hand lines for bottom fish in 37 fathoms at station 3497, latitude 56° 59′ N., longitude 163° 48′ W. Nothing was caught here, although thirty minutes were given to the trial, long enough, under ordinary circumstances, to test the bottom as to the abundance of food-fishes.

The following day, two hours were devoted to hauling the seine in Akutan Harbor. The beaches where seining was carried on were quite steep and rough, there being many sharp rugged bowlders lying from 50 to 150 feet from the shore. The character of these beaches did not indicate an abundance of fish. Several hauls were made on both sides of the harbor. The result, however, was far from satisfactory; two small flounders, several sand-lance, and a red-spotted trout were the catch. About 2 miles from where the *Albatross* was anchored, toward the head of the bay or harbor, there is a smooth beach; the water is much shallower than where we hauled the seine, and there are also fewer rocks—a much better place for collecting than where our investigations were made. There are likewise several small streams which flow down the mountain side into the head of the bay, at the mouths of which salmon are said to be plentiful. Our time being limited, it was not deemed advisable to go so far away from the ship, and in consequence our search was confined more diligently to the barren places than it otherwise would have been.

The inhabitants of Akutan village, like all other tribes in Alaska, consume large quantities of fish. Cod can be had at all seasons, and the above-mentioned streams afford a sufficient supply of salmon for all purposes; if not, there are other small bays close by where salmon are numerous enough to meet the requirements of a village of this size. The settlement, however, is not large, being composed of seven frame houses and about a dozen barabaras. The catching of fish is mostly done by the women, assisted by the children of both sexes. The able-bodied male portion of the village spend a greater part of their time

in hunting the sea-otter. This was formerly a very lucrative employment, but the indications are that in future the hunters will have to resort to fishing, and depend more on the necessities of life and less on the luxuries which they have been accustomed to for so many years. Sea-otter are becoming very scarce, and before long some other employment will have to be found. These people are in no danger of starving, even should the sea-otter become exterminated, for fish of various kinds are plentiful and can be caught almost at their doors.

The next forenoon, July 4, being caught in a dense fog, the ship came to anchor in 7 fathoms of water 4 miles to the westward of Wislow Island, on the north shore of Unalaska Island. A hand line was dropped over the side, and in a few minutes several cod were caught. Soon after ten lines were put over, and in an hour's time 49 cod were taken, the average weight of which was 10 pounds, and the average length 30 inches; 26 were males and 23 females. When the lines were first put over there was a continual tugging and biting at the hooks, but at the end of half an hour not a bite could be felt, although the lines remained out for an hour. It is not to be supposed that all the fish on this ground were caught; it was probably one of those freaks which cod frequently take in all localities by "slacking up," or ceasing to bite when they seem to be the most ravenous.

Hand-line fishing has been carried on in this locality in times past by the *Albatross*, and nearly, if not all, the local places investigated. In most places cod were abundant; scattering halibut were also taken.

Later in the day we came to anchor in Dutch Harbor. The seine was hauled in a small bay which forms a part of Iliuliuk Harbor, and 300 large herring taken; also a few flounders. Herring visit this bay each season, generally during the months of July and August. They are not numerous, and are seldom seen in large numbers. A dory load is frequently taken, however, but this would not be called large by fishermen. There is no place in the Aleutian group known to the writer where herring are sufficiently numerous to warrant the introduction of oil works or smokehouses. Southeastern Alaska is the only part of the Territory where herring are plentiful enough for these industries to be successfully carried on.

On July 13 deep-sea fishing was carried on in 59 fathoms at station 3502, in latitude 56° 35′ N., longitude 168° 18′ W. This trial was made while the ship was stopped in order to make some slight repairs to one of the engines. At first only two lines were put over, and at the end of a half hour 16 cod were caught. Finding that fish were plentiful, 11 more lines were brought into use and fishing carried on for another thirty minutes, at the end of which time 76 cod had been taken. The sexes were nearly equally divided, there being 30 males and 46 females. They were a fine-looking lot of fish, and quite uniform both in size and weight; average weight, 12 pounds; average length, 30 inches. Their livers were large and healthy; much more so, in fact, than usual. Had a fishing vessel been anchored on this spot, she

undoubtedly would have had excellent fishing, for at the end of the trial the fish were being caught "pair and pair."

The result of this fishing trial was somewhat different from one made in August, 1893, in latitude 56° 34′ N., longitude 167° 9′ W. On this occasion only 2 cod were caught. The scarcity of cod here was attributed to the ground being close to the Pribilof Islands. This, no doubt, was true at the time the trial was made, but this theory is not tenable now, for it will be found by looking on the chart that the ground where the last trial was made is comparatively near the above-mentioned islands. As a rule, each season the main body of the seal herd change their feeding-grounds, and where cod and other bottom species are found in plenty one year, it may be almost barren of life the next, for as soon as seals arrive and have selected some particular place for a feeding-ground economic bottom fish grow scarce or leave altogether, and do not appear again until most of the seals have left the sea.

In early spring, before the arrival of seals, cod are plentiful on all the local fishing-grounds in the vicinity of the Pribilof Islands, but later in the season hardly any fish are to be found on these grounds except scattering halibut. Late in the fall, after most of the seals have migrated south and before the ice forms, cod come in from outlying banks and are caught by the natives of the islands until prevented from doing so by the ice and stormy weather. It is not known whether cod remain about the Pribilofs after the ice appears in large quantities, there being no way of finding out after the fall is well advanced. Neither is it known whether or not cod remain on the banks in other parts of Bering Sea. The natives of Alaska are as little enlightened on this subject as anyone, and are indifferent about the whole matter, owing to the fact that their wants are supplied with but little effort on their part. The migratory habits of cod or halibut do not seemingly enter the minds of these people.

The writer has conversed, from time to time, with fishermen regarding the matter, but the knowledge they possess threw but little light on the subject. I am informed that dead cod are frequently seen in winter scattered along the coast on the Bering Sea side of the Alaskan Peninsula; but, so far as I have been able to learn, no attempt has ever been made to carry on fishing at this season on any of the banks along the Aleutian Islands or in Bristol Bay. That cod are much more numerous on the fishing banks off the Sannak and Shumagin Islands in winter than in summer is due, no doubt, to a large portion of the school leaving Bering Sea and repairing to these grounds. This is the generally accepted theory of most fishermen belonging to the above-named islands. It is very probable that this theory is correct, for while it is perfectly natural for cod to seek water of a low temperature, it is not, however, likely that they would long remain in a region where the water is chilled to an unusual degree by heavy masses of ice. This supposition is not substantiated by knowledge possessed concerning the winter habits of the Bering Sea cod.

As the season for carrying on fishing in this northern region is limited to a few months of each year, it will probably be a long time before much more is known of the winter habits of the cod which inhabit this locality; at least not until the time shall come when it will be expedient to send fishing vessels to these banks in winter. The high latitudes in which these fishing-grounds are situated practically preclude the possibility of this until a superior class of vessels is built. The vessels now engaged in the fishing industry of the Pacific coast are far from what would be required to carry on winter fishing with success. Even with a superior type of vessel a great deal of doubt is entertained in the minds of fishermen as to whether such an undertaking would be feasible, owing to the heavy gales which prevail. Not more than two or three fishing days could be expected out of a month. This, together with the heavy masses of ice which are swept over the fishing-grounds by wind and current, would make it a very hazardous calling, particularly so as the best fishing-grounds are comparatively near the coast, with but few available harbors in which to find refuge. Everything considered, Bering Sea offers no great inducement to fishermen during the winter months.

On the morning of July 15 the *Albatross* came to anchor in Ikatan Bay. This bay is situated close to the southern entrance to Isanotski Pass, which separates Unimak Island from the Alaskan Peninsula. While here, salmon, both large and small, flounders, sculpins, and a large quantity of sand lance, were taken with the drag seine. The beaches, however, are not very good for carrying on fishing with seines, there being many sunken rocks covered with sharp barnacles, which are very destructive to nets. Cod are plentiful in all parts of the bay; also small halibut. The hand lines took ten of the latter species, which averaged 5 pounds in weight and 23 inches in length.

Fishing and shore collecting were carried on at New Morzhovoi anchorage. Flounders, salmon, sculpins, and crabs were numerous. The best place for collecting is near the village, where nearly all species desired by the natives can be had within a stone's throw of their doors. The village is situated about 11 miles from the southern entrance to the pass, and has a population of about 150 persons. Like all other villages in Alaska, the occupations of the people are fishing and hunting. Nine bidarkas, carrying two men each, started out in the spring of 1894, and at the time of our visit had only captured nine sea-otters, one to each bidarka. The people here predict that, in a few years at the most, sea-otter will be exterminated, or so nearly so that it will not pay to hunt them.

In the spring, before the hunters start off on their annual hunt, and also on their return in the fall, they lay in a supply of cod and halibut, which are quite plentiful in and off the mouth of the pass. While these species play an important part in the way of food for these people, the amount cured for winter use is small as compared to the quantity of salmon stored away. After winter sets in, cod become very scarce

in all parts of the pass and do not return again until late in March or the first of April.

Fishing for salmon is almost wholly performed by the women and young girls of the village. The men and large boys take good care not to get wet. The male portion of the settlement seldom takes part in the fishing, and when it does it is only to direct the work, the laborious part of it being done by the women. This work is looked upon by the latter as a privilege rather than a hardship. If a native woman should allow her husband to perform this work for her, she would be looked down upon by all the other women of the village. The custom has been in vogue so long that it would be hard to change it.

Only one seine is owned, it being the common property of all. It is about 100 feet long by 12 feet deep; mesh, 3 inches. When the tide serves right it is hauled every other day, but is never set unless a chief or subchief is there to direct the work. In setting the seine no boat is used. The net is stretched to its full length, the head rope, foot rope, and twine being gathered up so that it will not foul when it is thrown into the water. When the seine ropes or hauling lines have been coiled down and made fast to the ends of the seine, the whole thing is picked up by the women and placed on their shoulders. They walk with their burden in single file about 6 feet apart. In the rear of the procession closely follow the chief, old men, boys, and little girls. On their way to the seining beach, which is situated about a third of a mile from the village, a sharp lookout is kept for signs of schooling salmon. Usually, however, one place is resorted to, a small indentation formed by a sudden curve in the beach, where salmon generally school in considerable numbers.

When a school is observed, which is thought sufficiently large to supply the wants of all, the head woman in the procession steps into the water and wades out as far as she can, all the others following. A course is taken so as to form a semicircle outside of the school. Not until the fish have been surrounded is the seine dropped into the water. As soon as it is thrown from the shoulders of the women they all seize hold of the seine ropes and begin to drag the net to the shore. Men, women, and children take part in this operation. Between the shouting of the men and women, the screaming of boys and girls, and the struggling and splashing about of the salmon trying to escape, the scene presented is indeed a novel one. Frequently a woman will lose her footing on the round, smooth rocks, slip, and go down for a moment. No attention, however, is paid to her, and she is pulled along in the net with the salmon until she again regains her feet. An accident of this kind is considered a good joke and affords considerable amusement to all. The water being comparatively shallow, the seine can not be hauled within 25 or 30 feet of the shore when a good catch of salmon has been secured, and in consequence more than half the fish have to be picked out one by one. This is somewhat difficult, as well as very wet work to engage in, for when several hundred salmon are inclosed

in a small space, all desperately struggling to make their escape, it takes a skillful hand to grab them one by one and throw them to the beach. Each person is entitled to the number of salmon he succeeds in dragging from the net. As may be supposed, this causes a greedy and wild competition. Standing to their knees, and frequently up to their waists, in water, they push each other about in a lively manner, each one trying to get the lion's share. There is no quarreling over the matter, everything being carried on in a good-natured manner.

As fast as the salmon land on the beach they are knocked on the head with a club by the boys, there always being a representative of each family to see that the different lots of salmon do not get mixed. After the seine has been emptied of its contents, the fish are strung in bunches of thirty or forty each, thrown into the water, and towed to the village, where they are cleaned. This work also falls to the lot of the women, but it is not commenced until they have put on dry clothing, when they form themselves into family groups close to the water's edge. They seldom leave their work until it is finished, unless driven indoors by heavy rain.

During our stay at New Morzhovoi a diligent search was made for clams. There are only a few places where this mollusk is found, and the natives keep them pretty well thinned out. We only succeeded in getting half a bucketful in one tide.

Besides the agent of the Alaska Commercial Company, there are three other white men who make their homes here; one follows sea-otter hunting for a living, and the other two hunt bear.

On the morning of July 20 the *Albatross* came to anchor on the south side of Ikatan Bay in 12 fathoms of water. While here 43 cod and 3 Alaska pollock were caught from the ship. The average weight of the cod was 9 pounds, length 29 inches. The following day 25 halibut were taken in 30 fathoms of water on a "spot" situated about half a mile from the shore and about the same distance from the ship. The ground covered but a small area—less than a third of a mile across it; the character of the bottom was sand and gravel. The boats that were anchored here, there being several belonging to the U. S. S. *Petrel* besides two from our ship, were obliged to keep close together in order to get any fish. If one boat happened to swing two or three times her length from the others, she would be off the ground altogether and not a bite would be felt. All the boats, however, did fairly well. The total weight taken by the two boats from the *Albatross* was 228 pounds, a fraction over 9 pounds each; average length, 27 inches.

Judging from our limited experience in this bay, I am of the opinion that all the fishing-grounds here are prolific. It is an excellent place for small boats to fish. This fact, however, has not been overlooked, for 14 miles from the *Albatross's* anchorage in East Anchor Cove two shore fishing stations have been located for many years. It is understood that these stations have recently been abandoned, not on account of the scarcity of fish, but for the reason that it has been found cheaper

to carry on the industry in vessels. It is also understood that nearly all the shore fishing stations in Alaska have been abandoned for the same reason.

The beaches in the vicinity of our anchorage were very poor for collecting on with a drag seine, there being many small sharp rocks scattered along the shore. The beach in many places ran off steep, so much so that the seine would not touch bottom except when close in. In most places the bottom was barren of all kinds of life, and only in a few instances was life found by turning over the rocks at low tide. A considerable number of specimens were, however, taken with the drag seine at the mouth of a small stream. The species caught were young salmon, salmon trout, flounders, sculpins, and sand-lance. No adult salmon were caught, although two individuals were observed about 100 yards from the shore. Young salmon and salmon trout were numerous; good catches of the latter species were taken by a party of anglers up the stream about a third of a mile from its mouth. All organic life seemed to be in and at the mouth of the stream; repeated hauls with the seine failed to catch anything elsewhere.

Late in the afternoon of July 22 the ship anchored off the entrance to Acherk Harbor, situated on the northwest end of Sannak Island. The bottom was at once tested with hand lines. The result was 3 cod and 3 small halibut. From parties on shore it was learned that few cod inhabit the local fishing-grounds at this season. They leave early in the spring, and do not appear until late in the fall. It is thought by the people here that they enter Bering Sea on leaving the region of the Sannaks. The cod fishery has been carried on at this harbor for a long time. The principal fishing-ground resorted to lies 4½ miles to the northward of Petrof Point, in water varying in depth from 11 to 20 fathoms. There are many more local fishing-grounds around Sannak; also several more stations. These stations are owned and operated by Messrs. Lynde & Hough and the McCullum Fishing and Trading Company, both of San Francisco. The stations located at East Anchor Cove, previously mentioned, are also owned by the same parties. During the time we lay at anchor off Acherk Harbor the weather was too stormy to perform any work.

On the morning of July 25 the *Albatross* came to anchor in Dutch Harbor. The following day the drag seine was hauled in a small bay opposite Iliuliuk, and 300 salmon and some 30 herring taken. Most of the salmon were distributed among the various ships in the harbor. This was the last practical work performed for the season by the *Albatross* while the writer was on board. On the afternoon of the 29th he joined the sealing schooner *Louis Olsen*, of Astoria, Oreg., for a cruise in the Bering Sea.

TABLES.

Record of soundings by the United States Fish Commission steamer Albatross, July 1, 1894, to June 30, 1895.

Date.	Serial hydrographic number.	Time of day.	Position.		Depth (in fathoms).	Character of bottom.	Temperatures.		
			Lat. north.	Long. west.			Air	Sea.	
							D. B.	Surf.	Bot'm.
			Eastern portion of Bering Sea.						
1894.			° ′ ″	° ′ ″					
July 1	3499	3.20 a. m.	56 57 00	166 33 00	40	gn. M	39	39	84.0
1	3500	8.28 a. m.	56 54 00	167 51 00	44	gy. S	39	39	.....
1	3501	4.04 a. m.	57 52 00	167 19 00	37	gn. M	42	43	37.0
13	3502	1.50 a. m.	56 35 00	168 18 00	59	S. M	43	41	.....
			South of Unimak Island and north of Sannak Islands.						
15	3503	3.06 a. m.	54 24 00	163 51 00	43	crs. bk. S	43	41	.....
15	3504	3.47 a. m.	54 26 00	163 44 00	54	fne. bk. S	43	41	37.3
15	3505	4.29 a. m.	54 29 00	163 37 00	57	crs. bk. S. P	43	41	37.0
15	3506	5.14 a. m.	54 30 30	163 29 00	59	bk. S. P	43	40	37.0
15	3507	5.59 a. m.	54 32 30	163 21 00	60	bk. S	43	40	39.0
15	3508	6.46 a. m.	54 34 30	163 14 00	41	bk. G	43	39	38.0
15	3509	7.31 a. m.	54 36 00	163 06 00	46	gy. S	43	39	41.0
15	3510	8.00 a. m.	54 37 00	163 02 00	25	gy. S	43	39	40.0
15	3511	8.15 a. m.	54 37 30	163 01 00	30	gy. S	43	39	39.0
15	3512	8.28 a. m.	54 38 00	162 59 00	38	rky	43	39	40.0
15	3513	8.58 a. m.	54 40 30	163 00 00	30	bk. S. G	43	39	38.0
15	3514	10.07 a. m.	54 46 30	163 08 00	46	gn. M	43	39	38.0
22	3515	10.43 a. m.	54 40 00	163 01 00	23	rky	48	41	40.1
22	3516	11.12 a. m.	54 38 00	162 58 30	50	bk. S. P	47	40	.....
22	3517	11.39 a. m.	54 35 00	162 55 40	38	rky	48	41	.....
22	3518	12.06 p. m.	54 32 30	162 53 00	33	Sh	49	42	41.0
22	3519	1.13 p. m.	54 28 15	162 49 00	33	rky	49	42	41.2
			Northern portion of Bering Sea.						
Aug. 3	3520	10.04 a. m.	58 18 00	175 57 00	1,363	gy. oz. fne. S	49	43	35.0
3	3521	2.35 p. m.	58 27 00	176 51 00	1,279	gy. oz. fne. S	50	43	35.6
3	3522	7.27 p. m.	58 37 00	177 45 00	717	gn. M. S	49	43	36.4
3	3523	9.18 p. m.	58 40 00	178 03 00	349	R. fne. gy. S	50	43	38.0
3	3524	10.23 p. m.	58 42 00	178 12 00	369	fne. gy. S	49	43	38.0
4	3525	12.24 a. m.	58 45 00	178 30 00	1,231	fne. gy. S	48	43	35.0
4	3526	2.53 a. m.	58 48 00	178 49 00	1,830	gn. M. fne. S	46	42	35.0
4	3527	5.38 a. m.	58 52 00	179 07 00	1,812	gy. oz	46	42	35.1
4	3528	7.44 a. m.	58 56 00	179 25 00	1,838	gy. oz	46	42	35.0
4	3529	12.05 p. m.	59 25 00	179 13 00	1,765	gy. oz. fne. S	55	44	35.0
4	3530	4.13 p. m.	59 55 00	179 01 00	713	gy. oz. fne. S	47	44	36.3
4	3531	8.09 p. m.	60 25 00	178 49 00	183	gn. M. fne. S	48	44	38.0
7	3532	10.18 a. m.	58 00 00	172 58 00	61	fne. dk. S	51	45	36.0
			South of Alaska Peninsula.						
1895.									
June 13	3533	1.34 p. m.	55 31 00	159 23 00	100	fne. bk. G	46	42	.....
			Bering Sea, south of St. Paul Island.						
24	3534	11.01 a. m.	56 59 30	170 24 30	20	fne. bk. S	36	37	.....
24	3535	11.20 a. m.	57 01 00	170 26 20	38	fne. bk. S. brk. Sh	36	37	.....
24	3536	12.29 p. m.	57 04 00	170 30 45	33	rky	36	37	.....
24	3537	12.51 p. m.	57 04 45	170 29 15	36	fne. bk. G	36	37	.....
24	3538	1.16 p. m.	57 05 30	170 27 45	25	fne. gy. S. P	40	35	.....
24	3539	1.30 p. m.	57 06 00	170 26 30	29	fne. gy. S. Sh	40	35	.....
24	3540	1.48 p. m.	57 06 40	170 25 00	32	bk. P	40	35	.....
24	3541	2.04 p. m.	57 07 30	170 23 20	19	fne. gy. S	42	34	.....
			Bering Sea, between Pribilof and Commander islands.						
26	3542	9.56 p. m.	56 53 00	172 15 00	66	fne. S. M	37	39	38.9
27	3543	9.30 p. m.	56 00 00	177 30 00	2,056	No specimen	40	40	35.1
28	3544	5.32 a. m.	56 02 00	178 50 00	2,083	do	40	40	35.1
29	3545	6.36 a. m.	55 45 00	179 57 00 East.	2,086	br. M. oz	40	39	35.1
30	3546	3.04 p. m.	55 59 00	178 43 00	2,105	br. M. oz	43	41	35.1
30	3547	10.25 p. m.	55 55 00	177 12 00	2,113	br. M. oz	40	41	35.6

NOTE.—The time of soundings is the time at which bottom was made.

Record of fishing trials of the United States Fish Commission steamer Albatross, July 1, 1894, to June 30, 1895.

Date.	Position.		Temp.		Time of day.	Number of station.	Depth.	Character of bottom.	Lines used.	Bait used.	Length of trial.	Fish taken.	Range in weight.	Average weight.	Range in length.	Average length.
	Lat. N.	Long. W.	Surf.	Bot.												
1894.							*Fms.*						*Pounds.*	*Pounds.*	*Inches.*	*Inches.*
July 4	At anchor 4′ west of Wislow Island, north shore of Unalaska Island.		42°	41°	10 a. m.....	.....	7	fne. bk. S	10	Salt salmon..	60 minutes..	49 cod	6½ to 20	10	27 to 36	30
13	56° 35′	168° 18′	43°	37°	1.50 p. m....	Hy. 3502	59	S. M	13	Salt cod.....	60 minutes..	76 cod	4 to 23	12	20 to 39	30
15	Ikatan Bay, Unimak Island. At anchor, NW. part.		Mean 40°	.....	All day.....	.....	10	S. G	3	.....do	All day	10 halibut.	.....	5	.....	23
0	Ikatan Bay, Unimak Island. At anchor, south shore.		41°	39½°	9.45 a. m....	.....	12	bk. S. G..	6	Salt salmon..	60 minutes..	43 cod .... 3 Alaska pollock.	5 to 29	9	22 to 36	29
21	.....do.....		Mean 40°	.....	8 a. m. to 4 p. m.	.....	30	S. G.....	8	.....do	8 hours	25 halibut.	5 to 24	9	20 to 40	27
22	Achirk Harbor, Sanak Island. At anchor.		41°	39°	5 p. m.....	.....	15	S. G.....	4	Salmon and halibut.	60 minutes..	3 cod.....	7 to 9	8	24 to 30	26
												3 halibut..	7 to 9	8	22 to 27	24

Meteorological and cruising record of the United States Fish Commission steamer Albatross, July 1, 1894, to June 30, 1895.

Date.	Meridian positions.		Distance steamed.	Barometer.		Temperatures.						State of the weather.	Direction and force of wind.	Amount of rainfall.	State of the sea.	Currents.		Number of hours sealing weather.	
						Air.				Water surface.						Setting to the—	Knots per day.		
						Dry bulb.		Wet bulb.											
	Lat. N.	Long. W.		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.								
1894.	° ′ ″	° ′ ″	*Knots.*																
July 1	57 22 00	167 36 00	186.7	30.29	30.16	52	38	51	37	42	38	Cloudy and rainy to foggy.	NW., 2–4–2	Light	Smooth	N. 57° W	4.0	20	1
2	55 17 00	165 05 00	203.4	30.28	30.22	46	41	45	40	43	39	Foggy; thick	WNW., 2–3; WSW., 1–2	None	Smooth			16	2
3	Akutan Harbor, Akutan Island.		170.7	30.37	30.28	49	41	48	40	43	39	Overcast and foggy	S'd and W'd, 3–1	None	Smooth			16	3
4	54 00 00	166 48 00	107.2	30.44	30.37	53	41	51	39	47	39	Foggy; thick	SW., 1; calm; E., 1; calm.	None	Smooth			12	4
5	Dutch Harbor, Unalaska.		21.0	30.40	30.29	49	45	48	44	48	45	Foggy to fair and pleasant.	Calm; NE., 2–4; S'd, 2	None					5
6	do			30.27	30.20	59	43	56	42	50	45	Fair and pleasant	SSW., 3; ENE., 4; N'd, 3	None					6
7	do			30.32	30.26	47	43	46	41	46	45	Fair and pleasant to foggy.	N. by E., 3	None					7
8	54 30 00	167 04 00	43.2	30.38	30.32	47	43	46	42	46	42	Foggy in a. m.; misty and thick in p. m.	Calm; SSW., 2; SSE., 4	Light	Smooth			14	8
9	North anchorage, St. George Island.		163.3	30.32	30.14	49	43	47	43	42	38	Overcast and foggy to rainy.	SSE., 4–8	Light	Moderate to rough.			0	9
10	do			30.17	30.10	46	42	45	41	39	38	Overcast, rainy, and stormy.	S. by E. and SSE., 8–10	Heavy	Rough				10
11	do			30.10	29.76	45	43	44	43	39	38	do	SSE., 10–8; SE., 6	Heavy	Rough				11
12	56 42 00	169 42 00	6.9	30.24	29.70	44	42	43	42	40	38	Overcast, misty, and stormy.	S. to SW., 8–6; SW., 4	Moderate	Rough			0	12
13	56 35 00	168 18 00	148.6	30.32	30.24	49	38	48	38	44	37	Overcast; foggy midnight to 8 a. m.	S'd, 2; S'd and E'd, 1	None	Smooth			18	13
14	54 56 00	165 21 00	157.2	30.25	30.20	49	41	49	40	44	39	Cloudy; mist and fog at times.	E. to NE., 1; N'd and W'd, 2; N'd, 3	Light	Smooth	N. 60° W	18.0	18	14
15	Ikatan Bay: 54 48 00	163 23 00	143.4	30.24	30.20	47	43	46	43	41	38	Overcast; misty during a. m.	N'd, 4; NE., 3–2; variable, 1; calm.	Light	Smooth			8	15
16	54 48 00	163 23 00		30.20	30.02	47	43	46	43	39	38	Overcast, fog and rain	Calm; variable, 1	Moderate					16
17	Mozkovoi Village, Traders Cove, Isanotski Strait.		9.8	30.39	30.13	47	43	46	42	38	38	Rainy and misty to clearing.	W., 4–5–3	Moderate	Smooth				17
18	do			30.39	30.36	50	44	50	43	39	38	Fair to overcast and rainy.	W., 2; calm; E., 1	Moderate					18
19	do			30.37	30.23	57	47	56	46	42	39	Overcast, with mist and rain.	Calm; variable, 1–2; W'd, 1.	Moderate					19

	20	Ikatan Bay: 54 46 00	163 18 00	11.2	30.24	30.16	59	51	58	50	41	39	Overcast and drizzly to cloudy.	Calm; variable, 1–2	Light	Smooth				20
	21	54 46 00	163 18 00		30.18	30.12	66	48	65	47	41	38	Misty and foggy to clear and pleasant.	Variable, 1; calm; SW., 1	Light					21
	22	54 33 00	162 53 00	18.8	30.20	30.01	51	46	50	45	42	40	Overcast to foggy and misty.	SW., 1; calm; S'd and W'd, 2.	Light	Smooth			6	22
	23	Off Acherk Harbor, Sannak Island.		7.6	29.98	29.76	51	47	49	47	40	40	Foggy and misty to clearing.	S'd and W'd, 4–6–2; W., 2	Light	Smooth				23
	24	54 34 00	162 53 00	1.7	29.89	29.70	50	46	49	45	41	40	Overcast, with drizzling rain.	Variable, 1; S'd and W'd, 1–3.	Moderate	Smooth			8	24
	25	Dutch Harbor, Unalaska.		184.0	30.04	29.74	50	44	50	43	42	39	Rain, mist, and fog to clearing.	S'd and W'd, 4–3	Light	Moderate			0	25
	26	do			30.25	30.04	51	47	50	46	41	40	Fair and pleasant	S. by W., 4–2	None					26
	27	do			30.31	30.01	58	47	57	46	45	40	Fair and pleasant to rainy.	Calm; variable, 1; N., 1; calm.	Light					27
	28	do			30.02	29.86	58	48	57	48	43	42	Overcast and rainy	S'd, 2; S'd and E'd, 2; calm.	Moderate					28
	29	do			30.02	29.80	54	49	53	49	45	43	Overcast, with mist, rain, and fog.	ENE., 1–2; N'd, 4; E., 2	Moderate					29
	30	do			30.24	30.03	55	45	54	45	43	42	Overcast and foggy	Calm; NE., 2; variable, 1–2.	None	Smooth			8	30
	31	55 03 00	170 48 00	176.5	30.26	30.08	50	46	50	46	42	40	Overcast, with mist and fog.	S. by E., 2–4; SW., 2	Light	Smooth	S. 41° E.	2.6	6	31
Aug.	1	56 41 00	169 37 00	162.9	30.09	30.02	51	44	50	44	40	38	Fair to foggy and drizzly.	S'd and N'd, 2–3	Moderate	Smooth			16	1
	2	56 26 00	172 42 00	140.0	30.00	29.82	50	46	50	46	43	38	Overcast, with mist and fog.	SE., 3; S'd, 3; SW., 3	Light	Smooth	S. 82° W	(15 hr) 7.1	16	2
	3	58 22 00	176 22 00	184.8	30.06	29.80	51	44	51	44	43	40	Misty and foggy to clearing.	S'd and W'd, 3–5	Light	Smooth	S. 7° E.	4.0	18	3
	4	59 25 00	179 13 00	131.6	30.23	30.07	55	46	55	46	45	42	Misty and foggy; thick.	SW., 2–1; S'd, 1–3	Light	Smooth	None	0.0	19	4
	5	60 15 00	174 45 00	182.5	30.24	30.02	48	46	48	46	43	42	Thick, rainy, and stormy.	S. by E., 4; SE., 6–7	Heavy	Moderate	North	7.0	0	5
	6	59 09 00	174 12 00	153.1	30.09	29.98	49	46	49	46	43	41	do	SE., 8; S., 3; SW., 2	Heavy	Rough to moderate.	North	5.0	0	6
	7	57 57 00	173 05 00	178.0	30.08	29.94	54	47	54	47	45	41	Thick, foggy, and misty.	SW., 1; S'd, 1; SE., 3–4	Light	Smooth	N. 16° E.	9.4	19	7
	8	56 53 00	172 43 00	172.8	29.91	29.72	51	49	51	49	45	43	Overcast, with drizzling rain and mist.	SE., 3–2; S'd, 3–5; S. by W., 6–8.	Moderate	Smooth to rough.	N. 18° W	12.5	0	8
	9	56 00 00	171 52 00	162.5	30.04	29.72	50	48	50	48	44	44	Overcast, mist and rain, to clearing.	S'd and W'd, 7–4; SW., 3–2.	Moderate	Moderating	N. 26° W	19.0	0	9
	10	55 38 00	171 09 00	170.4	30.20	30.07	65	47	65	47	48	44	Fair and pleasant	SW., 3–1; variable, 1; NE., 2.	None	Smooth	N. 58° W	4.0	16	10
	11	54 07 00	166 55 00	194.6	30.20	30.16	55	47	54	47	48	44	Overcast; fog and mist in a. m.	N'd and E'd, 3; E'd, 3; S'd, 2; calm.	Light	Smooth	N. 47° W	17.6	0	11
	12	Dutch Harbor, Unalaska.		23.1	30.19	29.89	58	48	57	48	46	44	Overcast, with fog and mist.	NE., 1; E., 1; S'd, 1–2	Light					12
	13	do			29.86	29.23	59	49	59	49	46	44	Overcast, with rain and mist.	SE., 3–1; NE., 3; SE., 3–1	Moderate					13

Meteorological and cruising record of the United States Fish Commission steamer Albatross, July 1, 1894, to June 30, 1895—Continued.

Date.	Meridian positions.		Distance steamed.	Barometer.		Temperatures.						State of the weather.	Direction and force of wind.	Amount of rainfall.	State of the sea.	Currents.		Number of hours sealing weather.	
						Air.				Water surface.						Setting to the—	Knots per day.		
						Dry bulb.		Wet bulb.											
	Lat. N.	Long. W.		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.								
1894.	° ′ ″	° ′ ″	*Knots.*																
Aug. 14	Dutch Harbor, Unalaska		.....	29.66	29.24	51	48	50	47	45	44	Stormy and rainy, to clearing.	W., 3-6; WSW., 4-7; SW., 5-3.	Moderate	.....	.....	.....	.....	14
15	.....do		.....	29.74	29.63	55	47	54	46	47	44	Fair and pleasant.....	SW., 4-2; S'd, 1; NNW., 2; W., 2.	None	.....	.....	.....	.....	15
16	.....do		.....	29.81	29.72	50	48	49	46	45	41	Cloudy, with passing showers.	S'd and W'd, 3-5.....	Light	.....	.....	.....	.....	16
17	54 01 00	166 28 00	8.3	29.81	29.70	55	45	53	45	42	40	Fair to foggy and misty.	W., 3-2; WSW., 4-6-2.....	Light	Rough	.....	.....	0	17
18	55 28 00	169 23 00	158.8	29.82	29.62	47	45	47	45	45	41	Foggy and misty to cloudy.	WSW., 2; NW. by W., 2; NW., 3.	Light	Moderate to smooth.	S. 2° E.	16.0	14	18
19	North anchorage, St. George Island.		175.0	29.82	28.86	48	46	47	45	44	41	Fair to misty and rainy.	NW., 2; Calm; S'd and E'd, 4-8-5.	Moderate	Smooth to rough.	.....	.....	4	19
20	57 06 00	171 37 00	132.2	29.76	28.83	47	46	46	45	43	41	Rainy, misty, and stormy.	S'd, 2; W'd, 5; W. by N., 7-9.	Moderate	Rough.....	S. 40° E.	5.2	0	20
21	57 43 00	171 58 00	45.4	30.14	29.76	47	44	46	43	42	40	.....do.....	W. by N., 7-9-5.....	Moderate	Rough.....	S. 28° E.	4.5	0	21
22	58 24 00	173 07 00	78.3	30.24	30.16	46	43	45	42	42	41	Clearing to fair and pleasant.	WNW., 7-4; SW., 2; SE., 3.	None	Rough to moderate.	East	7.9	6	22
23	57 49 00	173 34 00	189.0	30.24	30.16	47	43	45	42	43	42	Fair and pleasant.....	S'd and E'd, 2-5.....	None	Smooth.....	N. 15° W	16.5	6	23
24	57 07 00	173 45 00	148.1	30.14	29.66	47	45	46	44	41	41	Overcast and rainy; stormy.	S'd and E'd, 5-10-7.....	Heavy	Rough.....	2 days N. 23° E.	.....	0	24
25	56 13 00	172 44 00	87.4	29.82	29.71	48	47	48	46	43	42	Overcast and misty...	SW., 4-8.....	Light	Moderating...		33.0	0	25
26	55 08 00	171 26 00	185.6	29.91	29.81	50	45	50	45	44	41	Overcast, with rain and mist.	SW., 8-4; S'd, 4-2.....	Moderate	Rough to moderate.	N. 37° W	3.8	0	26
27	54 05 00	166 52 00	204.2	29.89	29.76	47	46	47	46	43	41	Overcast and misty...	S'd and E'd, 3-2.....	Light	Smooth.....	N. 45° W	6.0	0	27
28	Dutch Harbor, Unalaska.		24.2	29.82	29.70	54	46	54	46	44	42	Cloudy, with rain latter part.	Calm; E., 2; calm.....	Light	.....	.....	.....	.....	28
29	.....do		.....	30.13	29.74	50	47	49	46	44	42	Rainy to clearing.....	Calm; NW., 1.....	Light	.....	.....	.....	.....	29
30	.....do		.....	30.20	30.16	50	46	49	45	43	42	Fair and pleasant.....	NE. by N., 2; calm; N'd and E'd, 2-1.	None	.....	.....	.....	.....	30
31	.....do		.....	30.35	30.18	59	47	59	46	44	42	.....do.....	SW., 3; variable, 1; NW., 2; calm.	None	.....	.....	.....	.....	31
Sept. 1	Dutch Harbor.....		.....	30.38	30.03	55	46	55	45	45	42	Fair and pleasant.....	Calm; NE., 2; calm.....	None	.....	.....	.....	.....	1
2	.....do		.....	30.02	29.89	54	46	52	45	46	42	.....do.....	Calm; E., 2; calm.....	None	.....	.....	.....	.....	2
3	.....do		.....	29.88	29.51	51	45	50	45	44	42	.....do.....	Calm; SE., 2-4-2; calm..	None	.....	.....	.....	.....	3

	4	54 13 00	166 21 00	23.6	29.60	29.52	50	45	50	44	43	40	Fair to overcast and misty.	Variable, 1; WNW., 1–3; variable, 1.	Light	Smooth			8	4
	5	56 44 00	165 21 00	204.4	29.60	29.51	49	45	48	45	42	40	Cloudy in a. m.; misty and rainy in p. m.	SE., 2–3; WSW., 3–5	Light	Smooth	S. 46° W	11.4	2	5
	6	54 47 00	166 23 00	194.8	29.83	29.66	49	45	49	45	43	40	Overcast, with rain and mist.	S'd, 5–3; SSE., 3; SSW., 4–1; calm.	Moderate	Smooth	North	9.0	8	6
	7	Dutch Harbor, Unalaska.		67.3	30.05	29.84	53	48	52	47	42	40	Fair generally; occasional showers.	Calm; SSW., 1–3; S. by W., 1; calm.	Light					7
	8	do			30.23	30.06	50	46	50	46	42	40	do	Calm; W'd, 1–3; S'd and W'd, 3–4.	Light	Smooth			4	8
	9	55 47 00	170 10 00	181.9	30.34	30.24	49	46	49	46	44	42	Fair and pleasant	SSW., 3; SW., 2–3	None	Smooth	S. 37° W.	7.5	12	9
	10	57 43 00	169 49 00	235.8	30.36	30.16	57	44	56	44	43	41	Misty till noon; then fair and pleasant.	W'd, 1; S'd, 3; SE., 2; E., 4–6.	Light	Smooth	S. 47° W.	7.3	16	10
	11	56 34 00	169 49 00	207.5	30.09	29.66	46	44	46	44	42	39	Rainy, misty, and stormy.	NE., 5–7–4	Heavy	Moderate			0	11
	12	Village Cove, St. Paul Island.		45.6	30.08	29.69	47	44	47	44	40	40	Rainy and stormy to clearing.	NNE., 3–5; N., 2–1	Moderate	Moderating			0	12
	13	56 36 00	169 20 00	50.8	30.08	29.80	46	43	46	43	42	39	Fair to overcast and rainy.	NE., 2; E., 3–5	Moderate	Smooth			4	13
	14	54 18 00	166 54 00	201.9	30.07	29.76	50	46	50	46	43	40	Overcast and misty, to clearing.	E., 5–7; NE., 6–3; NW., 2; calm.	Light	Moderate to smooth.	N. 32° W	23.3	0	14
	15	Dutch Harbor, Unalaska.		36.8	30.08	29.86	51	45	50	45	42	40	Fair to misty and rainy.	Calm; variable, 1; calm	Moderate					15
	16	do			29.93	29.75	50	45	50	45	42	41	Fair and pleasant	Calm; SW., 2–5; S., 1	None					16
	17	54 24 00	166 08 00	41.6	29.70	29.45	54	43	53	43	42	40	Overcast, with frequent rain squalls.	SW., 3–5; calm; N'd, 1; SW., 2–5.	Light	Smooth			0	17
	18	54 37 00	166 30 00	94.3	29.86	29.54	46	44	46	43	41	39	Overcast and rainy to clearing.	SW., 2–5; WSW., 4–2	Light	Moderate w'ly swell.			0	18
	19	Dutch Harbor, Unalaska.		50.6	29.92	29.78	50	41	49	41	41	40	Overcast and cloudy; rain 1 to 3 p. m.	Calm; variable, 1–2	Light					19
	20	53 56 00	166 29 00	3.0	30.30	29.94	50	44	49	43	42	40	Fair and pleasant	SSW., 1; calm; NW., 2–1	None	Smooth			8	20
	21	55 10 00	161 52 00	209.9	30.53	30.31	59	42	57	42	45	39	do	Variable, 3–2	None	Smooth		(15hr)	16	21
	22	55 35 00	155 41 00	245.5	30.54	30.36	53	45	53	45	44	43	do	NE., 3; East, 4	None	Smooth	N. 78° W	14.5	16	22
	23	56 11 00	150 48 00	187.2	30.34	29.50	50	47	49	46	45	43	Fair to rainy and stormy.	East, 4–7; NE., 6–8; SE., 6–2.	Moderate	Rough	N. 60° W	18.0	0	23
	24	56 22 00	148 57 00	103.0	29.52	29.42	49	47	49	47	45	43	Overcast, with drizzling rain.	S'd and W'd, 3; NNW., 4–2.	Heavy	Moderate c'ly swell.	N. 86° W	15.5	0	24
	25	56 37 00	143 40 00	196.0	29.57	29.46	54	48	53	48	46	44	Overcast and rainy to clearing.	ESE., 5–6; ENE., 3; NNE., 4.	Light	Moderating	S. 81° W	20.4	0	25
	26	56 47 00	137 43 00	223.6	29.67	29.58	55	45	53	44	47	44	Clear and pleasant	N'd and E'd, 4; N., 3–2	None	Cross to smooth.	S. 82° W	28.0	0	26
	27	Sitka, SE. Alaska.		97.9	29.72	29.64	50	42	49	42	47	44	Fair to overcast and rainy.	Eastward, 2–1	Light					27
	28	do			29.75	29.66	64	47	62	47	49	46	Clear and pleasant	Calm; Eastward, 2–1	None					28
	29	Peril Strait, SE. Alaska.		26.5	29.80	29.60	55	42	54	41	47	45	do	Calm; variable, 1	None	Smooth				29
	30	Off Douglas I'd, SE. Alaska.		143.0	29.62	29.51	47	45	47	45	42	40	Overcast and rainy	E'd, 2; squalls, 6; SE., 4–1.	Heavy	Smooth				30
Oct.	1	Frederick Sound: 56 09 00	132 58 00	107.0	30.03	29.64	48	44	48	44	42	40	Cloudy; frequent showers.	SE., 4–2; calm	Moderate	Smooth	Local			1

Meteorological and cruising record of the United States Fish Commission steamer Albatross, July 1, 1894, to June 30, 1895—Continued.

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						Air.				Water surface.						Setting to the—	Knots per day.		
	Lat. N.	Long. W.		Max.	Min.	Dry bulb.		Wet bulb.											
						Max.	Min.	Max.	Min.	Max.	Min.								
	° ′ ″	° ′ ″	*Knots.*																
1894.	Clarence Strait:																		
Oct. 2	55 42 00	132 19 00	119.5	30.06	29.83	67	44	65	43	48	43	Fair and pleasant	Calm; SE., 2; NE. 2; NW. 2.	None	Smooth	Local			2
	Grenville Channel:																		
3	53 55 00	130 10 00	156.2	30.30	29.83	54	46	54	46	46	44	do	NW. 3; E., 1; SE., 2; calm.	None	Smooth	Local			3
	Finlayson Channel:																		
4	52 32 00	128 29 00	124.4	30.30	30.14	51	47	50	46	47	45	Fair to cloudy and rainy.	NW. 2; calm; NW., 1; calm.	Moderate	Smooth	Local			4
	Queen Charlotte Sound:																		
5	51 06 00	127 50 00	107.9	30.36	30.21	62	45	61	45	47	44	Clear and pleasant	Calm; N'd and W'd, 2-3; calm.	None	Smooth	Local			5
	Discovery Passage:																		
6	50 10 00	125 23 00	127.1	30.46	30.38	57	41	56	41	51	40	Fair and pleasant	Calm; S'd and E'd, 1	None	Smooth	Local			6
	Rosario Strait:																		
7	48 23 00	122 48 00	204.8	30.42	30.00	56	47	55	47	51	47	Misty to fair and pleasant.	SE., 1; calm	Light	Smooth	Local			7
8	New Whatcom, Wash.		26.5	30.31	29.96	59	50	58	49	49	47	Fair and pleasant	S., 1-2; calm; WNW., 1; calm.	None	Smooth	Local			8
9	do			30.40	30.32	56	49	56	48	49	46	do	Calm; SE., 2; S. 1; calm.	None	Smooth	Local			9
10	Victoria, B. C.		48.9	30.31	30.16	55	47	54	47	48	41	do	Calm; variable, 1; calm; SW., 2-1.	None	Smooth	Local			10
11	46 34 00	124 49 00	185.4	30.30	30.19	57	50	57	50	50	42	do	SSW., 1; NE., 1-2	None	Smooth			14	11
12	42 59 00	124 41 00	233.7	30.25	30.20	54	52	54	52	50	41	do	NNE., 2; SE., 2; S'd, 2; SE., 3-4.	None	Smooth	N. 28° W	20.0	14	12
13	39 32 00	124 10 00	232.5	30.24	30.04	60	52	59	52	46	43	do	S'd and E'd, 1; variable, 1; W'd, 4.	None	Smooth			14	13
14	Sausalito Harbor, California.		150.3	30.04	29.90	65	55	64	54	47	44	do	Calm; E., 1; SW., 1; calm.	None	Smooth				14
15	do			30.00	29.85	75	58	74	58	60	46	do	Calm; W'ly, 1; calm	None					15
16	do			30.00	29.85	62	56	62	55	60	59	do	SW., 3; calm; WSW., 3-5-2.	None					16
17	San Pablo Bay, California.		10.4	29.88	29.75	65	56	64	56	64	60	do	Calm; WNW., 3; calm.	None	Smooth				17

18	Navy-yard, Mare Island, Cal.		8.6	29.91	29.73	65	58	64	58	63	61	Cloudy; showers 2 to 8 a. m.	Calm; SW., 2–3; variable, 1.	Light.							18
1895.																					
May 18	San Pablo Bay, California.		20.1	30.00	29.89	69	53	67	53	65	61	Clear and pleasant	S'd, 2; SW., 1	None	Smooth						18
19	Sausalito Harbor, California.			30.05	29.99	59	51	58	50	63	52	do	SW., 1–2; local squalls, 4.	None							19
20	do			30.12	30.06	60	49	59	49	60	52	do	WSW., 1; local squalls, 4.	None							20
21	do			30.16	30.08	65	50	61	50	59	46	do	Calm; SW., 1; WNW., 4.	None	Rough to moderate.				0		21
22	38 37 00	123 42 00	79.0	30.13	30.09	54	49	53	49	50	46	Fair and pleasant	NW., 7–4	None	Moderate	South	22.0	0			22
23	40 51 00	124 16 00	137.0	30.14	30.07	57	49	56	50	55	47	Clear and pleasant	NW., 7–4	None	Moderating				0		23
24	43 54 00	124 33 00	183.0	30.11	29.97	61	54	62	55	56	53	Overcast, with passing showers.	S'd, 3; SE., 4	Light	Smooth to moderate.				8		24
25	47 26 00	125 00 00	213.0	29.90	29.40	57	49	58	49	55	49	Overcast and rainy; thick.	S'd and E'd, 4; squalls, 7.	Heavy	Moderate				0		25
26	48 18 00	123 41 00	113.5	29.53	29.38	55	49	56	48	51	47	Overcast to fair and pleasant.	Calm; E'd, 3; SW., 3	Light	Smooth						26
27	Victoria, B. C.		9.1	29.76	29.54	58	49	56	48	52	48	Fair and pleasant	SW., 1–2	None							27
	Straits of Fuca:																				
28	48 16 00	123 11 00	12.0	30.17	29.78	54	50	54	49	51	47	do	SSW., 3; WSW., 1–3	None	Smooth						28
29	Port Townsend, Wash.		22.6	30.31	30.13	56	49	55	48	50	48	Cloudy, boisterous; frequent showers.	Calm; SE., 2; W'd, 2–5	Moderate							29
30	do			30.33	30.23	52	47	52	46	50	47	Fair; passing showers 8 to 10 a. m.	SE., 1; W'd, 1	Light							30
31	48 21 00	122 56 00	17.2	30.26	30.11	58	46	58	46	52	46	Clear and pleasant	S'd and W'd, 1–2	None	Smooth						31
June 1	49 21 00	124 11 00	85.1	30.16	30.05	70	45	69	46	56	47	Clear and pleasant	Calm	None	Smooth	Local					1
2	Union Bay, Baynes Sound, B. C.		28.7	30.23	30.14	66	46	65	46	58	55	do	Calm; variable, 1	None							2
3	do			30.26	30.16	64	53	64	54	59	56	Fair and pleasant	Calm; variable, 1	None							3
4	49 53 30	125 06 30	43.5	30.39	30.20	66	48	65	48	57	53	Clear and pleasant	Calm; NW., 3; SW., 3	None	Smooth	Local					4
5	Alert Bay, B. C		99.1	30.53	30.40	51	48	50	47	53	47	Fair and pleasant	WSW., 4–3	None	Smooth	Local					5
6	50 54 00	127 59 00	42.6	30.63	30.53	51	47	51	47	52	47	Clear and pleasant	SSW., 3; W., 3	None	Smooth				8		6
7	52 00 00	133 40 00	222.0	30.64	30.43	51	48	51	48	48	47	Cloudy; foggy at times.	WSW., 2; S., 2	None	Smooth	East	3.9	16			7
8	52 59 00	139 19 00	215.0	30.40	29.99	47	43	48	44	48	44	Overcast, thick, and misty.	S'd, 4–7; squalls	Light	Moderate				0		8
9	53 57 00	142 31 00	128.0	30.07	29.97	44	43	44	43	44	42	Overcast, boisterous, and stormy.	SSW., 5; squalls, 7	None	Rough	South	6.0	0			9
10	54 27 00	144 08 00	64.0	30.20	30.08	43	41	43	40	42	40	do	SW., 6; squalls, 7	None	Rough	None	0.0	0			10
11	55 42 00	147 47 00	146.0	30.24	30.18	42	40	42	40	41	40	Overcast and boisterous; rain squalls.	SW., 4; squalls, 6	Moderate	Rough	S. 57° E.	11.0	0			11
12	55 32 00	152 25 00	158.0	30.40	30.26	44	40	43	40	43	42	Overcast and rainy to clearing.	SW., 4–6; W., 3; WSW., 3	Moderate	Moderating	S. 45° E.	7.9	0			12
13	55 31 00	159 08 00	228.0	30.38	29.89	46	42	46	42	43	41	Fair to overcast, with rain and mist.	SW., 3; S., 3; SE., 4; ESE., 1.	Moderate	Smooth				8		13
14	Sand Point, Humboldt Harbor, Popof Island, Alaska.		64.6	29.88	29.80	45	43	45	42	41	40	Foggy and rainy; thick.	SE. and ESE., 1	Moderate							14
15	55 03 00	161 52 00	65.6	29.97	29.80	45	40	44	40	41	39	Overcast and misty	ENE., 1; S'd and W'd, 2–4	Light	Smooth				14		15

Meteorological and cruising record of the United States Fish Commission steamer Albatross, July 1, 1894, to June 30, 1895—Continued.

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						Air.				Water surface.						Setting to the—	Knots per day.		
						Dry bulb		Wet bulb.											
	Lat. N.	Long. W.		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.								
1895.	° ′ ″	° ′ ″	*Knots.*																
June 16	Dutch Harbor, Unalaska.		202.4	30.37	30.01	45	39	45	39	41	39	Overcast, foggy, and misty.	W'd. 4–3; WNW., 2–1	Light	Smooth			0	16
17	Hinlink Harbor, Unalaska.			30.44	30.39	47	39	46	39	42	40	Overcast, with rain and mist.	Calm; ENE., 1; calm	Moderate					17
18	do			30.45	30.34	47	41	47	41	45	40	Overcast and misty to clearing.	Calm; NE. veering to SW., 1.	Light					18
19	do			30.35	30.21	51	40	50	40	45	42	Misty and rainy to fair and pleasant.	Calm; NNE., 1; calm	Light					19
20	do			30.21	30.04	48	42	47	42	45	42	Overcast but pleasant.	Variable, 1	None					20
21	do			30.03	29.84	49	43	49	43	45	44	do	Calm; SW., 1; variable, 1; calm.	None					21
22	do			29.89	29.83	50	44	50	44	45	43	Overcast, with fog and mist at times.	Calm; NE., 1; calm	Light					22
23	54 38 00	167 34 00	58.0	30.14	29.88	43	41	43	40	44	41	Overcast and misty to cloudy.	Calm; N'd and E'd, 3–2	Light	Smooth			16	23
24	57 02 00	170 32 00	187.0	30.17	30.09	40	31	40	31	41	32	Overcast and foggy; cold.	NNE., 3; N'ly, 1; calm	None	Smooth			14	24
25	Village Cove, St. Paul Island.		9.5	30.08	29.98	36	30	36	30	34	32	Overcast and foggy	W'd, 1 and 2	None	Smooth				25
26	do			30.01	29.98	39	34	38	34	39	33	do	W'd, 1 and 2	None	Smooth			8	26
27	56 21 00	175 22 00	172.0	30.04	30.00	41	37	41	37	42	39	Overcast, but pleasant.	WSW., 1; SW. by S., 2	None	Smooth	N. 72° E.	11.0	20	27
28	56 00 00	179 45 00 *East.*	148.0	29.98	29.72	42	40	42	40	41	40	Overcast and misty to stormy.	SW., 3–7–5	Moderate	Smooth to rough.			0	28
30	55 43 00	179 05 00	43.0	29.74	29.66	43	39	43	39	41	39	Overcast and stormy; moderating.	S'd and W'd 4–2	Light	Moderate to smooth.	S. 68° E.	25.0	14	30
	Total		13,181.3																

112 days steaming during fiscal year 1895.

Record of fur-seals observed at sea by the United States Fish Commission steamer Albatross, July 1, 1894, to June 30, 1895.

Date.	Time of day.	Temperatures.		Position.				Seals seen.		Remarks.
		Air, D. B.	Sea, surf.	Lat. N.		Long. W.		No.	Sizes.	
				°	′	°	′			
1894.										
July 1	9.20 a. m.	40	39	56	58	167	42	1	Medium ..	Traveling away from ship.
1	12.45 p. m.	39	39	57	28	167	32	1	Small.....	Sleeping.
3	4.11 a. m.	42	39	55	01	165	58	1	.....do	Jumping and diving.
4	3.43 a. m.	41	39	54	13	167	00	3	Medium ..	Do.
4	7.30 a. m.	41	39	54	03	166	54	2	.....do	Do.
8	1.35 p. m.	45	45	54	41	167	17	1	.....do	Do.
8	3.00 p. m.	47	45	54	59	167	27	1	Small.....	Do.
8	4.10 p. m.	47	45	55	00	167	39	1	Medium ..	Do.
9	5.48 a. m.	45	41	56	31	168	57	1	.....do	Do.
12	3.58 p. m.	43	40	57	01	170	15	1	Large.....	Do.
12	4.32 p. m.	43	40	57	05	170	08	1	Medium ..	Do.
12	5.15 p. m.	44	39	57	09	170	04	1	.....do	Do.
13	4.47 a. m.	38	38	56	58	169	15	1	.....do	Do.
13	4.55 a. m.	38	38	56	57	169	06	2	.....do	Do.
13	11.25 a. m.	46	42	56	35	168	18	1	.....do	Swimming to westward.
13	2.30 p. m.	47	43	56	35	168	18	1	Small.....	Playing near ship while sounding.
13	6.52 p. m.	43	44	56	24	167	55	1	Medium ..	Jumping and diving.
13	7.35 p. m.	43	44	56	20	167	47	1	Large.....	Do.
13	7.43 p. m.	43	44	56	18	167	46	2	Medium ..	Do.
13	7.50 p. m.	42	43	56	17	167	45	2	.....do	Do.
13	8.25 p. m.	42	43	56	15	167	37	1	.....do	Do.
13	8.40 p. m.	42	42	56	14	167	35	1	.....do	Do.
30	3.45 p. m.	47	43	54	10	166	42	1	.....do	Do.
30	7.50 p. m.	46	42	54	36	167	30	1	.....do	Sleeping.
31	6.20 a. m.	46	40	54	48	169	23	1	.....do	Jumping and diving.
31	10.40 a. m.	48	40	55	00	170	28	1	.....do	Traveling to northward.
31	12.27 p. m.	48	41	55	00	170	50	1	Small.....	Traveling to southeast.
31	1.52 p. m.	50	41	55	18	170	56	1	Medium ..	Diving.
31	5.57 p. m.	49	42	55	48	171	13	1	Large.....	Do.
31	8.23 p. m.	49	42	56	06	171	18	1	Medium ..	Jumping and diving.
Aug. 1	3.27 a. m.	48	40	56	39	170	23	1	.....do	Do.
1	6.15 a. m.	48	40	56	42	169	57	1	.....do	Do.
1	6.25 a. m.	48	40	56	42	169	55	1	.....do	Do.
1	6.45 a. m.	48	40	56	41	169	52	1	.....do	Do.
1	12.00 m. to 6.00 p. m.	.....	.....	East shore, St. Paul Island.				.....	.....	Common near rookeries.
2	4.36 a. m.	47	39	56	38	171	21	1	Medium ..	Jumping and diving.
2	5.40 a. m.	47	40	56	35	171	29	1	.....do	Do.
2	2.45 p. m.	50	43	56	19	173	23	1	Small.....	Traveling to northward and eastward.
2	5.32 p. m.	49	42	56	36	173	40	1	.....do	Traveling to westward.
2	6.00 p. m.	49	42	56	39	173	45	2	Medium ..	Playing.
2	7.37 p. m.	49	42	56	49	173	58	2	.....do	Jumping and diving.
3	10.22 a. m.	50	43	58	19	176	00	1	.....do	Do.
3	2.30 p. m.	50	43	58	27	176	51	1	Small.....	Playing near ship while sounding.
6	9.55 a. m.	48	43	59	13	174	45	1	Large.....	Traveling to southward and eastward.
6	11.00 a. m.	48	43	59	11	174	27	1	Small.....	Sank.
6	1.15 p. m.	49	43	59	07	173	53	3	.....do	Playing.
6	2.55 p. m.	49	43	59	04	173	27	4	.....do	Do.
6	4.02 p. m.	49	43	59	02	173	10	1	Medium ..	Do.
6	6.30 p. m.	49	43	58	57	172	32	1	Large.....	Jumping and diving.
6	6.35 p. m.	49	43	58	57	172	31	2	Medium ..	Do.
6	7.05 p. m.	49	43	58	55	172	24	1	Small.....	Do.
6	7.17 p. m.	49	43	58	54	172	18	1	.....do	Do.
7	3.50 a. m.	47	41	58	24	172	02	1	.....do	Do.
7	8.35 a. m.	50	44	58	07	172	42	1	.....do	Do.
7	9.40 a. m.	51	45	58	02	172	54	1	Medium ..	Do.
7	9.42 a. m.	51	45	58	02	172	54	2	.....do	Traveling to southwest.
7	9.55 a. m.	51	45	58	01	172	56	.....	.....	Abundant; many sleeping, others scratching.
7	10.10 a. m.	51	45	58	00	172	58	.....	.....	Abundant; lowered seal boat; fishing station; Hyd. 3532.
7	11.57 a. m.	54	45	57	57	173	05	5	Medium ..	Jumping and diving.
7	1.55 p. m.	52	45	57	47	173	26	2	.....do	Sleeping.
7	4.57 p. m.	50	44	57	33	174	03	1	.....do	Jumping and diving.
7	6.15 p. m.	50	44	57	25	174	23	1	Small.....	Playing.
7	7.00 p. m.	50	44	57	23	174	25	1	Medium ..	Do.
8	10.25 a. m.	50	44	57	05	172	46	2	Small.. ..	Do.
8	11.45 a. m.	51	45	56	54	172	43	1	.....do	Do.
8	12.35 p. m.	51	45	56	49	172	43	1	Medium ..	Jumping and diving.
8	1.05 p. m.	51	45	56	46	172	43	1	.....do	Do.
8	4.05 p. m.	51	45	56	40	172	41	1	.....do	Do.
8	5.00 p. m.	50	45	56	32	172	40	3	.....do	Playing.

Record of fur-seals observed at sea by the United States Fish Commission steamer Albatross, July 1, 1894, to June 30, 1895—Continued.

Date.	Time of day.	Temperatures.		Position.		Seals seen.		Remarks.
		Air, D. B.	Sea, surf.	Lat. N.	Long. W.	No.	Sizes.	
1894.				° ′	° ′			
Aug. 8	5.25 p. m.	50	45	56 32	172 46	1	Large.....	Jumping and diving.
8	7.40 p. m.	50	44	56 25	173 40	1	Medium ..	Do.
9	5.25 a. m.	49	44	55 57	172 26	1	.....do	Do.
9	9.00 a. m.	49	44	55 47	171 57	1	.....do	Playing.
9	9.50 a. m.	49	44	55 45	171 45	3	.....do	Do.
9	12.00 m.	49	44	56 00	171 52	1	.....do	Do.
9	12.40 p. m.	49	44	56 05	171 55	1	Small.....	Do.
9	2.34 p. m.	49	44	56 21	172 02	1	Medium ..	Jumping and diving.
9	5.12 p. m.	50	44	56 44	172 11	1	.....do	Do.
9	5.57 p. m.	50	44	56 44	172 18	1	.....do	Do.
9	6.30 p. m.	50	44	56 44	172 25	1	.....do	Do.
9	6.45 p. m.	49	44	56 44	172 28	1	.....do	Do.
10	4.00 a. m. to 8.00 a. m.	48	44	56 01 to 55 51	171 57 to 171 44			Abundant, over 200 counted; most sleeping, some playing, some scratching.
10	12.22 p. m.	54	45	55 38	171 09	1	Medium ..	Jumping and diving.
10	12.30 p. m.	55	46	55 37	171 03			Abundant; majority sleeping.
10	1.00 p. m. to 3.00 p. m.	57	46	55 35 to 55 25	170 40 to 170 20			Abundant, over 150 counted; majority sleeping, some traveling away from ship.
10	7.14 p. m.	63	48	55 18	169 44	2	Small.....	Sank.
11	5.00 a. m.	47	44	54 45	168 11	1	.....do	Jumping and diving.
11	6.20 a. m.	47	44	54 37	167 55	1	.....do	Do.
11	11.00 a. m.	48	44	54 13	167 06	2	Medium ..	Sleeping.
17	2.00 p. m.	48	41	54 08	166 43	1	.....do	Traveling to eastward.
18	7.25 a. m.	46	42	54 55	168 54	2	.....do	Sank.
18	11.10 a. m.	47	45	55 22	169 19	2	.....do	Sleeping.
18	11.35 a. m.	47	45	55 26	169 22	1	.....do	Playing.
18	5.50 p. m.	47	44	55 35	170 36	1	.....do	Sank.
19	5.11 a. m.	48	43	56 29	170 44	1	Small.....	Do.
19	5.15 a. m. to 7.45 a. m.	48	43	56 29 to 56 30	170 42 to 170 03			Common; majority medium size; traveling westward.
19	3.25 p. m.	47	42	56 45	170 25	1	Medium ..	Jumping and diving.
19	4.35 p. m.	48	43	56 48	170 45	3	.....do	Traveling to eastward.
19	4.45 p. m.	48	43	56 49	170 48	1	Small.....	Sank.
19	5.00 p. m.	48	43	56 50	170 51	2	.....do	Traveling to eastward.
19	6.20 p. m.	48	43	56 50	170 59	1	Medium ..	Jumping and diving.
20	6.00 a. m.	47	41	57 02	171 52	1	Small.....	Do.
20	8.25 a. m.	46	41	57 03	171 50	1	.....do	Do.
20	4.30 p. m.	46	43	57 02	171 21	1	Medium ..	Do.
20	6.30 p. m.	46	43	57 06	171 37	1	Large.....	Sank.
21	5.15 p. m.	45	41	57 51	172 00	2	Small.....	Playing near ship.
22	1.30 p. m. to 4.00 p. m.	44	42	58 23 to 58 22	173 30 to 174 03			Common; majority medium size; some sleeping, others going to northwest.
22	4.25 p. m.	45	42	58 21	174 21	1	Small.....	Jumping and diving.
23	5.00 a. m.	43	42	58 04	172 48	2	Medium ..	Do.
23	5.30 a. m.	43	42	57 59	172 49	1	.....do	Do.
23	6.40 a. m.	43	42	57 48	172 51	3	Small.....	Do.
23	10.00 a. m.	44	42	57 42	173 18	1	.....do	Playing near ship; boarding Mary Ellen.
24	11.50 a. m.	45	41	57 07	173 45	2	.....do	Jumping and diving.
25	9.00 a. m.	47	42	56 24	172 42	1	Medium ..	Do.
25	9.15 a. m.	47	42	56 23	172 44	1	.....do	Do.
25	11.30 a. m.	48	42	56 13	172 44	3	.....do	Playing near ship; boarding Walter A. Earle.
25	5.00 p. m.	47	43	55 45	173 21	1	Small.....	Playing.
26	2.25 p. m.	46	44	54 45	171 13	1	.....do	Jumping and diving.
26	4.35 p. m.	46	43	54 33	171 06	1	Medium ..	Do.
26	5.35 p. m.	46	43	54 25	171 02	1	.....do	Do.
27	8.10 a. m.	46	43	54 09	167 46	1	.....do	Traveling away from ship.
27	9.15 a. m.	46	42	54 08	167 28	3	.....do	Sleeping.
27	9.50 a. m.	46	42	54 07	167 20	2	.....do	Do.
27	10.00 a. m.	46	42	54 07	167 16	1	Small.....	Playing.
Sept. 5	9.17 a. m.	48	42	56 40	165 04	1	.....do	Sleeping.
6	9.00 a. m.	46	42	55 00	166 30	1	Medium ..	Jumping and diving.
6	2.30 p. m.	47	42	54 33	166 26	2	.....do	Do.
6	2.45 p. m.	47	42	54 27	166 26	3	Small.....	Do.
9	8.30 a. m. to 12.00 m.	48	42	55 28 to 55 47	169 17 to 170 10			Common; majority small; some sleeping, others diving and playing.
9	4.10 p. m.	48	43	55 58	171 12	1	Medium ..	Sank.
10	4.30 a. m. to 8.00 a. m.	47	41	57 35 to 58 03	171 18 to 170 52			Common; majority medium; mostly jumping and diving; few sleeping.

Record of fur-seals observed at sea by the United States Fish Commission steamer Albatross, July 1, 1894, to June 30, 1895—Continued.

Date.	Time of day.	Temperatures.		Position.				Seals seen.		Remarks.
		Air, D. B.	Sea, surf.	Lat. N.		Long. W.		No.	Sizes.	
1894.				°	′	°	′			
Sept. 10	10.00 a. m.	48	42	57	53	170	20	1	Medium ..	Sank.
10	2.30 p. m.	50	42	57	44	169	33	1	Small.....	Jumping and diving.
10	5.45 p. m.	46	42	57	45	168	28	2	.....do	Do.
11	6.00 a. m.	46	42	56	12	168	29	1	Large.....	Do.
11	9.15 a. m.	47	42	56	29	169	34	1	Medium ..	Do.
11	12.25 p. m.	45	40	56	38	169	53	2	Small.....	Do.
11	4.00 p. m.	45	40	57	00	170	23	....	.....	Common; near Otter Island.
13	11.30 a. m.	47	40	56	40	169	25	5	Medium ..	Near St. George Island.
13	1.30 p. m.	46	40	56	29	169	07	1	Small.....	Sank.
13	7.00 p. m.	46	40	55	46	168	45	2	Medium ..	Playing.
17	1.15 p. m.	47	41	54	32	165	56	3	Small.....	Jumping and diving.
18	9.00 a. m.	45	40	54	22	166	04	1	.....do	Do.
1895.										
June 13	5.00 p. m.	44	41	Popof Strait, Shumagin Island.				1	Medium ..	Traveling away from ship.
24	10.00 a. m.	36	37	56	50	170	20	3	.....do	Do.
24	4.00 to 8.00 p. m.	37	34	Village Cove, St. Paul Island.				....	.....	Several seals seen near rookeries.
27	5.42 a. m.	38	40	56	30	174	00	1	Medium ..	Traveling to northward and eastward.
27	7.40 a. m.	38	41	56	28	174	40	1	.....do	Jumping.
27	7.53 a. m.	38	41	56	27	174	45	1	.....do	Traveling to eastward.
27	11.00 a. m.	40	40	56	25	175	00	6	.....do	Do.
27	11.30 a. m.	40	40	56	22	175	10	2	.....do	Sleeping.
27	11.35 a. m.	40	40	56	22	175	15	2	.....do	Jumping.
27	12.15 p. m.	40	40	56	20	175	25	6	.....do	Sleeping.
						East.				
30	1.00 p. m.	42	40	55	45	178	50	1	.....do	Do.

Record of animals, drift, kelp, etc., observed at sea by the United States

FROM DUTCH HARBOR, UNALASKA, ON CRUISE IN

Date.	Meridian positions.		Mean temperatures.		Seals.	Whales.	Auks.	Albatrosses.	Cormorants.
	Lat N.	Long. W.	Air, D. B	Sea, surf.					
1894.	° ′ ″	° ′ ″	°	°					
July 1	57 22 00	167 36 00	45	40	Two				
2	55 17 00	165 05 00	43	41				Several	
3	Akutan Harbor, Akutan Island.		45	41	One	Many	Many	Several	
4	54 00 00	166 48 00	47	43	Five	Two	Few	Several	

FROM DUTCH HARBOR, UNALASKA, TO PRIBILOF ISLANDS, TO ISANOTSKI

July 8	54 30 00	167 04 00	45	44	Three	Many		Several	
9	North anchorage, St. George Island.		46	40	One	One	Many		
10	do		44	38			Many		
11	do		44	38			Many		
12	56 42 00	169 42 00	43	39	Three		Many	Few	One
13	56 35 00	168 18 00	43	40	Thirteen				
14	54 56 00	165 21 00	45	41				Few	
	Ikatan Bay.								
15	54 48 00	163 23 00	45	39					
16	54 48 00	163 23 00	45	38					
17	Morzhovoi Village, Traders Cove, Isanotski Strait.		45	38					
18	do		47	38					
19	do		52	40					
	Ikatan Bay.								
20	54 46 00	163 18 00	55	40					
21	54 46 00	163 18 00	57	44					
22	54 33 00	162 53 00	48	41					
23	Off Acherk Harbor, Sannak Island.		49	40					
24	54 34 00	162 53 00	48	40					
25	Dutch Harbor, Unalaska.		47	40		Many			

FROM DUTCH HARBOR, UNALASKA, ON CRUISE IN

July 30	Dutch Harbor, Unalaska.		50	42	Two	One		One*	
31	55 03 00	170 48 00	48	41	Six				
Aug. 1	56 41 00	169 37 00	47	39	Many		Many		
2	56 26 00	172 42 00	48	40	Eight	Many			
3	58 22 00	176 22 00	47	41	Two	Several		One	
4	59 25 00	179 13 00	50	43					
5	60 15 00	174 45 00	47	42				One	
6	59 09 00	174 12 00	47	42	Fifteen				
7	57 57 00	173 05 00	50	43	Many	Several		Few	
8	56 53 00	172 43 00	50	44	Eleven			Several	
9	56 00 00	171 52 00	49	44	Twelve	Several			
10	55 38 00	171 09 00	56	46	Many	Several		Several	
11	54 07 00	166 55 00	51	46	Four				

FROM DUTCH HARBOR, UNALASKA, ON CRUISE IN

Aug. 17	54 01 00	166 28 00	50	41	One				
18	55 28 00	169 23 00	46	43	Six	Two			
19	North anchorage, St. George Island.		47	42	Many	Three	Many		Many
20	57 06 00	171 37 00	46	42	Four	Two			
21	57 43 00	171 58 00	45	41	Two				
22	58 24 00	173 07 00	44	41	Many	Three			
23	57 49 00	173 34 00	45	42	Seven				
24	57 07 00	173 45 00	46	41	Two				
25	56 13 00	172 44 00	47	42	Six	Several			
26	55 08 00	171 26 00	47	42	Three				
27	54 05 00	166 52 00	46	42	Seven	One			

* White.

Fish Commission steamer Albatross, July 1, 1894, to June 30, 1895.

BERING SEA, AND RETURN TO DUTCH HARBOR.

Ducks.	Guillemots.	Gulls.	Petrels.	Puffins.	Terns.	Drift.	Kelp.	Remarks.
.....	Several	Several	Several	.....	.....	.....	.....	
.....	Many	Several	Many	.....	.....	.....	Much	
.....	Many	Many	Many	Many	.....	.....	Much	Many whales off Unimak Pass.
Few	Many	Several	Many	Many	.....	.....	Much	

STRAIT, TO SANNAK ISLAND, AND RETURN TO DUTCH HARBOR.

.....	Many	Many	Many	Many	Several	.....	.....	Several orcas.
Few	Many	Many	Many	Many	Several	.....	Little	
Few	Many	Many	Many	Many	Several	.....	Little	
Few	Many	Many	Many	Many	Several	.....	Little	
Few	Many	Many	Many	Many	Several	.....	Little	
.....	Many	Several	Many	Several	.....	.....	.....	
.....	Many	Several	Many	.....	.....	.....	.....	
Few	Several	Several	Several	Few	.....	.....	Little	
Few	.....	Several	.....	.....	.....	.....	.....	
.....	.....	Several	.....	.....	.....	.....	Much	
.....	.....	Several	.....	.....	.....	.....	.....	
.....	.....	Several	.....	.....	.....	.....	.....	
.....	.....	Several	.....	.....	.....	.....	.....	
Few	Few	Several	Few	Few	.....	.....	Much	
Few	Few	Several	Few	Few	.....	.....	.....	
.....	Several	Few	Several	Few	.....	.....	Much	
.....	Several	Few	Several	Few	.....	.....	Much	
.....	Several	Several	Several	Few	.....	.....	Little	One hair seal.
.....	Many	Few	Many	Several	.....	.....	Much	

BERING SEA, AND RETURN TO DUTCH HARBOR.

.....	Few	Few	Few	.....	.....	.....	.....	
.....	Many	Many	Many	.....	.....	.....	.....	
.....	Many	Many	Many	Many	Few	.....	Little	Many seals near Pribilofs.
.....	Many	Several	Many	.....	.....	.....	.....	
.....	Several	Few	Several	.....	.....	.....	.....	
.....	.....	.....	.....	.....	.....	.....	.....	
.....	Many	Few	Several	.....	.....	.....	.....	
.....	Many	Few	Several	.....	.....	.....	.....	
.....	Many	Several	Several	.....	.....	.....	.....	
.....	Many	Several	Many	.....	.....	.....	.....	
.....	Several	Few	Several	.....	.....	.....	.....	
.....	Many	Few	Many	Several	Several	.....	Little	
.....	Many	Few	Several	Several	.....	.....	Much	

BERING SEA, AND RETURN TO DUTCH HARBOR.

.....	Many	Several	.....	Several	.....	.....	.....	
.....	Several	Few	Few	.....	.....	.....	.....	
.....	Many	Many	Many	Many	.....	.....	.....	
.....	Few	.....	Many	Many	.....	.....	.....	
.....	Few	.....	Few	.....	.....	.....	.....	
.....	Many	Many	Many	Many	.....	.....	.....	
.....	Several	Few	Several	.....	.....	.....	.....	
.....	Few	.....	Few	.....	.....	.....	.....	
.....	.....	Few	Several	Few	.....	.....	.....	
.....	.....	Few	Few	Few	.....	.....	.....	
.....	Several	.....	.....	.....	.....	.....	.....	

Record of animals, drift, kelp, etc., observed at sea by the United States Fish

FROM DUTCH HARBOR, UNALASKA, ON CRUISE OFF

Date.	Meridian positions.		Mean temperatures.		Seals.	Whales.	Auks.	Albatrosses.	Cormorants.
	Lat. N.	Long. W.	Air, D. B.	Sea, surf.					
1894.	° ′ ″	° ′ ″	°	°					
Sept. 4	54 13 00	166 21 00	47	41	.....	Many.....	Many.....	Several...	Few ....
5	56 44 00	165 21 00	47	41	One.....	.....	.....	One.....	.....
6	54 47 00	166 23 00	47	41	Six	One.....	.....	.....	.....

FROM DUTCH HARBOR, UNALASKA, ON CRUISE TO

Sept. 8	Dutch Harbor, Unalaska.		48	41	.....	One.....	.....	Two	.....
9	55 47 00	170 10 00	47	43	Many....	One.....	.....	Two	.....
10	57 43 00	169 49 00	50	42	Many....	.....	.....	.....	.....
11	56 34 00	169 49 00	45	40	Many....	Two	Great many.	.....	.....
12	Village Cove, St. Paul Island.		45	40	.....	.....	Many.....	.....	.....
13	56 36 00	169 20 00	44	40	Eight....	.....	.....	.....	.....
14	54 18 00	166 54 00	48	41	.....	Two	.....	.....	One.....

FROM DUTCH HARBOR, UNALASKA, TO AKUTAN

Sept. 17	54 24 00	166 08 00	48	41	Three ...	Several ...	.....	.....	.....
18	54 37 00	166 30 00	45	40	One.....	Many.....	.....	.....	.....

FROM DUTCH HARBOR, UNALASKA,

Sept. 20	53 56 00	166 29 00	47	41	.....	Several ...	.....	.....	.....
21	55 10 00	161 52 00	50	42	.....	Two	.....	.....	.....
22	55 35 00	155 41 00	49	43	.....	.....	.....	.....	.....
23	56 11 00	150 48 00	48	44	.....	One.....	.....	Few	.....
24	56 22 00	148 57 00	48	44	.....	One.....	.....	Several ...	.....
25	56 37 00	143 40 00	51	45	.....	.....	.....	Several ...	.....
26	56 47 00	137 43 00	50	45	.....	One.....	.....	Several ...	.....

FROM SITKA, SOUTHEAST ALASKA, TO NEW

Sept. 29	Peril Strait, SE. Alaska.		48	46	.....	.....	.....	.....	.....
30	Off Douglass Island, SE. Alaska.		46	41	.....	.....	.....	.....	.....
	Frederick Sound.								
Oct. 1	56 59 00	132 58 00	46	41	.....	.....	.....	.....	Several.
	Clarence Strait.								
2	55 42 00	132 19 00	55	45	.....	.....	.....	.....	.....
	Grenville Channel.								
3	53 55 00	130 10 00	50	45	.....	.....	.....	.....	.....
	Finlayson Channel.								
4	52 32 00	128 29 00	49	46	.....	.....	.....	.....	.....
	Queen Charlotte Sound.								
5	51 06 00	127 50 00	53	45	.....	.....	.....	.....	Several.
	Discovery Passage.								
6	50 10 00	125 23 00	49	45	.....	.....	.....	.....	Several.
	Rosario Strait.								
7	48 23 00	122 48 00	51	49	.....	.....	.....	.....	.....

Commission steamer Albatross, July 1, 1894, to June 30, 1895—Continued.

UNIMAK PASS, AND RETURN TO DUTCH HARBOR.

Ducks.	Guillemots.	Gulls.	Petrels.	Puffins.	Terns.	Drift.	Kelp.	Remarks.
.....	Many...	Many...	Many...	Many...	Many...	.....	.....	Great numbers of birds accompanying school of whales.
.....	Few	Few	Few	.....	.....	.....	.....	
.....	Many...	Several .	Many...	Several .	.....	.....	.....	

PRIBILOF ISLANDS, AND RETURN TO DUTCH HARBOR.

.....	Many...	Several .	Several .	Several .	.....	.....	.....	Great numbers of whale birds feeding on surface life.
.....	Few	Few	Many...	Several .	.....	.....	.....	One finback whale.
.....	.....	Few	Few	.....	.....	.....	.....	
.....	Many...	Many...	Many...	Many...	.....	.....	.....	
.....	Many...	Many...	Few	Many...	Few	.....	.....	
.....	Several .	Few	.....	.....	.....	.....	.....	
.....	Many...	Many...	Many...	Many...	.....	.....	.....	Several small land birds.

HARBOR, AND RETURN TO DUTCH HARBOR.

.....	Many...	Many...	Many...	Many...	.....	.....	.....	
.....	Many...	Several .	Few	.....	.....	.....	.....	

TO SITKA, SOUTHEAST ALASKA.

.....	Many...	Many...	Great many.	Several .	.....	.....	.....	
.....	Several .	Few	.....	.....	.....	.....	.....	
.....	.....	Few	One	.....	.....	.....	.....	
.....	.....	Few	Few	.....	.....	.....	.....	
.....	.....	Few	Few	.....	.....	.....	.....	
.....	.....	.....	Few	.....	.....	.....	.....	
.....	.....	Few	Few ..	Few	.....	.....	Much...	

WHATCOM, WASH., VIA INLAND PASSAGES.

Few	.....	Few	.....	.....	.....	Little..	Little...	Few land birds.
.....	.....	Few	.....	.....	.....	Little..	Little...	Do.
Few	.....	Several .	.....	.....	.....	Little..	.....	
.....	.....	Several .	.....	.....	.....	Much..	Little...	Number of land birds.
.....	.....	Few	.....	.....	.....	Little..	Little...	
.....	.....	Few	.....	.....	.....	Much..	Little...	
Few	.....	Few	.....	Few	Few	Much..	Much...	
.....	.....	Few	.....	.....	.....	Little..	Little...	
.....	.....	Several .	.....	.....	.....	Much..	Much...	

Record of animals, drift, kelp, etc., observed at sea by the United States Fish

FROM NEW WHATCOM, WASH., TO

Date.	Meridian positions.		Mean temperatures.		Seals.	Whales.	Auks.	Albatrosses.	Cormorants.
	Lat. N.	Long. W.	Air, D. B.	Sea, surf.					
1894.	° ′ ″	° ′ ″	°	°					
Oct. 10	Victoria, B. C.		51	44					
11	46 34 00	124 49 00	53	46		Three			
12	42 50 00	124 41 00	53	46		Several			
13	39 32 00	124 10 00	56	49				One	

FROM SAUSALITO, CAL.,

1895.									
May 22	38 37 00	123 42 00	51	48					
23	40 51 00	124 16 00	53	51	Two	Many		Many	
24	43 54 00	124 33 00	57	54		Four		Many	
25	47 26 00	125 00 00	51	52		Many		Many	
26	48 18 00	123 41 00	52	49					

May 28 to June 5. IN INLAND WATERS, FROM PORT

FROM ALERT BAY, B. C., TO SAND

June 6	50 54 00	127 59 00	49	49				One	Many
7	52 00 00	133 40 00	49	47		One		Several	
8	52 59 00	139 19 00	45	46				Several	
9	53 57 00	142 31 00	43	43				Several	
10	54 27 00	144 08 00	42	41				Several	
11	55 42 00	147 47 00	41	40		One		Several	
12	55 32 00	152 25 00	42	42		One		Many	
13	55 31 00	159 08 00	44	42	One		Many		

FROM SAND POINT, POPOF ISLAND,

June 15	55 03 00	161 52 00	42	40					
16	Dutch Harbor, Unalaska.		42	40					

FROM DUTCH HARBOR, UNALASKA, TO ST.

June 23	54 38 00	167 34 00	42	42					
24	57 02 00	170 32 00	35	36	Few		Many		Few

FROM ST. PAUL, PRIBILOF ISLANDS, TO NIKOLSKI,

June 26	Village Cove, St. Paul Island.		36	36	Few		Many		
27	56 21 00	175 22 00	39	40	Seventeen.	Three		Few	
28	56 00 00	179 45 00 *East.*	41	40		Two			
30	55 43 00	179 05 00	41	40	One				

Commission steamer Albatross, July 1, 1894, to June 30, 1895—Continued.

SAUSALITO, CAL., VIA VICTORIA, B. C.

Ducks.	Guillemots.	Gulls.	Petrels.	Puffins.	Terns.	Drift.	Kelp.	Remarks.
.....	.....	Several	.....	.....	.....	Little	Little	Few land birds.
.....	.....	Few	.....	.....	.....	.....	.....	
.....	.....	Several	.....	.....	.....	.....	.....	
.....	.....	Few	Few	.....	.....	.....	.....	

TO VICTORIA, B. C.

.....	.....	Few	Few	.....	.....	.....	.....	
Few	Few	Many	Many	Few	.....	.....	.....	
Several	.....	Many	Many	Many	.....	.....	.....	Three sea lions. Large masses of velella.
Few	.....	Several	Several	.....	.....	.....	.....	One large sea lion.
Several	.....	Many	.....	.....	.....	Much	Much	Few geese; one sea lion. Large school of porpoises.

TOWNSEND, WASH., TO ALERT BAY, B. C.

POINT, POPOF ISLAND, ALASKA.

Many	.....	Many	Many	.....	.....	.....	.....	Few geese.
.....	Many	Several	Several	Several	.....	.....	.....	
.....	.....	Few	Few	.....	.....	.....	.....	
.....	.....	One	Several	.....	.....	.....	.....	
.....	.....	.....	Several	.....	.....	.....	Little	
.....	.....	Several	Several	.....	.....	.....	.....	
.....	.....	Many	Many	Several	.....	.....	.....	
.....	Many	Many	Many	Many	.....	.....	Much	Many Kanooski birds.

TO DUTCH HARBOR, UNALASKA.

Few	Many	Many	Many	Many	.....	Little	Much	
.....	Many	Many	Several	Few	.....	.....	Much	

PAUL, PRIBILOF ISLANDS, BERING SEA.

.....	Many	Many	Many	Several	.....	.....	.....	
.....	Many	Many	Several	Many	Many	.....	Little	

BERING ISLAND, COMMANDER ISLANDS.

.....	Many	Many	Many	Several	Few	.....	.....	
.....	Many	.....	Many	.....	.....	.....	.....	Large school of porpoises.
.....	.....	.....	Several	.....	.....	.....	.....	
.....	One	One	Two	.....	.....	.....	.....	

Boarding record of the United States Fish Commission

Date.	Position.		Name of vessel.	Reg.	Net tons.	Nationality.	Port of registry.	Name of master.
	Latitude N.	Longitude W.						
1894.	° ′	° ′						
July 14	54 31	165 10	Uranus	3-mast schr.	144	Amer.	San Francisco	E. B. Anderson.
16	Morzhovoi Village, Isanotski Strait.		Frederic	Slp	Less 5	...do	Owned in Morzhovoi Village.	Peter Johnson
16	Morzhovoi Village, Isanotski Strait.		Foam	Schr.	7	...do	Sand Point, Alaska.	Nicolas Olgin
18	Morzhovoi Village, Isanotski Strait.		Olga	Schr.	43.80	...do	Unalaska, Alaska.	E. Lee
Aug. 8	57 08	172 43	Ida Etta	Schr.	69	...do	Seattle	B. B. Whitney
10	55 38	171 09	Mascot	Schr.	40	Brit	Victoria	H. F. Siewerd
18	54 55	168 55	San Jose	Schr.	30	...do	.....do	M. Foley
18	55 30	170 56	Borealis	Schr.	37	...do	.....do	George Meyer
23	57 42	173 18	Mary Ellen	Schr.	63.08	...do	.....do	W. O. Hughes
23	57 30	173 54	Rosie Olsen	Schr.	38.71	...do	.....do	A. Whidden
25	56 13	172 44	Walter A. Earle	Schr.	68	...do	.....do	L. Magnessen
29	Dutch Harbor, Unalaska.		Nicoline	Schr.	47	Amer.	San Francisco	B. F. Tilton
Sept. 4	Off Unalaska Bay.		Kilmeny	Schr.	19	Brit	Victoria	L. Olsen
4	Off Unalaska Bay.		Decahks	Schr.	42.85	Amer.	Port Townsend	.....do
4	54 20	165 50	Jane Gray	Schr.	107	...do	San Francisco	.....do
6	54 47	166 23	Walter L. Rich	Schr.	75	Brit	Victoria	S. Balcom
8	54 05	166 42	Allie I. Alger	Schr.	75.45	Amer.	Port Townsend.	Wester
9	55 09	169 03	Triumph	Schr.	98	Brit...	Victoria	C. N. Cox
14	54 00	166 40	Columbia	Schr.	41.17	Amer.	Port Townsend.	T. I. Powers

steamer Albatross, July 1, 1894, to June 30, 1895.

Name of owner.	Crews.		Hunters.		Boats.	Canoes.	Spears.	Shotguns.	Rifles.	Ammunition.	Number of seal skins.				Number of days in Bering Sea.	Remarks.
	White.	Indian.	White.	Indian.							Total taken.	Taken at sea.	On board	Females killed.		
C. G. Jorgensen	14	0	0	0	1	[1]9	0	1	0	40 rounds	0	0	0	0		Fisherman.
Peter Johnson	1	0	1	0	0	0	0	1	1	10 pounds powder.	0	0	0	0		Bear hunting.
Nicolas Olgin	2	0	0	0	[2]1	0	0	0	0		0	0	0	0		Do.
R. Neumann	3	0	0	19	1	[3]9	0	9	0	35½ pounds powder; 20 pounds shot.	0	0	0	0		Sea otter hunting.
Gordon Hdwr. Co.	17	0	9	0	9	0	82	0	0	None	255	130	130	(*)	8	
Mrs. Sieward	5	0	0	19	1	9	30	11	3	Large quantity.	595	37	5	(*)	4	
C. J. Kelly	7	14	7	14	2	7	36	13	2	do		163	163	120		
{A. Wasburg {Thos. Hardd	6	0	0	20	1	10	54	0	0	1½ kegs powder.		646	646	613		
V. Jakobsen	23	0	6	0	8	0	30	20	6	Large quantity.	144	67	144	(†)	21	
Monroe, et al	6	0	0	16	2	8	18	15	2	do	43	41	43	(‡)	15	
Thos. Earle	8	0	1	20	2	10	24	19	12	do	238	229	238	(*)	[4]35	
J. A. McGee	8	0	[5]4	[5]0	1	0	0	..	..		0	0	0	0		Whaler.
												600		350		Spoken.
												850		750		Do.
												138		92	22	Do.
G. Munroe	7	12	3	12	2	13	50	19	2	9 kegs powder; 50 sacks shot.	2,429	1,738	1,738	(§)	33	
												327		189	34	
E. B. Marvin & Co.					3	17						3,014		2,806	40	
C. Petersen	4	20	0	10	1	10	40	[6]1	..	None		403	402	223	44	

[1] Dories.
[2] Skiff.
[3] Bidarkas.
[4] July 21.
[5] Passengers.
[6] Bomb gun.
* Proportion of females killed, about two-thirds.
† Proportion of females killed, about three-fourths.
‡ Proportion of females killed, about three-fifths.
§ Proportion of females killed, about two-fifths.

Record of ocean temperatures and specific gravities by the United States Fish Commission steamer Albatross, July 1, 1894, to June 30, 1895.

Date.	Time of day.	Station.	Lat. N.	Long. W.	Depth.	Temperature by attached thermometer.	Temperature of the air.	Temp. of specimen at time spec. grav. was taken.	Specific gravity.	Specific gravity reduced to 15° C.
1894.			° ′ ″	° ′ ″		°	°	°		
July 1	12 m		57 22 00	167 36 00	Surface.	39	39	63	1.0238	1.023391
3	12 m	Akutan Bay			do	42	46	62	1.0242	1.023650
13	12 m		56 35 00	168 18 00	do	43	46	62	1.0242	1.023650
14	12 m		54 56 00	165 21 00	do	43	47	62	1.0242	1.023650
16	12 m	Ikatan Bay			do	39	47	62	1.0240	1.023450
17	12 m	Morzhovoi Village			do	38	47	62	1.0238	1.023250
20	12 m	Ikatan Bay, south side			do	41	57	62	1.0238	1.023250
22	12 m		54 33 00	162 53 00	do	44	47	62	1.0240	1.023450
23	12 m	Sannak Island			do	40	49	62	1.0240	1.023450
24	12 m		54 34 00	162 53 00	do	41	47	62	1.0240	1.023450
25	12 m	Unalaska Harbor			do	42	50	62	1.0240	1.023450
Aug. 1	12 m		56 41 00	169 37 00	do	40	51	62	1.0240	1.023450
2	12 m		56 26 00	172 42 00	do	42	50	62	1.0240	1.023450
3	12 m		58 22 00	176 22 00	do	43	50	62	1.0240	1.023450
4	12 m		59 25 00	179 13 00	do	45	54	62	1.0240	1.023450
5	12 m		60 15 00	174 45 00	do	42	46	62	1.0240	1.023450
6	12 m		59 09 00	174 12 00	do	43	49	62	1.0240	1.023450
7	12 m		57 57 00	173 05 00	do	45	54	65	1.0234	1.023270
8	12 m		56 53 00	172 43 00	do	45	51	65	1.0240	1.023870
9	12 m		56 00 00	171 52 00	do	44	49	65	1.0244	1.024270
10	12 m		55 38 00	171 09 00	do	45	54	65	1.0244	1.024270
18	12 m		55 28 00	169 23 00	do	45	47	65	1.0242	1.024070
21	12 m		57 43 00	171 58 00	do	41	46	65	1.0242	1.024070
Sept. 20	12 p. m.	Unimak Pass			do	40	44	65	1.0240	1.023870
21	6 a. m		54 42 00	162 10 00	do	39	43	65	1.0240	1.023870
21	12 m		55 10 00	161 52 00	do	43	49	65	1.0238	1.023670
21	6 p. m		55 22 00	160 15 00	do	44	48	65	1.0236	1.023470
22	6 a. m		55 28 00	157 10 00	do	43	46	64	1.0236	1.023328
22	12 m		55 35 00	155 41 00	do	44	49	63	1.0240	1.023591
22	6 p. m		55 45 00	154 28 00	do	44	46	63	1.0240	1.023591
22	12 p. m		55 52 00	153 15 00	do	43	47	63	1.0240	1.023591
23	6 a. m		56 05 00	152 12 00	do	44	49	63	1.0240	1.023591
23	12 m		56 11 00	150 48 00	do	44	49	63	1.0240	1.023591
23	6 p. m		56 15 00	150 12 00	do	45	49	63	1.0242	1.023791
23	12 p. m		56 20 00	149 45 00	do	44	49	63	1.0240	1.023591
24	6 a. m		56 18 00	149 25 00	do	43	48	63	1.0240	1.023591
24	12 m		56 22 00	148 57 00	do	45	49	63	1.0241	1.023691
24	6 p. m		56 25 00	147 35 00	do	45	47	63	1.0240	1.023591
24	12 p. m		56 32 00	146 12 00	do	45	49	63	1.0240	1.023591
25	6 a. m		56 35 00	144 55 00	do	45	49	63	1.0242	1.023791
25	12 m		56 37 00	143 40 00	do	45	51	63	1.0240	1.023591
25	6 p. m		56 42 00	142 04 00	do	46	51	63	1.0240	1.023591
25	12 p. m		56 48 00	140 40 00	do	45	50	63	1.0238	1.023391
26	6 a. m		56 47 00	139 05 00	do	46	50	63	1.0236	1.023191
28	12 m	Sitka Harbor, high water			do	47	51	63	1.0234	1 022991
29	1 p. m	Peril Strait			do	46	52	63	1.0223	1.021801
30	12 m	Douglass Island			do	41	47	63	1.0202	1.019791
30	12 p. m	Taku Harbor			do	40	45	63	1.0176	1.017191
Oct. 1	12 m	Wrangle Narrows			do	41	45	63	1.0194	1.018991
2	12 p. m	Marya Island			do	45	51	63	1.0190	1.018591
3	12 p. m	Promise Island			do	44	47	63	1.0182	1.017791
4	12 p. m	Bella Bella Harbor			do	46	48	63	1.0182	1.017791
5	12 p. m	Alert Bay			do	44	48	63	1.0208	1.020301
8	6 p. m	Bellingham Bay			do	49	54	63	1.0162	1.015791
1895.										
June 7	12 m		52 00 00	133 40 00	do	48	50	70	1.0232	1.023830
7	6 p. m		52 12 00	134 35 00	do	47	50	70	1.0232	1.023830
7	12 p. m		52 28 00	135 40 00	do	47	48	70	1.0232	1.023830
8	6 a. m		52 41 00	136 58 00	do	46	46	70	1.0232	1.023830
8	12 m		52 59 00	138 19 00	do	46	47	70	1.0230	1.023630
8	6 p. m		53 10 00	139 10 00	do	45	45	70	1.0230	1.023630
8	12 p. m		53 26 00	140 12 00	do	44	44	70	1.0236	1.024230
9	6 a. m		53 38 00	141 10 00	do	44	43	70	1.0236	1.024230
9	12 m		53 57 00	142 31 00	do	42	43	70	1.0236	1.024230
9	6 p. m		54 06 00	142 48 00	do	42	43	70	1.0238	1.024430
9	12 p. m		54 11 00	143 15 00	do	42	43	70	1.0240	1.024630
10	6 a. m		54 18 00	143 35 00	do	42	42	70	1.0240	1.024630
10	12 m		54 27 00	144 08 00	do	41	42	70	1.0240	1.024630
10	12 p. m		55 04 00	145 50 00	do	41	42	70	1.0238	1.024430
11	6 a. m		55 30 00	146 45 00	do	41	40	70	1.0240	1.024630
11	12 m		55 42 00	147 47 00	do	41	42	70	1.0238	1.024430

Record of ocean temperature and specific gravities by the United States Fish Commission steamer Albatross, July 1, 1894, to June 30, 1895—Continued.

Date.	Time of day.	Station.	Lat. N.	Long. W.	Depth.	Temppratnre by attached thermometer.	Temperature of the air.	Temp. of specimen at timespec. grav. was taken.	Specific gravity.	Specific gravity reduced to 15° C.
1895.			° ′ ″	° ′ ″		°	°	°		
June 11	12 p. m.		55 35 00	150 48 00	Surface.	41	41	70	1.0240	1.024630
12	6 a. m.		55 32 00	151 12 00	....do...	42	40	70	1.0240	1.024630
12	12 m.		55 32 00	152 25 00	....do...	42	42	70	1.0242	1.024830
12	6 p. m.		55 38 00	154 35 00	....do...	43	43	70	1.0240	1.024630
12	12 p. m.		55 42 00	156 16 00	....do...	43	42	70	1.0240	1.024630
13	6 a. m.		55 40 00	157 32 00	....do...	43	42	70	1.0236	1.024230
26	12 m.	St. Paul Island			....do...	34	39	70	1.0232	1.023830
26	6 p. m.		56 50 00	171 35 00	....do...	36	37	70	1.0232	1.023830
26	12 p. m.		56 46 00	172 55 00	....do...	39	37	70	1.0232	1.023830
27	6 a. m.		56 32 00	174 10 00	....do...	40	38	70	1.0234	1.024030
27	12 m.		56 21 00	175 22 00	....do...	40	40	70	1.0236	1.024230
27	6 p. m.		56 12 00	176 20 00	....do...	41	40	70	1.0238	1.024430
27	12 p. m.		56 02 00	177 25 00	....do...	40	40	70	1.0238	1.024430
28	6 a. m.		56 00 00	178 40 00	....do...	40	40	70	1.0238	1.024430
28	12 m.		56 00 00	179 45 00	....do...	40	42	70	1.0240	1.024630
28	6 p. m.		55 50 00	179 55 00	....do...	41	41	68	1.0238	1.024116
28	12 p. m.	East	55 45 00	180 05 00	....do...	41	40	68	1.0240	1.024316
30	6 a. m.		55 48 00	180 20 00	....do...	40	40	68	1.0242	1.024516
30	12 m.		55 43 00	179 05 00	....do...	40	41	68	1.0242	1.024516
30	6 p. m.		55 52 00	179 30 00	....do...	40	42	68	1.0242	1.024516
30	12 p. m.		55 50 00	177 05 00	....do...	41	39	68	1.0244	1.024716

Table of air and water temperature observations made at the Mare Island navy-yard, California, by the United States Fish Commission steamer Albatross, October 18, 1894, to May 17, 1895.

Date.	Temperature.				Date.	Temperature.			
	Air.		Surface water.			Air.		Surface water.	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
1894.					1894.				
Oct. 18	58	65	61	63	Nov. 20	49	63	56	58
19	53	62	61	62	21	49	62	56	58
20	58	64	60	61	22	49	60	55	57
21	58	64	60	61	23	48	61	56	57
22	57	67	60	63	24	48	65	56	59
23	58	63	60	61	25	49	61	56	57
24	54	64	60	63	26	53	59	56	58
25	55	69	60	62	27	53	61	55	57
26	53	64	59	61	28	49	60	53	56
27	49	67	57	61	29	47	57	54	55
28	50	67	58	61	30	47	54	54	56
29	55	70	58	61	Dec. 1	43	52	53	55
30	53	64	59	60	2	44	50	54	55
31	57	64	59	60	3	47	57	53	54
Nov. 1	55	63	60	62	4	49	54	53	53
2	55	70	59	61	5	50	54	53	53
3	56	70	59	61	6	49	52	52	53
4	58	71	59	62	7	47	55	50	52
5	54	71	58	62	8	48	55	50	52
6	55	72	60	62	9	48	57	52	52
7	57	76	59	61	10	42	54	50	52
8	56	73	59	62	11	46	56	50	54
9	52	66	59	63	12	46	57	49	51
10	52	65	59	62	13	48	59	49	51
11	54	73	59	62	14	43	49	49	50
12	52	73	59	61	15	46	54	50	51
13	53	72	59	60	16	47	53	50	51
14	52	70	58	60	17	49	54	49	50
15	50	61	58	59	18	48	50	49	50
16	50	61	56	59	19	47	50	49	50
17	46	63	57	59	20	49	57	49	50
18	47	67	57	60	21	51	55	49	50
19	50	68	57	58	22	48	54	48	49

Table of air and water temperature observations made at the Mare Island navy-yard, California, by the United States Fish Commission steamer Albatross, etc.—Continued.

Date.	Temperature.			
	Air.		Surface water.	
	Min.	Max.	Min.	Max.
1894.				
Dec. 23	44	52	48	49
24	40	52	46	49
25	38	47	46	48
26	37	51	45	46
27	43	47	45	46
28	46	49	45	46
29	46	53	45	46
30	47	57	45	46
31	43	54	43	46
1895.				
Jan. 1	39	54	45	46
2	45	49	45	46
3	44	54	45	46
4	50	56	46	49
5	47	52	48	51
6	47	53	49	50
7	43	47	45	49
8	45	55	47	49
9	47	53	48	48
10	49	52	48	48
11	48	51	48	48
12	49	55	48	49
13	50	57	49	49
14	47	55	49	50
15	41	53	48	49
16	45	49	48	48
17	43	49	46	48
18	45	49	47	48
19	44	49	46	48
20	41	50	47	48
21	47	53	48	49
22	48	56	48	49
23	43	52	48	50
24	39	51	47	50
25	39	50	47	49
26	39	47	45	47
27	39	50	45	46
28	39	52	45	46
29	38	48	45	45
30	40	54	43	45
31	41	55	43	45
Feb. 1	43	55	45	45
2	42	58	44	45
3	41	58	45	45
4	41	58	44	45
5	41	58	45	45
6	41	58	45	45
7	43	55	45	47
8	46	56	45	48
9	44	57	45	45
10	48	54	45	48
11	48	55	45	48
12	51	58	45	50
13	48	57	45	50
14	44	59	44	50
15	48	59	45	50
16	49	60	45	52
17	45	62	45	52
18	50	65	45	54
19	51	64	52	54
20	53	62	51	54
21	54	63	53	54
22	55	60	53	55
23	50	61	53	56
24	50	61	52	54
25	48	62	52	55
26	49	62	54	56
27	47	70	In dry dock.	
28	51	69	Do.	
Mar. 1	51	70	Do.	
2	52	65	Do.	
3	48	71	Do.	
4	48	70	Do.	

Date.	Temperature.			
	Air.		Surface water.	
	Min.	Max.	Min.	Max.
1895.				
Mar. 5	52	64	In dry dock.	
6	50	61	Do.	
7	51	64	Do.	
8	50	63	Do.	
9	50	59	Do.	
10	50	60	Do.	
11	50	59	Do.	
12	49	56	Do.	
13	43	57	Do.	
14	39	55	Do.	
15	40	57	Do.	
16	43	59	Do.	
17	45	55	Do.	
18	49	59	Do.	
19	46	62	Do	
20	46	58	Do.	
21	49	53	Do.	
22	48	61	Do	
23	45	69	Do.	
24	49	65	Do.	
25	52	70	Do.	
26	58	66	Do.	
27	55	63	Do.	
28	45	54	Do.	
29	41	58	54	55
30	44	63	54	55
31	48	64	54	56
Apr. 1	50	60	54	56
2	45	62	54	56
3	48	63	54	55
4	42	57	53	56
5	41	63	53	57
6	47	68	55	57
7	50	70	54	56
8	52	63	54	55
9	51	61	54	58
10	49	69	55	57
11	48	64	54	57
12	48	69	55	58
13	49	63	55	56
14	47	65	55	58
15	48	64	54	58
16	55	69	57	58
17	52	66	56	58
18	48	70	56	58
19	51	71	55	61
20	55	78	58	65
21	56	85	59	63
22	56	74	58	60
23	54	62	60	65
24	56	64	60	62
25	55	65	59	62
26	56	65	60	61
27	56	64	60	60
28	54	69	60	62
29	53	68	60	62
30	52	66	60	61
May 1	51	64	60	61
2	52	68	60	61
3	53	62	60	60
4	57	65	60	61
5	57	66	60	62
6	54	63	60	61
7	55	68	60	62
8	55	72	60	62
9	55	77	60	63
10	62	88	60	66
11	64	89	60	66
12	64	82	62	64
13	56	80	62	64
14	54	72	62	66
15	53	64	62	60
16	52	66	60	63
17	54	70	61	65

2.—NOTES ON BISCAYNE BAY, FLORIDA, WITH REFERENCE TO ITS ADAPTABILITY AS THE SITE OF A MARINE HATCHING AND EXPERIMENT STATION.

By Hugh M. Smith,
Assistant in Charge of Division of Statistics and Methods of the Fisheries.

The United States Commissioner of Fish and Fisheries having under consideration the establishment of a hatching and experiment station on the coast of Florida, the writer was directed to visit Biscayne Bay to ascertain the adaptability of the region for the purpose named. A period of about two weeks in February, 1895, was devoted to the examination, and the accompanying memoranda embody the observations then made.

In constructing a station on the east coast of Florida for the purpose of preserving and increasing the supply of economic marine products of the region, of studying scientific problems having an important bearing on the directly practical work of such a station, and of pointing out the lines along which the fishery resources of the State may be developed, the essential point to be determined is the most advantageous location.

The desire of the Commissioner of Fish and Fisheries to have such a station deal with as many classes of water animals as can properly be considered, including sponges, oysters, turtles, terrapins, and, possibly, several crustaceans, as well as fish, makes it necessary to seek a more southern position than would be required if the operations were to be more restricted. The interest of late being manifested in the preservation and extension of the sponge fishery, both by the public men of the State and by those engaged in the industry, renders it especially desirable that sponges should be one of the subjects to receive attention. As the natural distribution of the marketable sponges embraces only the southern fourth of the east coast of the State, a marine station would have to be located at least as far south as Lake Worth. The latter body of water has many advantages as the site of a station, being readily accessible by rail, bountifully supplied with desirable food-fishes, and possessing excellent land features; but the absence of a natural growth of sponges in the lake itself, and the excessive salinity of the water, owing to the circumstance that no fresh-water streams drain into the lake, thus precluding the possibility of successful oyster

culture, are thought to be sufficient reasons for debarring it from present consideration.

South of Lake Worth, the physical and other conditions are not favorable for the purpose in question until Biscayne Bay is reached, while the region south of that bay is too remote from present and prospective lines of communication to entitle it to notice. It was, therefore, the Biscayne Bay region that the Commissioner of Fish and Fisheries conceived to be the most inviting section of the east coast of Florida for the special object named, and it was there that the writer was instructed to make a preliminary investigation covering the physical conditions, natural resources, eligible sites for a station, commercial fisheries, and prospects for the future development of the fishing industry.

The inquiries of the Commission were greatly facilitated by Mr. J. E. Ingraham, general agent of the Jacksonville, St. Augustine and Indian River Railroad, and by Hon. Frederick S. Morse, of Miami, to whom acknowledgments are due.

GEOGRAPHICAL FEATURES OF THE BISCAYNE BAY REGION.

Key Biscayne Bay, or Biscayne Bay as it is more commonly designated, is one of the finest bodies of water on the coast of Florida. It is the most northern member of a series of shallow bays or sounds intervening between the Florida keys and the mainland. It occupies almost the extreme southern part of the east side of Florida and extends from 25° 57′ to 25° 22′ north latitude, its length being about 35 miles. Its northern third is comparatively narrow, having an average width of only 2 miles. The remaining part has a maximum width of about 8½ miles and an average width of 7 miles. Its area is 210 miles. On the south, at Arseniker Keys, it merges into Cards Sound. In the upper 10 miles of its length it is separated from the Strait of Florida by a very narrow strip of mainland ending at Norris or Narrow Cut, which is the most northern opening into the bay. South of this inlet the following keys form the eastern boundary of the bay: Virginia Key, Key Biscayne, Soldier Key, Ragged Keys, Sands Key, Elliott Key, and Old Rhodes Key. The largest and widest of these is Key Biscayne, at whose southern end is Cape Florida, which marks the principal passageway into the bay.

The shores of the bay are for the most part low and densely overgrown with mangrove trees; in places, however, on he mainland, the shores are comparatively high, consisting of an abrupt bank of coral limestone overgrown with deciduous trees, constituting a topographical feature said to exist nowhere else in Florida.

The bay is shoal throughout. In that part north of the Miami River a greater depth than 7 feet is not found, and the average is not more than 4 feet. In the southern part the depth varies from 7 to 13 feet in the center of the bay and gradually decreases toward the shores. The

deepest water occurs in a small depression west of Cape Florida, where from 13 to 17 feet are found.

The water of Biscayne Bay is exceedingly clear. In no part can one fail to clearly distinguish objects on the bottom when the surface is not especially rough. It seldom becomes roily, and the amount of muddy water brought down from the Everglades is too small to have any noticeable effect on the clearness of the bay.

Four small streams flow into the northern third of the bay from the mainland, and exert an appreciable influence on the salinity of the water and the character of the fauna. At the extreme northern end of the bay, Snake Creek enters; one branch rises in the Everglades, another in Dumfounding Bay, a small, shallow lagoon located in a long, wide marshy belt intervening between the ocean and the pine lands. Arch Creek is a short Everglade stream discharging near the head of the bay. About 8 miles south of Snake Creek, Little River enters the bay, flowing from the Everglades, which at this point are within 2 or 3 miles of the bay. The largest stream emptying into the bay is the Miami River, whose mouth is nearly opposite Norris Cut, the most northern passage between the bay and the ocean. A few creeks flow into the lower part of the bay, but their volume is too small to have any effect on the water of the bay. The water brought down by all the streams named is mostly clear, but has a dark-brown color, owing to the presence of decomposed vegetable matter. On the eastern side of the bay, opposite the entrance to Little River, a long, narrow body of water, known as Indian Creek, communicates with the bay by three broad mouths. It extends parallel with and near to the coast for a distance of 5 miles. The water is in general much deeper than that in the adjacent part of the bay and is salt throughout.

Besides the water discharged by the rivers mentioned, it is said that considerable fresh water enters the bay from the Everglades by seepage. The surface of the Everglades is reported to be 10 or 12 feet above the level of the bay, and the underlying coral formation between the Everglades and the coast prevents much absorption by the soil and serves as an underground drain. At a depth of a few feet fresh water may be found at almost any point on the shore of the mainland.

The shores of the bay are very thinly populated, and only at a few points are there settlements. The latter, which are very small, are all on the mainland, and are located on the northern half of the bay. The most northern community is Lemon City, situated a short distance south of the mouth of Little River. Six miles farther south is Miami, at the mouth of Miami River. The principal settlement is Cocoanut Grove, opposite Cape Florida. Buenavista is a small place between Miami and Lemon City. The mainland below Cocoanut Grove is an almost unbroken wilderness, known as the "Hunting Grounds," and resorted to by the Seminole Indians. Some of the keys are under partial cultivation and have a sparse population.

ANIMAL RESOURCES OF BISCAYNE BAY.

The animal resources of the southern part of the eastern coast of Florida are very abundant and varied. The rich West Indian fauna, which extends to this region, is supplemented by numerous species belonging to a more northern faunal area. Biscayne Bay and the water lying about the adjacent keys and reefs are probably as well supplied with economic water products and interesting forms having special scientific value as any part of the Florida coast. Mammals, fishes, reptiles, crustaceans, oysters, sponges, and other invertebrates of commercial importance occur. The following notes on some of the more valuable products are intended rather to illustrate the possibilities for developing the fisheries of the region than to serve as even an incomplete list of the animals of different classes there found:

MAMMALS.

The mammalian resources of the region are limited, and will scarcely ever support commercial fishing of much importance. The most interesting mammal is the sea cow or manatee (*Manatus americanus*). It is by no means common, but is not especially rare. It is found throughout the bay, in Indian Creek, and in the lagoons on the bay side of the keys, and is sometimes observed in droves in the ocean near the bay. Up to a few years ago it was assiduously persecuted by all classes of people and killed in pure wantonness; it was yearly becoming scarcer, and its extermination in a short time seemed inevitable. Mr. F. S. Morse, of Miami, brought up the question of preserving the sea cow in a recent session of the Florida legislature and secured the passage of a law prohibiting under heavy penalties the killing of that animal except for scientific purposes.

Porpoises of various kinds frequently enter Biscayne Bay, where large schools are at times seen, while outside the bay they are also common. The shoal waters of the bay appear to be favorite feeding-grounds, and they may often be observed in water hardly deep enough to cover them where they have followed the schools of mullet. A few are killed for their oil, but there is no regular effort made to take them. Small schools and straggling individuals were observed on several occasions during my visit.

FISHES.

These are the most interesting and important of the water animals of this region. The number of species of economic importance which inhabit the bay and the adjoining ocean is very large and includes some of the best food-fishes of the United States. The comparatively shallow water of the bay affords excellent feeding-grounds for some of the pelagic fishes, besides being the resort of many other fishes which regularly frequent the littoral waters. It is not known that any systematic collecting has been done in Biscayne Bay, and a full list of the

fishes can not be given, but the following list, based on personal observations and inquiries in February, 1895, is thought to embrace most of the principal economic fishes of the bay at that season. The unusual cold which prevailed in Florida during the month of February had driven nearly all the important fishes into the ocean, and many of them had not returned in any noteworthy numbers when the examination of the bay was made.

Bonefish (*Albula vulpes*).—Common. Taken by the professional line fishermen.

Tarpon (*Megalops atlanticus*).—Large numbers enter the bay, the northern part of which seems to be the ground most frequented. During the cold weather which prevailed throughout Florida in February many tarpon were killed in the upper bay by the sudden change in temperature before they could reach the ocean. February 8 and 9 were very cold days on Biscayne Bay, the thermometer on the morning of the 9th registering 26° F. On that day a few numb fish were observed near Lemon City. On February 11 Mr. J. H. Peden picked up 24 dead or dying tarpon, weighing from 30 to 160 pounds each, and placed them on his land for fertilizing purposes, and during the few days following the cold snap over 200 tarpon were secured and utilized in a similar way by people living in the vicinity of Lemon City. Many of the fish were not dead when found, but were floating belly up in a stupefied or benumbed condition, and it would appear that the immediate cause of death was drowning or asphyxiation. On February 16 and 17 about 25 dead tarpon, with an average weight of 75 or 80 pounds, were observed by the writer in different parts of the bay. These had begun to decompose. By that time the water of the bay was getting warmer, and a school of several hundred very active tarpon was seen at the mouth of the Miami River.

Striped Mullet (*Mugil cephalus*).—Abundant at all times. Ascends the fresh-water rivers as far as the Everglades. But little utilized in this region, although the most valuable Florida fish.

Barracuda (*Sphyræna picuda*).—Reported to be found in the bay at all seasons, but takes the hook most freely in April and May, when it is caught by trolling along the shores. Single fish or scattered bodies were often seen in the grassy flats in the upper part of the bay.

Spanish Mackerel (*Scomberomorus maculatus*).—At one time this fish was common in the bay, which was a favorite resort, but it is now scarce, and is said to have become so since the extensive seine fishing by Gloucester vessels began along the keys about five years ago.

Kingfish (*Scomberomorus cavalla*).—Sometimes enters the bay in schools, but is not common. About the inlets is found in large bodies, and is taken by trolling. Examples weighing from 6 to 30 pounds observed.

Pompano (*Trachinotus carolinus*).—This, the best and most popular of the Florida food-fishes, is probably less abundant in Biscayne Bay than in Indian River and Lake Worth; in the absence of net fishing, however, no accurate idea of the abundance of the fish can be gained.

Permit or Pompano (*Trachinotus rhodopus*).—This large pompano, which attains a weight of over 25 pounds, is not uncommon along the keys.

Runner or Crevalle (*Caranx crysos*).—Very common in the inlets.

Jack or Crevalle (*Caranx hippos*).—Very common.

Bluefish (*Pomatomus saltatrix*).—Not common, and as a rule found only in the vicinity of Cæsar Creek, in the lower part of the bay. The presence of large schools of kingfish at the inlets is thought by some to keep the bluefish out of the bay.

Squirrel-fish or Sand Perch (*Diplectrum formosum*).—Very common in the bay adjacent to the inlets. A small but good food-fish. At Norris Cut, on February 21, the fish was found in great abundance, biting readily at a hook baited with conch meat; all caught were 7 or 8 inches long.

Groupers (*Epinephelus and Mycteroperca*).—At least six species of groupers are found in greater or less numbers in the lower part of the bay and about the adjacent reefs, keys, and inlets. All are valuable food-fishes, some being very small and others very large. Small jewfish (*Epinephelus nigritus*) occur in the bay, but the larger ones are rare; some individuals weighing 250 pounds have, however, been taken in the bay.

Sheepshead (*Archosargus probatocephalus*).—Common, and averages about 4 pounds in weight, the largest being about 7 pounds. Feeds largely on raccoon oysters.

Yellow-tail (*Ocyurus chrysurus*).—Common about the reefs and inlets.

Mangrove Snapper (*Lutjanus griseus*).—Extremely abundant around the shores of the bay and not uncommon in the fresh-water streams almost as far as the Everglades. At times in February the fish was found in incredible numbers under the mangrove trees, the shores for miles being lined with immense bodies of snappers, in company with smaller quantities of redfish, pigfish, mullet, and other fishes. The average weight of the fish was probably less than a pound, but some weighed 4 or 5 pounds. This fish is quite shy, and in the clear waters of the region takes the hook with great hesitation. Several other snappers, *e. g.*, the schoolmaster (*L. caxis*) and the lane snapper (*L. synagris*), are also common in the bay.

Grunts, etc. (*Hæmulon*).—Numerous species of sparoid fishes belonging to this genus are found in and adjacent to the bay. They occur in abundance and are all valuable as food. A number of fish belonging to closely related genera also frequent the Biscayne region.

Redfish or Channel bass (*Sciæna ocellata*).—Abundant at all seasons. It is generally regarded as an excellent food and game fish.

Spot (*Leiostomus xanthurus*).—Common in bay.

Drum (*Pogonias cromis*).—Found near the oyster beds in the bay. Common. By most persons it is looked on as a food-fish of little value, owing to the fact that it is reported to always have "worms" in its back.

Trout (*Cynoscion nebulosus*).—Common.

Anchovies (*Stolephorus*).—Several species of anchovy occur in great abundance in the bay and constitute an important food for the larger fishes. Doubtless the business of salting and canning these fish would be profitable and will in time be undertaken.

In the small fresh-water streams entering the bay the supply of food and game fishes is large, although the variety is limited. Besides the mangrove snappers, mullet, and several other salt-water species which are almost constantly found in these rivers, there are large-mouth black bass (*Micropterus salmoides*) and a number of sunfishes belonging to the genera *Lepomis*, *Acantharchus*, and *Chænobryttus*.

Mr. W. F. McCormick, of Cocoanut Grove, has devoted some attention to the fish fauna of Biscayne Bay, and, in response to a request, furnished the following list of species he had taken or observed in that body of water. Mr. McCormick states that the list is not complete, as it does not contain a number of species, principally of small size, which he was unable to identify. The common and scientific names are those given by Mr. McCormick, with a few exceptions indicated by means of brackets.

List of marine fishes observed in Key Biscayne Bay, Florida, by W. F. McCormick.

1. Yellow shark (*Carcharhinus platyodon*).
2. Cub shark (*Carcharhinus lamia*).
3. [Sharp-nosed shark] (*Carcharias terræ-novæ*).
4. Bonnet-cub (*Sphyrna tiburo*).
5. Hammerhead (*Sphyrna zygæna*).
6. Stingaree (*Trygon sayi*).
7. Whip ray (*Stoasodon narinari*).
8. Sawfish (*Pristis pectinatus*).
9. Catfish (*Ailurichthys marinus*).
10. Catfish (*Arius felis*).
11. Anchovy (*Stolephorus mitchilli*). There are numerous species of *Stolephoridæ* and *Clupeidæ* here, but I can not give their correct names.
12. Tarpum (*Megalops thrissoides*).
13. Bonefish (*Albula vulpes*).
14. Houndfish (*Tylosurus notatus*).
15. Houndfish (*Tylosurus crassus*).
16. Needle-fish (*Hemirhamphus roberti*).
17. Needle-fish (*Hemirhamphus unifasciatus*).
18. Skipjack (*Scombresox saurus*).
19. Mullet (*Mugil cephalus*).
20. Silver mullet (*Mugil curema*).
21. Sardine (*Atherina stipes*) [=*laticeps*].
22. Barracuda (*Sphyræna picuda*).
23. Spanish mackerel (*Scomberomorus maculatus*).
24. Kingfish (*Scomberomorus cavalla*).
25. Cero (*Scomberomorus regalis*).
26. Bonito (*Sarda sarda*).
27. Crevallé or Jack (*Caranx hippos*).
28. Yellow jack (*Caranx pisquetus*) [=*bartholomæi*].
29. Running jack (*Caranx chrysus*).
30. Pompano (*Trachinotus carolinus*).
31. Permit (*Trachinotus goreensis*) [=*goodei*].
32. Permit (*Trachinotus rhodopus*) [=*falcatus*].
33. Leather jack [*Oligoplites saurus*].
34. Moonfish (*Selene vomer*).
35. Amber jack (*Seriola lalandi*).
36. [Scad or Round robin] (*Decapterus punctatus*). Very rare.
37. Bluefish (*Pomatomus saltatrix*).
38. [Squirrel-fish] (*Serranus fascicularis*) [=*Diplectrum formosum*].
39. [Scamp] (*Mycteroperca falcata phenax*).
40. [Gag] (*Mycteroperca microlepis*).
41. Black grouper (*Mycteroperca bonaci*).
42. Jewfish (*Epinephelus nigritus*).
43. Red grouper (*Epinephelus morio*).
44. Nassau grouper (*Epinephelus striatus*).
45. Red hind (*Epinephelus apua*).
46. Rock hind (*Epinephelus adscencionis*).
47. Rockfish (*Enneacentrus punctatus*).
48. Lane snapper (*Lutjanus synagris*).
49. Mutton-fish (*Lutjanus analis*).
50. Red snapper (*Lutjanus blackfordi*). Very rare.

List of marine fishes observed in Key Biscayne Bay, Florida, by W. F. McCormick—Cont'd.

51. Gray snapper (*Lutjanus griseus*).
52. Schoolmaster (*Lutjanus caxis*).
53. Grunt (*Hæmulon plumieri*).
54. Yellow grunt (*Hæmulon elegans*).
55. Black grunt (*Hæmulon parra*).
56. Chub (*Hæmulon rimator*).
57. Black margate fish [*Hæmulon?*].
58. Bream (*Lagodon rhomboides*).
59. Yellow-tail (*Ocyurus chrysurus*).
60. Sailor's choice (*Orthopristis chrysopterus*).
61. Porkfish (*Anisotremus virginicus*).
62. Porgy (*Calamus calamus*).
63. Grassfish (*Calamus arctifrons*).
64. Porgy (*Calamus bajonado*).
65. Sheepshead (*Archosargus probatocephalus*).
66. Redfish (*Sciæna ocellata*).
67. Drum (*Pogonias chromis*).
68. White perch (*Bairdiella chrysura*).
69. Weakfish; Trout (*Cynoscion maculatum*).
70. Spot (*Leiostomus xanthurus*).
71. Whiting (*Menticirrus alburnus.*)
72. Whiting (*Menticirrus nebulosus*).
73. Croaker (*Micropogon undulatus*).
74. Shad (*Gerres olisthostoma*).
75. Shad (*Gerres cinereus*).
76. Shad (*Gerres harengulus*).
77. Angel-fish (*Chætodipterus faber.*) There are also other fishes known as "angel-fish" which I am unable to name. [These belong to the genera *Holacanthus* and *Pomacanthus.*]
78. Snooks (*Centropomus undecimalis*).
79. Hogfish (*Lachnolaimus falcatus*).
80. Pug (*Sparisoma flavescens*).
81. [Parrot-fish] (*Sparisoma cyanolene*).
82. Flounder (*Platophrys ocellatus*).
83. Plaice (*Paralichthys squamilentus*).
84. Flounder (*Achirus lineatus*).
85. Sole (*Symphurus plagiusa*).
86. Turbot (*Balistes carolinensis*).
87. Leather-fish (*Monacanthus hispidus*).
88. Shellfish (*Ostracion trigonum*).
89. Cowfish (*Ostracion quadricorne*).
90. Burfish (*Chilomycterus schœpfi*).
91. Porcupine-fish (*Diodon hystrix*).
92. Rabbit-fish (*Lagocephalus lævigatus*).
93. Swellfish (*Spheroides spengleri*).
94. Green moray (*Sidera funebris*).
95. Moray (*Gymnothorax moringa*).

REPTILES.

Among the aquatic reptiles inhabiting the Biscayne Bay region are crocodiles, alligators, green turtles, loggerhead turtles, and diamond-back terrapins.

The crocodile (*Crocodilus acutus*) is of no economic value and is chiefly interesting as a freak of geographical distribution. While it is by no means common, it can not be regarded as rare, and it is known to exist, in communities, in a number of localities around the shores of the bay, as, for instance, in Crocodile Hole near the head of Indian Creek, in a landlocked pond on Virginia Key, and in Arch Creek. From the last-named place specimens of large size have been obtained for museum purposes. It is very wary and difficult to approach, and for this reason appears to be less common than it really is. Almost every season the nests and eggs are found by boatmen under bushes on the sandy shores of the holes to which the animal resorts.

The issue of the Tropical Sun, of West Palm Beach, for March 16, 1895, gave an account of a trip of Mr. Charles B. Cory to Card Sound for crocodiles. A "large family" of crocodiles was found; one 16 feet long was observed, and a specimen 13½ feet long was obtained for Mr. Cory's collection. The paper recalls the killing of a crocodile in Snake Creek about five years ago by Mr. Charles Peacock and Mr. Ralph M. Munroe. This example was 14 feet 7 inches long, and is said to be now in the American Museum of Natural History, New York.

On February 16 the writer came upon a sleeping crocodile in Crocodile Hole, and had an excellent opportunity to identify it. The animal was between 9 and 10 feet long. At the eastern side of the "hole," where there is a small sandy beach, there were numerous crocodile tracks of various sizes. Under a bush at the edge of the beach the native boatman pointed out a depression in which he had on several occasions found crocodile eggs.

The existence of a species of crocodile in the United States was first made known in 1869 by Wyman, who based a paper* on a skull sent from the Miami River.

Alligators (*Alligator mississippiensis*) are found in all the fresh-water streams discharging into the bay. Of late they have been so assiduously hunted by the Indians that their number has been greatly reduced, and the species is approaching extinction here as elsewhere in Florida.

The green turtle (*Chelonia mydas*) is one of the most valuable water animals of this region. It has undergone a noteworthy diminution in abundance within a comparatively few years, and it would appear that some protective measures are urgently demanded in order to preserve it from practical extermination. The poaching of turtle fishermen from Bahama Islands is a source of great annoyance and injury to the people of Biscayne Bay, who have seriously felt the effects of the wholesale capture of turtles on the grounds lying off the bay. As many as 10 or 12 sail of Nassau vessels are sometimes seen taking turtles within jurisdictional waters. They withdraw on the approach of a revenue cutter and are seldom apprehended by the customs officers. As a result of the indiscriminate fishing done by these fishermen the turtle fishery along the reefs and keys is reported to have been almost ruined, and the turtles are yearly becoming scarcer in the bay itself. The turtles found in the bay range from 75 to 10 pounds in weight, the average being about 25 pounds. The average weight of those taken outside is probably 60 or 75 pounds. It is reported by the fishermen that only a few green turtles now visit the beaches of southern Florida and that no eggs are there deposited. This species is supposed to chiefly frequent the shores of Yucatan for the purpose of breeding.

The loggerhead turtle (*Thalassochelys caretta*) resorts to the outer beaches in large numbers for the purpose of depositing its eggs. The supply is much less than formerly owing to the wholesale destruction of the eggs by fishermen and by various predaceous animals, such as bears and raccoons, which walk the beach incessantly at night and devour a large part of the eggs not taken by man. The loggerhead turtle is much less valuable as a commercial product than the green turtle, and is chiefly taken for local consumption, although at times considerable numbers are secured by the turtle smacks from Key West. Their average weight is about 300 pounds.

* Amer. Journ. Sci. and Arts, XLIX, 1870, p. 105.

The diamond-back terrapin (*Malaclemmys palustris*) is found in suitable situations throughout the bay. It is said to be most abundant in the southern part. It is said to be somewhat inferior in food value to the same terrapin taken farther north. No efforts are made to take it for shipment or local sale.

CRUSTACEANS.

This section is well supplied with crustaceans suitable for food, but, owing to the absence of any fisheries for them, their abundance and local distribution are only imperfectly known.

The common blue crab (*Callinectes*) is found throughout the bay in considerable numbers, and it or an allied species also exists in the fresh-water streams flowing from the everglades. The stone crab (*Menippe*) frequents the inlets and channels of the section, and is well known to the people of the bay, but is eaten in only limited quantities. The lady crab (*Platyonichus*) is observed along the sandy beaches of the keys, and is reported to be abundant.

The horseshoe crab or king crab (*Limulus*) is found throughout Biscayne Bay and in other suitable localities along this coast. It is not utilized.

Perhaps the most valuable crustacean of this region is the salt-water crawfish or spiny lobster (*Panulirus*), which is reported to occur in immense bodies around the keys forming the eastern boundary of the lower part of the bay. It is marketable as food and bait and is similar to the "lobster" of the Pacific coast, which is eaten in large numbers, but no use is at present made of the animal in the Biscayne Bay region, except its casual employment in very small quantities for bait and family supply.

Shrimp (*Penæus*) are probably present in sufficient numbers to warrant the prosecution of a fishery, if the facilities for marketing the catch were better.

OYSTERS.

There is a luxuriant growth of oysters in parts of Biscayne Bay. They are all raccoon oysters, growing in dense reefs or beds in the open bay, and on the roots and submerged limbs of mangrove and other trees along the shores. In places they hang in large compact bunches to the mangroves, forming long continuous lines of oysters 10 or 12 inches deep. They also attach themselves to the piling of docks, the bottoms of boats, and submerged logs and branches.

The oysters are uniformly small. The average length of the shells is under 2½ inches and the maximum size of the oysters growing on the reefs is but little over 4 inches. When the clusters are separated, however, the oysters attain a much larger average size. The oysters grow very rapidly. Mr. Ralph Munroe, of Cocoanut Grove, has seen oysters on the bottom of a boat at his wharf attain a length of over 2 inches from the spat in nine months. A large proportion of the oysters on

the reefs have remarkably well-shaped shells, considering the condition under which they exist. The shells are rather thick, owing to the presence of lime salts in abundance brought down by the rivers and by surface drainage from the limestone formation which is such a conspicuous feature of the topography of this region. Many of the shells are marked by high radiating ridges which project beyond the proper margin of the shell and give it a fluted appearance.

According to Mr. Munroe, who has had extended practical experience in oyster planting in New York, the oysters in Biscayne Bay have an excellent flavor, and, when scattered, become quite fat in a short time. Some oysters taken from a large reef near the mouth of Little River on February 21 were in very fine condition, although the flavor was somewhat less agreeable than that of the oysters of more northern States. The oysters are eaten to a limited extent by the people living around the bay, but there is no regular fishery.

It appears that only the upper part of the bay—that is, the part north of Cape Florida—is now suitable for oyster-culture. The absence of fresh-water streams in the southern section leaves the water of too high a density to permit the production of the best oysters. Even in the upper section an inlet seems to be needed which, while providing for a freer movement of the water, will at the same time prevent excessive freshening of the upper bay, which occasionally results from a heavy rainfall in the Everglades and jeopardizes the oyster life. At a point known as "Baker's Haulover," only a narrow piece of sandy land intervenes between the ocean and bay, and communication between them could easily be established at little cost. The existence of such an inlet would doubtless greatly improve the general fishery resources of the entire bay, and is much desired by the people of the section.

The character of the bottom of the upper bay varies greatly. There are large areas covered with a growth of long grass; soft sand or muck predominates in places; hard shelly bottom is found in some parts, and a mixture of sand and firm mud exists in others. While a considerable part of the bay would not be suitable for oyster-planting purposes, there is beyond question ample bottom of a suitable nature to permit extensive operations. Probably the best grounds will be found to occur in the lagoons or coves in the northern part and on the eastern side of the bay.

The drum (*Pogonias cromis*) is reported to be destructive to the oyster beds in the bay, but Mr. Munroe and others doubt if much harm is done by that fish. While starfish in great variety occur in the bay, their numbers are not especially large, and they are not, as a general thing, found on the oyster beds.

At the head of Indian Creek, a large indentation on the eastern side of the bay running parallel with the coast, some beds of very fine oysters formerly existed. The shells that remain and the testimony of the inhabitants of the region indicate that the oysters were of large size

and excellent quality, such as do not now exist in the bay. The ground was resorted to by people from all over the bay, and many boat loads were taken annually for local use. The quality of these oysters is thought to have been due to the breaking up of the dense clusters and the scattering of the oysters by the people who visited the ground, so that in time the oysters partook of the character of planted stock. None of these oysters have been found in the creek since the famous hurricane of 1878, when the sea washed into the creek and the beds were destroyed by being covered with sand.

SPONGES.

South of a line drawn west from Cape Florida sponges are found in great abundance. Besides loggerhead sponges, sulphur sponges, and other nonmerchantable species, which exist in remarkable profusion, there are the valuable sheepswool, yellow, and grass sponges. The commercial species are well distributed throughout the southern part of the bay, growing on muddy and rocky bottom. The relative freshness of the water in that part of the bay north of Cape Florida precludes the existence of the desirable sponges. The specific gravity of the water in the bay opposite the cape on February 18 was 1.023. As about the normal amount of fresh water was at that time being brought down by the Miami, Little, and other rivers, the figure given may be taken as approximating the mean density of that part of the bay and as marking the minimum density in which the economic sponges are found. While loggerhead and other useless species were observed some miles north of that position, in water having a specific gravity as low as 1.019, few sheepswool or other similar sponges exist in water having a lower density than 1.023.

Of the marketable sponges growing in Biscayne Bay, the most abundant and valuable are the sheepswool. These grow very rapidly, and some specimens of large size are obtained, notwithstanding the comparative facility with which the grounds are worked and the assiduity with which the business has been carried on. The yellow sponge ranks next to the sheepswool sponge in abundance and value, and then comes the grass sponge. On the authority of experienced sponge fishermen and dealers, it may be stated that the sponges in the bay are of a finer quality and grow faster than those found on the ocean reefs, although the latter, extending from Key West to Cape Florida, of course constitute a much more productive ground.

Off Elliott Key and Cæsar Creek, in Biscayne Bay, sponges are found within a short distance of the shore and are said to grow faster than elsewhere in the bay. Some of the finest sponges ever obtained in the waters of Florida have been taken near Elliott Key. On Featherbed Bank, which is a narrow shoal extending across the bay opposite Ragged Keys and has from 1 to 6 feet of water, sponges also grow rapidly, and some good specimens have at times been taken on that very shallow ground.

Biscayne Bay has been resorted to by sponge fishermen from Key West for fully forty years, and it is still regarded as a very good sponging ground. At times within a few years as many as 30 or 40 sponge vessels have been observed in the bay during one day, and within four months of the date when the visit to the bay was made some very satisfactory fares of sponges had been taken.

While the sponges exist in less abundance than when the fishery was first begun, they seem to be holding their own remarkably well, and no areas have been entirely exhausted, so far as known. The failure to deplete grounds having such a limited extent has been due to the extremely rapid growth of the sponges. In a single year a ground from which practically every marketable sponge was taken has been known to produce a good crop of fair-sized sponges. On the reefs adjoining the bay the sponge grounds also continue to be productive, and nowhere on the east coast of the State has that permanent depletion of the beds ensued which has occurred on some parts of the Gulf coast.

The artificial culture of sponges is one of the subjects to be considered in the event of a construction of a station in this region. The feasibility of raising sponges from cuttings is well known; fully fifteen years ago it was demonstrated at Key West, while in Europe successful experiments were made in the Adriatic Sea as early as 1863.* Attention may here be appropriately drawn to the very extensive and painstaking experiments in this line conducted in Biscayne Bay by Mr. Ralph Munroe, of Cocoanut Grove, by whom the adaptability of the bay to practical sponge cultivation has been clearly proved. The general shoalness of the bay, its protected position, and other favorable conditions have permitted the prosecution of an elaborate series of successful studies and experiments, an account of which has been courteously furnished by Mr. Munroe and is appended hereto.

Mr. Munroe's experiments were restricted to the rearing of sponges from cuttings, although he is convinced of the feasibility of artificially raising sponges from the egg stage. The three species of commercial sponges before named were experimented with, with the same general results. Briefly stated, Mr. Munroe's methods consisted in preparing cuttings of fresh sponges, fixing them to suitable supports, and placing them in the water where their growth could be watched. He had at one time several thousand sponge cuttings in different stages of growth, and his work covered a sufficiently long period and such diverse methods of fixation, etc., as to afford a safe basis for calculating the possibilities of practical efforts in this direction. For several months after the cuttings are placed in the water they remain inert, but when growth once begins it is very rapid, and in 8 to 10 months after planting cuttings the size of the end of one's thumb, marketable sponges 5 inches

* The Sponge Fishery and Trade, by Richard Rathbun. The Fisheries and Fishery Industries of the United States, sec. v, vol. 2, pp. 832-836.

in diameter have resulted. The absence of any protection to his growing sponges from the depredations of ignorant or malicious persons and the completion of his experiments up to a point where scientific research was needed to give full success to his practical studies, caused Mr. Munroe to discontinue this work.

COMMERCIAL FISHING IN BISCAYNE BAY REGION.

Owing to the remoteness of this region from the markets and the poor facilities for shipping perishable products, the general fisheries have never attained any prominence. It may be safely predicted, however, that the completion of the canal route between Lake Worth and Biscayne Bay will give a decided impetus to the fishing industry, and that the valuable water resources of the region, of which mention has been made, will be utilized to supply distant markets and the local demand resulting from the increase in permanent and transient population.

The most important fishing done in the Biscayne Bay region is for sponges. This is carried on wholly by Key West fishermen, and is not participated in by the people living on the bay. "Crawls," or pens for the cleaning and bleaching of sponges, have been located at Cocoánut Grove, Lemon City, Soldier Key, and elsewhere. There seems no reason why sponge fishing in this section might not be very profitably prosecuted by local fishermen.

The taking of green turtles is the most important fishing in which the people of the bay are engaged, and, besides the line fishing, is the only branch of commercial importance. In 1894 the business was of much less extent than formerly, the season being very poor. Three boats, belonging at Lemon City, Miami, and Cocoanut Grove, devoted a short time to turtle fishing in Biscayne Bay and the adjacent ocean reefs. Nets and pegs were used in the capture of the turtles. The aggregate catch was about 205 turtles, weighing 6,175 pounds, with a value to the fishermen of about $708; of these, about 175 turtles were taken in the bay. The turtles are shipped by sailing vessels to Key West. The fishermen find that it is much more difficult than formerly to make a remunerative business of this fishery, owing to the increasing scarcity of the turtles.

The quantity of loggerhead turtles taken exceeds that of green turtles. There is no regular fishery for the former, however, and they are simply taken on the beaches for family supply. Several hundred, with an average weight of 300 pounds, are obtained annually in spring by people residing around the bay. In 1894 the turtles were much scarcer than usual and only about 100 were secured, but in previous years from 300 to 400 were taken. Large numbers of eggs of this turtle are also utilized.

A small line fishery is carried on from the several settlements on Biscayne Bay, the catch being sold to meet the local demand. Fishing is done with hand lines at the inlets or on the adjacent ocean reefs.

Grunts (*Hæmulon*) and groupers (*Epinephelus*) constitute about three-fourths of the yield. The principal other fishes taken are the porgy, yellow-tail, turbot, bonefish, Spanish mackerel, kingfish, and redfish. Only about 4 men followed this business in 1894, and the aggregate catch was only about 11,000 pounds of fish, having a value of $410.

BISCAYNE BAY AS THE SITE FOR A STATION.

The special points considered in the examination of Biscayne Bay with reference to its adaptability as the site for a hatching and experiment station were accessibility, presence of fish and other water animals, proximity to fishing-grounds, existence of natural beds of oysters and sponges, harbor facilities, possibility of constructing salt-water ponds, and the acquisition of land.

Perhaps the principal objections which may be urged against the Biscayne Bay region as the location for a station are its distance from railroads and the poor transportation facilities for reaching it by water and stage. The nearest railroad point in 1895 was West Palm Beach, on Lake Worth, which is about 77 miles by stage from Lemon City, the most northern settlement on the bay.* Two days and nights are required to go from West Palm Beach to Lemon City by stage, the road being very heavy and traveling extremely tedious. Another means of reaching the bay is by water. Sailing vessels leave Lake Worth for Lemon City and Cocoanut Grove at somewhat regular intervals, and, if the wind be propitious, make the trip in one day, although the uncertainty of this means of travel (vessels often being three or four days on the way) leads one to prefer the slow but certain stage route.

Within a short time, however, Biscayne Bay will become easily accessible through the construction of a canal from the southern end of Lake Worth to the northern extremity of the bay. Much of the excavating has already been done, and it is thought that early in 1896 steamboats will be running on the canal. The existence of the canal will doubtless lead to the development of facilities for communication between the bay and Key West, and will certainly prove a great boon to a region having valuable land and water resources. The climate is excellent, even in summer, and the section is free from miasmatic diseases. While mosquitoes are very troublesome in summer, they are reported to be much less annoying than on the west coast or farther north on the east side of the State.

The localities on Biscayne Bay which may be considered as possible sites for a station are the end of the peninsula forming the eastern boundary of the upper third of the bay, the southern extremity of Virginia Key, the northern and southern ends of Key Biscayne, Soldier Key, and the several settlements on the mainland. The keys south

*In 1896 the East Coast Railroad was extended from West Palm Beach to Miami, thus making the Biscayne Bay region easily accessible. The canal alluded to was completed some months before the railroad. The bay now has triweekly steamer connections with Key West. Miami has (1896) become an important town with over 2,000 inhabitants.

of Soldier Key may be dismissed from consideration, owing to their remoteness.

The point of the peninsula mentioned is low and sandy. Back from the water line there are mangroves, palmettoes, and other characteristic vegetation of the region. On the side of the inlet and bay there are several natural salt ponds, some isolated and others connected with the bay by narrow channels. These ponds are practically persistent, but nearly all are subject to obliteration during the prevalence of hurricanes, which occur at rare intervals. They are simple depressions in the sand and are kept replenished and fresh by water which soaks through the soil at the rise and fall of the tide. Their length varies from 25 to 150 feet, their width from 15 to 50 feet, and their depth from 1 to 5 feet. All of them contain small fish, and some of them have various invertebrate animals, such as echini, starfishes, conchs, crabs, many kinds of small mollusks and crustaceans, etc. There is a natural growth of algæ and grass in all the ponds. Through the inlet known as Norris Cut the water runs with great swiftness during the tidal changes, and a channel 8 or 9 feet deep has been formed in the bay; the entrance to the cut, however, is occluded by a sand bar on which there is only 4 feet of water. A large sandy island bar lies in the bay to the west of the point and protects the shore from the waves during the prevalence of strong westerly winds.

This locality has some advantageous features, chief of which is the existence of natural ponds, which are capable of being enlarged and deepened to almost any required extent. The excavation of additional ponds could also be easily accomplished. The point is, however, 7 miles north of the sponge grounds, and the water on the bay side is usually too fresh to permit the prosecution of successful experiments with sponges. On February 19 the density of the bay near the shore, about 1 mile north of the point, was 1.010. As the tide was rising and there was a southerly wind at the time the observation was made, it is probable that this figure represents about the normal maximum density of the bay side of the end of the peninsula.

The southern shore of Virginia Key is a long, wide, regular, sandy beach extending along Bear Cut for a distance of 1½ miles. Bear Cut is one of the most used passageways into Biscayne Bay; it is three-eighths of a mile wide, and, with the exception of a small shoal area lying southeast of the key, on which there are only 5 to 7 feet of water, there is a good though somewhat tortuous channel through which a vessel drawing as much as 9 or 10 feet of water might go. The general land features of the key are similar to those previously mentioned. A large salt-water pond occupies a part of the southern shore. It is a permanent body of water not connected with the bay or ocean. The pond contains mullet and some other fishes of comparatively large size, as well as multitudes of small species; it is also the resort of a colony of crocodiles. The whole of Virginia Key is private land, and is now for sale. The agent expressed the belief that a station site would be donated by the present owner. The conditions are favorable for the

construction of a large series of ponds, which, however, would be open to the same objection that was made to the site first referred to, namely, that the position is not very near the sponge grounds, and the water becomes so fresh that sponge-cultural experiments could not be satisfactorily carried on.

Bear Cut separates Virginia Key from Key Biscayne. At the northern extremity of the latter there is a rocky bluff about 6 feet high, which would be an admirable site for buildings, considered from a purely architectural standpoint. The bay side of the point is thickly overgrown with mangrove trees, while the part nearest the ocean is covered with saw palmettoes. A long, shallow cove (bare at low tide), in which there are a number of islands, extends into the northern end of the point from the west; but the shores of the cove and its shoalness probably render it unfit as a site for ponds. The south end of Virginia Key, however, is sufficiently near to be utilized for the purpose named in the event of the northern part of Key Biscayne being found a suitable place for a station.

One of the localities most strongly recommended, and one which was thought to combine many necessary features, is Cape Florida, which forms the southern point of Key Biscayne and lies immediately opposite Cocoanut Grove, the principal settlement on the bay. An abandoned light-house occupies a reservation at the extremity of the cape, and it has been suggested that the Government ownership of the property would permit its acquisition by the Fish Commission without expense. On inquiry, it was learned that since the abandonment of the light-house the reservation has reverted to the heirs of the original owners, under the terms of the agreement by which the property was ceded to the Government.

Cape Florida is a rounded, sandy projection. For a key, the land is comparatively high, but in hurricanes, as in September, 1894, the sea breaks over the entire point. The cape is occupied by a private residence, buildings, etc., and a large part of the land is planted with pineapples and other subtropical fruits. It lies in close proximity to the channel constituting the deepest and best passage into Biscayne Bay. A recent preliminary examination of the channel has been made by the engineer office of the War Department with a view to deepen the entrance into the bay and the approaches to the cape. At present it is the principal thoroughfare between bay and ocean, and may be traversed by vessels drawing 9 feet of water. Along the bay side of the cape there is a sandy beach a third or half a mile long, beyond which an unbroken mangrove swamp occupies the water line. Adjoining the sandy beach is low land overgrown with scrub palmetto. No natural indentations or depressions exist suitable for the construction of ponds. About a mile above the end of the cape a large shallow lagoon enters the key from the bay; its sides are thickly overgrown with mangrove trees.

Cape Florida possesses many advantages for the purpose under consideration, in addition to its accessibility by water and its nearness

to the settlements on the bay as compared with the keys lying farther south. It is the most conveniently located point in the region from which to visit the sponge grounds within the bay and around the adjacent reefs. As a headquarters for biological investigations of the littoral and pelagic fauna of the section it is well situated. It appears, however, that the construction of salt-water ponds for hatching and experimental purposes would be attended with considerable labor and expense, the only available place for excavation being the saw-palmetto land mentioned. The light-house reservation, which originally had an area of 3 acres, is now much smaller, owing to the encroachment of the sea, and, being located on the ocean side of the cape, is not well adapted to fish-cultural work. While a limited tract of land on the bay side of the cape would probably be donated by the present owner, it is not likely that the full amount of land required for buildings, ponds, etc., could be obtained without a monetary consideration.

Soldier Key, located 4½ miles south of Cape Florida, is the property of the Government and was some years ago turned over to the United States Commission of Fish and Fisheries to be used, if suitable, as the headquarters for scientific studies of the fauna of the region. The island has an area of about 2 acres, and is densely wooded with mangrove and other subtropical trees. Good sponge grounds exist around the key, and the Key West sponge fishermen have crawls and an anchorage at the island. Vessels drawing under 7 feet of water can approach near to the northwestern side by means of a narrow circuitous channel.

The exposed condition of this key, its small size, the impossibility of constructing ponds, and its isolated situation render it unsuitable as a station site, although it would doubtless serve as a valuable collecting ground and temporary rendezvous for a station located in the vicinity.

Some years ago Mr. Ralph Munroe, of Cocoanut Grove, was, with other gentlemen of this section, instrumental in having a bill presented to the Florida legislature providing for a protected area of several square miles around Soldier Key for sponge-cultural purposes. Some very objectionable features were added to the bill, however, and its defeat was secured by those who first brought the matter to the legislature's attention. Enough was developed at that time to lead to the belief on the part of Mr. Munroe and his coworkers that the legislature would willingly sanction the segregation of ample territory for such purposes. The vicinity of Soldier Key would undoubtedly prove an admirable ground for practical experiments in the artificial production of sponges, and the proximity to the deeper reefs would permit a wider range of experimentation than would be possible in Biscayne Bay.

With reference to the availability of the western side of the bay as the site for a station, it may be stated that the construction of salt-water ponds on the mainland is entirely impracticable, owing to the fact that the seepage from the Everglades renders all ponds fresh except when there are high tides. All excavations along the shore quickly become filled with fresh water. The extreme shoalness of the western side of the lower bay is another feature to be considered.

ACCOUNT OF SPONGE-CULTURAL EXPERIMENTS IN BISCAYNE BAY.

By Ralph M. Munroe.

Agreeably to request made by you for a brief report on my experiments in sponge culture, I am pleased to submit the following:

Having had my attention called to the possibilities of sponge culture by Mr. J. Fogarty, of Key West, a gentleman of much experience as a buyer and packer of the article, who had a few years previously successfully grown a few samples from cuttings, I began work in the same line in November, 1889, at Biscayne Bay, a place admirably adapted to such experimenting, far more so than any other place on the coast, having a greater range of bottom, from the oozy marls of the inner lagoons to the hard outer coral reef, waters of all degrees of density from the Gulf Stream to fresh, and currents to suit.

Being already well provided with a vessel, boats, sponge hooks, and water glasses, the question of suitable material for attaching to and sinking the cuttings to the bottom gave some trouble, although apparently a simple problem. Saplings of white wood, which were plentiful, fairly proof against worms, and heavy enough to retain their place in strong tide ways, were finally chosen. They were about 12 feet in length, with a cross piece at one end to prevent rolling over. The cuttings were fastened to them by various contrivances, wedged into holes with pegs, wires around the pole, etc., but the quickest, if possibly not the best, as it afterwards turned out, were short pieces of brass wire doubled and driven into the pole with a peculiar grooved punch, which could be done rapidly. At other stages of the experiment I used bamboo stakes, long double lines of twisted wire connected by cross pieces of white wood with the cuttings inserted between the strands, also flat pieces of coral rock with drilled holes and wooden wedges. Galvanized iron in any form did not answer, especially wire, as it quickly corroded. Most of the first plantings were lost by its use, and I am also inclined to condemn brass wire on account of the possible poisonous effects of the salts formed on it, although some of the best results were obtained when it was used.

Having prepared the sinkers and hooked up sufficient sponge for several days' work, placing them in nets hung from the side of the schooner, the process was as follows: Take the poles or other sinker material in a small boat, two kedge anchors, a small long line, and the sponge in buckets, in which the water was changed every few minutes, a cutting board and knife, the latter very thin and resharpened often, owing to the calcareous matter embedded in the sponge. In this connection it has been generally understood that exposure to air and sun for even a few minutes was fatal to a sponge, and at first I was very careful in this respect. Subsequently I found that several hours of such exposure did not hurt them to any extent. Stagnant water, however, will kill them in a very short time.

Having reached the locality which was at first selected by the natural sponge growth already on it, the two kedges were let go at either end of the long line, and by hauling along this line the plantings could be kept quite regular, and when finished were marked by range stakes set up on the adjacent dry banks. The depth of water ranged from 8 feet to less than a foot at low tide, at which latter depth many fine sponges are found. By the use of a water glass the plantings could be easily observed at any time without disturbing them.

In cutting the sponge it was done as nearly as possible in a line with the radial circulating canals, and so that each piece should have on it a part of the outer cuticle. As many were not cut this way and lived, it may not be at all necessary. Each piece was about 1 inch square on top and somewhat more in length, coming to a point, averaging 25 to a sponge. In cutting care was taken not to express the natural juices or milk, and quickly attaching to the sinkers were immediately put into the water. The poles held on an average 12 pieces placed 12 inches apart, and with one assistant I was able to plant about 200 cuttings per day. With a more suitable boat, having a well to keep the sponge in, and another assistant, I could easily plant from 600 to 800.

This work was continued with intervals from November, 1889, until June 11, 1891, with various results, under all the conditions of bottom, depth, current, etc. With but few exceptions the sponge survived the cutting process and began a good, healthy growth, to be afterwards lost or destroyed in various ways. In many cases, notably one lot planted back of Elliot Key in 4 feet of water on hard bottom, 75 per cent lived and in six months had doubled in size. These were mostly taken up before reaching maturity, as a gale would have swept them away, and did so with those that were left. Mature specimens were gotten from many of the other plantings, but the average loss from defective fastenings and other causes was greater.

The results can be summed up as follows:

Material for anchoring cuttings: While very many things other than those used suggested themselves in the progress of the work, I kept strictly within the limits of what was economic and practical; therefore poles and stone seemed best suited, preferably the former, arranged so as to be elevated a short distance above the bottom to avoid smothering with silt and to avoid the coral, etc., which is apt to grow in with the sponge. Fastenings of just the right character have yet to be invented.

Location: Anywhere within the bays and lagoons free from heavy sea, too strong current, and too much fresh water, and in moderate depths for easy handling and observation.

Growth: This is faster in strong currents, but shape is apt to be poor and quality harsh. This point, however, is not fully determined. Under favorable conditions the cuttings double their size in six months; consequently eighteen months to two years will produce marketable sponge. The sheepswool was the only one of the useful kinds experimented on, although a few cuttings of velvet, grass, and others seemed to thrive and do equally well. It is quite possible that, with State protection to the planters and better methods to be determined upon by further experiment, sponge culture might be profitable. My belief is, gained in oyster culture from spawn, that a similar method with sponge will eventually prove the correct one, but until more is known of sponge biology it would be useless to suggest methods, notwithstanding the fact that several points in connection with it have been to my mind quite clearly demonstrated. Unfortunately, having had to turn my attention to matters of more immediate pecuniary return, the subject has remained in abeyance.

REPORT* ON A PRELIMINARY EXAMINATION OF BISCAYNE BAY

BY THOMAS H. HANDBURY,
Major, Corps of Engineers, U. S. Army.

I have the honor to submit the following report upon a preliminary examination made by me of the entrance to Biscayne Bay, Florida, authorized by the river and harbor act of August 17, 1894, and directed by your letter, August 20, 1894:

Biscayne Bay is located upon the east coast of Florida and near its southern extremity. It is about 36 miles in length, with an average width of 6 miles, and has an approximate area of 216 square miles. Over fully one-half of this area there is a low-water depth of 6 feet and less; over the remaining half the average is not above 10 feet. There are occasional holes where the water is 13 feet, and in the cuts which connect it with the ocean depths as high as 16 and 18 feet are to be found. The mean rise and fall of the tide is 1 foot.

The west shore of the bay is coral rock, which rises in places to a height of from 6 to 10 feet above the water level. This rock extends back under the Everglades, the eastern edge of which is about 6 miles from this shore of the bay. Several small streams that take their rise in the Everglades empty into the bay. The most considerable of these is the Miami River, at the mouth of which old Fort Dallas was located. About 4 miles from the mouth of this river there is a rapid a quarter of a mile in length, on which the fall is about 4 feet.

This seems to be the edge of the rim which holds the water of the Everglades at its present level. By excavating through this the level of water would undoubtedly be lowered and much valuable land reclaimed. The east side of the bay is limited throughout its entire length by coral reefs that have risen from the ocean bed. The greater portion of these are above high water, have some soil upon them, and are covered with a thick growth of mangrove, saw palmetto, and other semitropical vegetation. These are commonly designated "keys." The balance that is not to this height is covered with sand, bare at low water. Through this reef there are several openings or "cuts," by means of which communication is had between the bay and the ocean. Outside of this line of keys, at a distance of about 3 miles, and running nearly parallel to it, there is a second line of detached coral rocks that are only just awash at high water. There are also numerous rocks of the same character lying between the two reefs. In these waters lie what is known as Hawk Channel, an inside passage permitting a draft of about 12 feet from Cape Florida around to Key West. This is taken advantage of by light-draft vessels coasting along these shores.

Communication is had with Biscayne Bay by these boats through the passages just under Cape Florida—Bear Cut and Norris Cut. These may be considered as the "entrances to Biscayne Bay" contemplated by the act of Congress, and have been the subject of this preliminary examination.

Norris Cut is the most northerly of these entrances, and is the first to separate the keys from the mainland. It is about one-fourth of a mile in width, and has upon its bar at low water about 4 feet. I was told by reliable persons well acquainted with these waters that there is a reef under this bar with about 2 feet of sand upon it. This

* Dated February 18, 1895, and addressed to Chief of Engineers, U. S. Army.

would make 6 feet the maximum depth that could be obtained without recourse to blasting. I had no means of ascertaining how wide this reef is. Within the cut and in the shoal inside there is a narrow channel about a mile in length, having a depth of from 6 to 8 feet. The water then shoals up, and for the next 2 miles, going toward the interior of the bay, there is an average depth of about 3 feet. The mouth of the Miami River is directly opposite this cut. Near it there is a narrow channel in the bay, having a depth of 7 feet. The best water to be found within the bay and a range of 3 miles from the mouth of the cut does not exceed 8 feet.

Bear Cut is 1½ miles to the southward of Norris Cut and separated from it by a low island, called Virginia Key. It is about one-half mile in width, and has upon its bar a low-water depth of 4 feet. I was told that there is a rock reef 8 feet below the low water on this bar, covered with about 4 feet of sand. Eight feet, then, is the limit of the depth that can be expected over this bar without recourse to blasting. The width of the reef was not ascertained.

From the bar there is a narrow channel about 3 feet in depth, leading into the bay. Through this 10 feet could be carried with very little improvement of its present condition into the bay, where the same depth is found. If the difficulty at the bar were removed this would be a very accessible and desirable route for vessels passing between the bay and Hawk Channel.

About 4 miles to the southwest of Bear Cut and at the lower end of Key Biscayne we find Cape Florida. Immediately below this point there are three narrow channels making in across the low sand flats that here cover the coral reef. Through these depths of 10 and 12 feet can be carried into the bay to where there is the same depth; but in order to get into either one from the Hawk Channel a tortuous course over a shoal flat, having about 8 feet limit upon it, must be gone over. By this course the distance is about 9 miles. The most direct course would be about 4 miles, but over this there is a less depth of water. A small amount of dredging might give 11 feet over this course, but owing to the exposed location of the shoal and the attendant circumstances of light sands and prevailing storms it could not be expected that the dredged cut would maintain itself. Permanent works, such as training dikes or jetties, would be impracticable, as their cost would be out of proportion to the benefits to be derived from them.*

My observation and study of the country bordering Biscayne Bay lead me to suppose that the bottom of the bay throughout its whole extent is a coral rock formation, similar to that between its western shore and the Everglades, not always level, but containing depressions which are filled with sand. This being the case, the prospects for improving much beyond their present depths any portion of the bay or either of the cuts leading into it are not very encouraging. A series of borings will be necessary to ascertain at what depth rock is to be found.

Of the three different entrances here considered, that at Bear Cut seems to offer the most encouraging prospects for improvement at a reasonable expense and to the advantage of commerce. It is doubtful if this can be so improved that vessels of the class now plying between Key West and other Gulf ports and New York can be induced to make Biscayne Bay a stopping point. There might, however, be established here a very considerable trade with the southern keys of Florida, the Bahamas and other West India Islands, through the medium of light-draft vessels. This will require some improvement at this entrance and extension of the East Coast Railroad down to some point on the borders of the bay. By this means early vegetables and tropical and subtropical products of this region could be brought several days earlier to the markets of the North.

The winter climate of Biscayne Bay is mild and salubrious and can not be excelled by any to which our people resort for health-giving air and exercise during the

* In 1896, a channel was opened between Cape Florida and the railroad terminus at Miami; in the vicinity of the latter place a large amount of excavating was done at private expense.—H. M. S.

winter months. The scenery is delightful, and the winds and waters fulfill all requisites for pleasure sailing and light-draft vessels. As soon as better facilities are provided for reaching the locality, there is no doubt but it will become the most popular of our winter resorts and the headquarters for pleasure cruisers from this country among the adjacent islands.

The country in the vicinity is as yet sparsely populated. A few thriving settlements are growing up on the bay. The rich hummock land in the vicinity is being cleared of its dense natural growth and devoted to raising vegetables, which come to maturity and are shipped to northern markets in midwinter. Bananas, cocoanuts, pineapples, oranges, limes, lemons, and the ordinary tropical fruits flourish here.

The export products from this region and the keys lying to the south are now sent in light-draft sailboats to Key West, and from there shipped by steamer as Key West products to the North. This is the usual route of communication with the bay. There is a triweekly mail between Lemon City, on Biscayne Bay, and Lantana, at the lower end of Lake Worth; distance, 60 miles. This mail is carried in a hack, drawn by two mules, and two days are consumed in the journey each way. The Florida East Coast Canal Company is opening a canal 5 feet in depth, with 50 feet width, through the swamp lands which lie between Lake Worth and the head of Biscayne Bay. In a few weeks this will be open from Lake Worth as far as New River, a distance of 40 miles. The company expects to open the balance of the line during the coming year. When this is finished a large amount of excellent land will be drained, more convenient access will be had with the Biscayne Bay country, and a great impetus will be given to its development.

I am indebted to the Hon. F. S. Morse, of Miami, Fla., for the following statistical information relative to the commerce of Biscayne Bay and the adjoining keys:

"Merchant vessels' tonnage coming in during 1894 aggregate 5,164 tons. This does not include the vessels chartered to take away the pineapple crop or vessels coming into the bay on account of weather or for wood and water; also a large fleet of yachts coming here during the winter months.

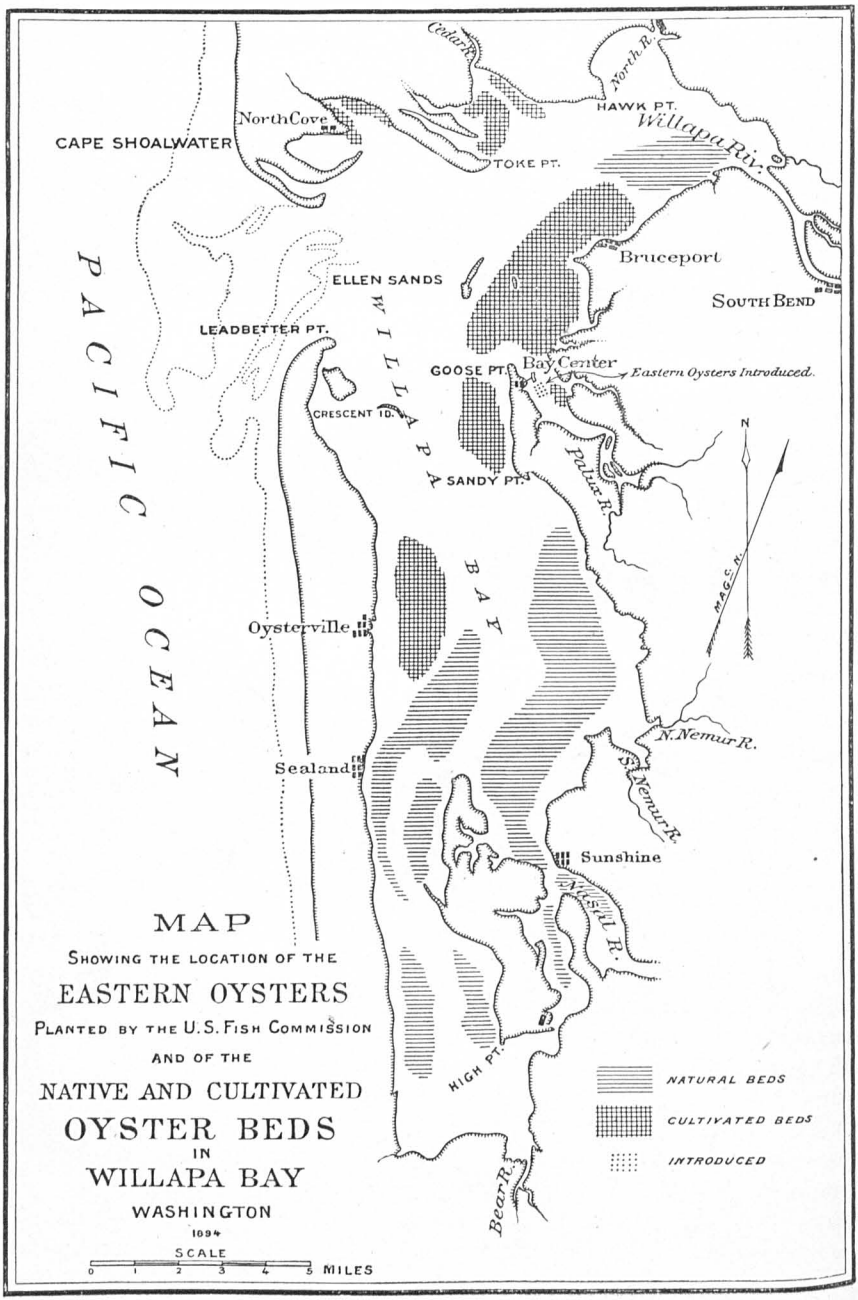
"Actual tonnage of general merchandise brought in during 1894, with statistics at hand, amounts to 3,985 tons. There were shipped out from Biscayne Bay and the keys during 1894, 250,000 dozen pineapples, 5,000 crates pineapples, 50,000 peck crates tomatoes, 10,000 carrier crates tomatoes, 1,000 crates limes, 50,000 alligator hides, besides tropical fruits, cocoanuts, jellies, sponges, fish, etc., of which I have not had time to obtain statistics.

"I have only included the commerce of those keys that would naturally use this harbor for their shipments of freight. The resources of this section are just beginning to be developed."

From the above facts I conclude that the present and prospective commerce of this locality is worthy of the fostering care of the General Government, and that the entrance at Bear Cut is worthy of improvement, provided that on further investigation by surveys and borings, to be taken on its bar, it does not appear that the cost will be excessive and out of proportion to the commerce to be benefited.

For the purpose of making additional investigations, surveys, plans, and estimates of the cost of the work proper to be done, I estimate that the sum of $1,500 will be required

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Cedar R.
North R.
HAWK PT.
Willapa Riv.
North Cove
CAPE SHOALWATER
TOKE PT.
Bruceport
SOUTH BEND
ELLEN SANDS
LEADBETTER PT.
WILLAPA
GOOSE PT.
Bay Center
Eastern Oysters Introduced.
CRESCENT ID.
SANDY PT.
Palix R.
N
MAG. N.
PACIFIC OCEAN
BAY
Oysterville
N. Nemur R.
S. Nemur R.
Sealand
Sunshine
Naselle R.
HIGH PT.
Bear R.
NATURAL BEDS
CULTIVATED BEDS
INTRODUCED
MAP
SHOWING THE LOCATION OF THE
EASTERN OYSTERS
PLANTED BY THE U.S. FISH COMMISSION
AND OF THE
NATIVE AND CULTIVATED
OYSTER BEDS
IN
WILLAPA BAY
WASHINGTON
1894
SCALE
0 1 2 3 4 5 MILES

3.—THE TRANSPLANTING OF EASTERN OYSTERS TO WILLAPA BAY, WASHINGTON, WITH NOTES ON THE NATIVE OYSTER INDUSTRY.

By C. H. Townsend,

Naturalist, U. S. Fish Commission Steamer Albatross.

During a visit of the late Marshall McDonald, United States Commissioner of Fisheries, to Willapa Bay, Washington, in the summer of 1893, representations in favor of the introduction of the eastern oyster were made to him by persons interested in the cultivation of the small native oysters at that place. Strongly impressed with the desirability of such an importation, the Commissioner promised to authorize the necessary investigations concerning the conditions of the bay and its adaptability for the growth of other species, to be followed by such further action as he might deem advisable to take. Accordingly, in October, 1894, the writer, who had previously made some study of the local oyster industry of Willapa Bay,* was directed to make a further examination of the native oyster deposits found there, and, if possible, select suitable localities for planting the eastern species.

Willapa Bay is the most favorable locality on the Pacific coast for the cultivation of the native oyster (*Ostrea lurida*). This species has always been abundant there, and for many years before its present system of cultivation was attempted was regularly shipped to San Francisco, where it was the only oyster used prior to the introduction of the eastern oyster into the waters of California. Native oysters are taken from the natural deposits with tongs and carefully sorted, the largest being at once marketed and the rest laid out for two or three years upon suitable beds for further growth.

The cultivation of this small oyster constitutes the principal fishery industry of the bay, there being about 350 persons employed, Indians constituting about one-third of the number. Over $66,000 worth of oysters were produced in 1895. The quantity of Willapa Bay oysters consumed annually in the Pacific coast States amounts to about 50,000 sacks, the total acreage of transplanted beds is over 2,000, and the value of small boats and other appliances of the fishery is over $20,000.

* Report U. S. Fish Commission, 1889-1891, Oyster Resources Pacific Coast, pp. 343-372.

Although the quantity of Willapa oysters used in San Francisco has been reduced by the introduction of the eastern oysters, a considerable percentage of the output still finds a market there, many persons preferring the native to the introduced species.

Of the adaptability of the eastern species to the water of San Francisco Bay there is no doubt. Eastern oysters have for the past twenty-five years been brought to California in the form of seed and kept in the bay for three or four years until grown to a large size. It was supposed for many years that, owing to the uniform coldness of the water, there was no natural increase, but an examination of San Francisco Bay in 1890–91 by the writer showed that considerable natural increase had taken place, and more recent inquiry develops the fact that the scattered tracts of naturally propagated oysters were developing into oyster beds, from which a small supply was being gathered annually by boys and others who knew where to look for them. It is altogether probable that the tendency of the acclimated stock is to increase from year to year. There are evidences of natural increase on the beds where the annual supply brought from the Atlantic coast is laid out for growth, but with a gradually developing market for oysters on the west coast and a comparatively limited area over which they could spread and propagate, it seems probable that the present custom of importing seed will have to be continued for many years. If San Francisco Bay were less muddy and more generally supplied with shelly bottom to which young oysters could attach themselves, the establishment of the species would go on more rapidly. Outside of San Francisco Bay the introduction of the eastern oyster has not been attempted on any scale worthy of more than passing notice.

The following extracts from the report previously referred to are of interest in this connection:

In Tomales Bay, Messrs. Weinard and Terry laid out about 17 carloads of eastern oysters in 1875. They remained there only two or three years, until all were marketed or removed to more accessible places in San Francisco Bay. The experiment was not repeated. Captain Lawson, one of the oldest residents upon Tomales Bay, says that these oysters lived and fattened as well apparently as those in San Francisco Bay. They were laid out at Millerton Station, near the southern end of the bay, where some of the stakes used in fencing the bed are still standing. There is perhaps no reason why the extensive mudflats of Tomales Bay should not be used for laying out oysters in the same manner as is done in San Francisco. The bay is nowhere very deep. With two or three good-sized streams flowing into it, the natural conditions ought to prove very similar to those of San Francisco. It is 18 miles long and averages 2 in breadth. There are no signs of the propagation of eastern oysters there, although *Ostrea lurida* is not uncommon.

From correspondents in southern California I have recently learned that eastern oysters are reported as propagating in San Diego Bay. A few years ago a quantity of oysters were placed there, and they still remain in good condition. It is said also that a lot of Mexican oysters, brought in a steamer from Guaymas several years ago, were found to be dying rapidly when the vessel arrived in San Diego Harbor, and were thrown overboard. It is claimed that survivors from this accidental planting are occasionally found. This bay, more than 400 miles south of San Francisco Bay, is much warmer, and it might be that the oyster of the Gulf of California, which

failed to live in the cold water of San Francisco Bay, would be a success in San Diego Bay. The greater part of this bay is shallow and there are extensive mudflats. There are no constant streams flowing into it, though False Bay, immediately north of it, receives San Diego River, a stream which disappears in midsummer.

Humboldt Bay, 200 miles north of San Francisco, is a large and shallow bay that may be found available for oyster-growing when the question of temperature has been studied. By far the greater area of this bay consists of tide lands, exposed at low water. My personal recollection of Humboldt mudflats, visited in 1885, is that they are altogether firmer than those of San Francisco, the bottom being more sandy.

Ballona Bay, near Santa Monica, in southern California, is a small bay where, I am informed, oysters have been placed and found to grow well, but it is not known whether they breed there. A report upon the small bays about Wilmington, near Los Angeles, has already been published by the Fish Commission.

* * * * * * * *

Governor E. P. Ferry, of Washington, informed me that he, in company with Colonel Laramie and Mr. William P. Wright, made an experiment in planting eastern oysters near Olympia many years ago. The history of the experiment is lost, but Governor Ferry's recollection of it is that two sacks of oysters were put in Budd Inlet, about 2 miles from Olympia. They were perhaps not properly looked after, as they were soon lost sight of. It was observed, however, that they lived for several weeks. The history of eastern oysters in Willapa Bay is similar; a few sacks only were laid out in the vicinity of Oysterville. They lived as well as those at San Francisco, but no signs of propagation were ever discovered. It was conceded by oystermen that there were hardly enough of them to insure fertilization. This experiment was made several years ago and has never been repeated.

Eastern oysters grown in San Francisco Bay, and thus acclimated to the comparatively cold waters of California, would, if the supply be large enough, constitute a better stock for introduction into other bays of the Pacific coast than oysters newly imported from the Atlantic region. It is probably true, also, that oysters derived from the most northerly localities on the Atlantic coast would be better adapted to Pacific coast bays than those from southerly and warmer localities.

Willapa Bay is situated on the southwest coast of Washington, a few miles north of the mouth of the Columbia River. It is about 25 miles in length, with an average width of 5 miles. On account of extensive shoals and tide flats it was formerly called Shoalwater Bay. Deep navigable channels make nearly all parts of it accessible to large vessels. Its shores are heavily wooded, and many streams valuable for their salmon fisheries flow into it. The most important of the latter is Willapa River, 30 miles in length, smaller rivers and creeks being the Palux, Cedar, Nemur, and Nasal. None of these streams are navigable for more than a few miles above their mouths, and some of them not at all. This part of Washington being decidedly rainy, particularly in winter, the volume of fresh water flowing into the bay is considerable, and it is said that during freshets the waters of the bay are discolored by the inflow of water from the Columbia River. Extensive natural oyster deposits are found along the channels, from the mouth of the Willapa on the north to the extreme head of the bay on the south.

The localities where oyster cultivation is carried on are Bay Center, Bruceport, Oysterville, North Cove, and Toke Point (see accompanying map), no transplanted beds being located in the southern part of the

bay. Oysters for planting are generally derived from the natural deposits in the adjacent channels. North Cove and Toke Point, where natural beds do not occur, are supplied with seed from points as far south as Sealand.

An examination of Willapa Bay in October, 1894, having shown that the tide lands generally had been filed upon or were already under cultivation, it became necessary to consider the deeper waters with reference to their suitability for the eastern species.

Many of the channels where native oysters grow were recommended by resident oystermen as favorable places for depositing eastern oysters, but the danger of leaving such deposits exposed to poachers being admitted, the following localities adjacent to cultivated oyster beds were then considered: Palux Channel, near the village of Bay Center; Willapa Channel, opposite Bruceport, and the channel off Sealand. It is quite possible that the shallow head of the bay will eventually be found to have the highest summer temperature and would therefore afford the most favorable conditions for the propagation of eastern oysters, but its remoteness from the present oyster-growing districts makes it undesirable on account of the lack of such protection as an interested oystering community would afford. The sandy districts near the mouth of the bay are unfavorable, the bottom being constantly shifted by the action of the sea.

Upon examination, Palux Channel seemed on the whole to offer the best conditions. It lies well back of very extensive flats, which would have a tendency to increase the summer temperature; the bottom is firm, and is well supplied with native oysters, while starfish are said to be less numerous than elsewhere. It is within sight of the village, which insures its security against poachers, and has a depth of 8 feet at low water, full security against the winter frosts that injure oysters on shallow transplanted beds.

On October 26, 1894, the J. & J. W. Elsworth Co., of New York, under the direction of the United States Fish Commission, shipped a carload of oysters from New York to South Bend, on Willapa Bay, Washington. It was stated by the shippers that the car would be eighteen days en route, but, owing to fortunate circumstances, the trip was made in thirteen days, the car reaching South Bend on November 7, my own arrival being unfortunately three days later. I arrived on the evening of the 10th, according to instructions received from the Commissioner, and at once examined the oysters, which proved to be in good condition. A number of oystermen from Bay Center had volunteered to transport the oysters on Monday, but not wishing to delay planting them a tug-boat and lighter were secured and everything arranged for a start at daylight the next morning (Sunday).

Mr. James Crawford, fish commissioner of Washington, who had been requested to assist in the work, had been looking over the ground. We agreed in favor of the Palux Channel location, and the oysters were accordingly deposited there in good condition at noon on November 11.

There were 80 barrels of oysters in all, collected from the following localities: Raritan Bay, 10 barrels (natural growth); Chesapeake Bay, 12 barrels; Newark Bay, 8 barrels (seed); Prince's Bay, 14 barrels; Keyport, 23 barrels; East River, 13 barrels.

Examining the four or five upper layers of oysters in each barrel as it was opened, a few dead oysters were found and counted, as follows: For the 23 barrels from Keyport, 35 oysters; for the 10 barrels from Raritan Bay, 6 oysters; for the 12 barrels from Chesapeake Bay, 18 oysters, and for the 14 barrels from Prince's Bay, 22 oysters. The Newark and East River lots were in still better condition. A few oysters that were slightly open closed upon being placed in a bucket of sea water, while a dozen or two that we opened were found fresh and well supplied with liquid.

By massing the entire consignment in one locality the chances for fertilization are increased. The tract upon which the oysters were placed, while not measured, is probably about 3 acres in extent. A large representation of the local oystermen were present at the planting, in which they were greatly interested. It was agreed that the entire tract, which lies a short distance south of the Bay Center wharf, be reserved as a bed for eastern oysters, and upon the recommendation of Mr. Crawford, State fish commissioner, the Washington legislature enacted a law protecting these oysters.*

Four months later Mr. N. B. Miller, of the United States Fish Commission steamer *Albatross*, examined this bed by tonging and found its condition to be excellent. State Commissioner Crawford, having tonged up enough to ascertain the general condition of the bed in October, 1895, reported that the oysters were doing well. Very few dead shells were found, while the oysters that were opened were fat and well-flavored. The placing of spat-collectors in the vicinity of this bed is a work that should be arranged for at the proper season.

The good condition of oysters after a year in the waters of Willapa Bay is sufficient evidence as to the suitability of the region for oyster-growing from imported seed, after the method employed at San Francisco. Many cultivators of the native oysters are anxious to try the bedding of eastern seed, but shipping rates at present are so high as to be prohibitory, the freight charges on a carload of oysters (31,200 pounds) shipped by the Fish Commission from New York to Willapa Bay in October, 1894, having amounted to $784.80.

The conditions for the acclimation of this oyster in Willapa Bay seem favorable, the summer temperature of the water being but little colder than in San Francisco Bay, according to our present knowledge of the subject, while the nature of the bottom is such that young oysters have wide tracts of shelly reefs upon which to settle and grow. The protection of oyster beds by closely driven stakes is here unnecessary, the stingray, so destructive to oysters in California waters, not being found here.

* For the laws of Washington respecting oysters, see the writer's report on Oyster Resources of the Pacific Coast, previously quoted.

The following notes on the temperature of Willapa Bay are taken from the writer's first report on the subject:

It is not unlikely that the summer temperature of the extreme southern part of Willapa Bay may be close to that of San Francisco, and that eastern oysters would propagate there. From the shelly nature of the bottom they might be expected to do well, provided the conditions of temperature were similar. It is certain that the native oysters of this bay breed freely at San Francisco. We know nothing as yet about the summer temperature of the water in this bay, except as it is indicated by observations made by the Coast Survey steamer *Gedney* in the northern part. The temperature even there may be higher than the following table indicates, as the observations were all made at 4 a. m., when the temperature is usually lowest, day temperatures being as a rule higher. Ranging, as it does, usually no lower than 60° at 4 a. m. for August and for that part of July covered by the record, it is probable that the temperature would not be lower than 65° for afternoon observations. Assuming a summer temperature of 60° to 65° for that part of the bay nearest the sea, we may reasonably expect to find the water decidedly warmer in those parts of the bay 15 or 20 miles back from the sea. A careful study of the temperature of this locality would, no doubt, yield important information.

Surface temperatures taken at 4 a. m., daily, by the United States Coast Survey steamer Gedney, in Willapa Bay, 1890.

Locality.	Date.	Temp.	Locality.	Date.	Temp.
		°F.			°F.
North Cove	July 26	57	North Cove	Sept. 4	58
Do	27	62	Do	5	58
Do	28	58	Do	6	59
Do	29	61	Do	8	59
Do	30	60	Do	9	56
Do	31	62	Do	15	58
Toke Point	Aug. 1	61	Do	16	59
South Bend	2	65	Do	17	52
Do	3	65	Do	20	55
Do	4	64	Do	23	54
North Cove	5	60	Willapa Bay	24	55
Do	6	61	Do	27	53
Toke Point	7	61	North Cove	29	60
South Bend	10	61	South Bend	Oct. 5	56
Toke Point	12	62	Do	6	56
Do	13	62	Do	8	54
Do	14	63	Do	9	55
Do	15	63	Do	12	54
Do	16	60	Do	13	54
South Bend	17	64	Do	17	52
Do	18	64	Do	18	52
Willapa Bay	19	60	Do	19	54
Sunshine (Nasal River)	20	60	Do	21	52
Sealand	21	61	Sunshine (Nasal River)	23	53
Do	22	62	Do	25	53
Do	23	62	Do	27	54
Do	24	63	Do	29	53
Do	25	62	Do	Nov. 2	56
North Cove	29	62	Do	4	54
Do	30	62	Do	5	52
Do	31	59	North Cove	8	50
Do	Sept. 3	58			

From March 18 to April 5, 1895, Mr. N. B. Miller, of the Fish Commission steamer *Albatross*, was engaged in studying the temperature and specific gravity of the water in Willapa Bay. Commencing on the 18th of March, with the Willapa River at South Bend, about 3 miles above where it enters the bay, temperatures and specific-gravity observations were taken hourly from 7 a. m. until 7 p. m. The specific gravity gradually decreased during the fall of the tide, which is about 10 feet, from 1.0105 at high water at 7 a. m. to 1.0065 at low water at

1 p. m. It gradually increased from this time to 1.0111 at 7 p. m., high water. The temperature was 47° F. On March 19 there was a slight increase in density caused by a strong wind backing the waters of the bay into the river, and the tide did not fall as low as on the previous day. Observations were continued on March 20 at Toke Point, on the north shore of the bay. The specific gravity was much higher than at any other station occupied, being 1.0205 at high water and 1.0141 at low water; temperature 47°. On March 21 the density was 1.0209 at high water, temperature 47°, and 1.0136 at low water, temperature 46°. At Bay Center, opposite the mouth of Palux River, on March 22, the density changed from 1.0182 at high water to 1.0110 at low water; temperature 46°. On March 23 and 24 at the same place, with lower tides, the density was found to be lower. On March 25, in the channel of Palux River, the surface density at low water was 1.0098 and at high water 1.0176. At a depth of 18 feet, high water, the density was 1.0180; temperature in each case 46°.

Before leaving Palux Channel Mr. Miller examined the deposit of eastern oysters I had made there four months before. Eighty-three live oysters were tonged up and only seven empty shells. The condition of the edges of their shells showed them to be growing. At Sealand on March 26 the high-water density was 1.0173, with a temperature of 48°, and on March 27, 1.0152 at low water, increasing to 1.0176 at high water; temperature 48°.

On March 28 at Oysterville the lowest surface density at low water was 1.0164, and at a depth of 35 feet, 1.0165; temperature 49°. At high water the surface density was 1.0178, and at 35 feet the same; temperature 49°. On March 29 the low-water density was 1.0159, temperature 48°; high water 1.0174, temperature 49°.

At Sunshine on March 31 the density decreased from 1.0100 at 8 a. m. to 1.0062 at noon, when it was low water. It then increased to 1.0108 at high water. On April 1 low-water density 1.0062, high water 1.0116, temperature 49°. On April 3 the high-water surface density was 1.0106, temperature 49°, and at a depth of 20 feet 1.0108.

At High Point on April 2 the water was quite fresh, the density being 1.0033, temperature 49°; at high water it was only 1.0084. On April 4 at high water it was 1.0081, at low-water 1.0027; temperature 48°.

Surface observations made from the steamer between Sealand and South Bend showed a low-water density of 1.0148; temperature 49°.

In this work on Willapa Bay observations were as a rule made hourly throughout the day. The specific gravities have been reduced to 15° C. The specimens of water from below the surface were secured with the Sigsbee water bottle.

KODIAK MARINE FISHERIES CENTER
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Record of temperatures and specific gravities.

Date.	Time of day.	Station.	Locality.	Depth.	Temperature of water.	Temperature of air.	Temp. of specimen at time specific gravity was taken.	Specific gravity observed.	Specific gravity reduced to 15° C.	Remarks.
1895.					°F.	°F.	°F.			
Mar. 18	7 a. m.	1	South Bend	Surface.	47	48	47	1.0126	1.0105	High water.
18	8 a. m.	1	do	do	47	48	47	1.0112	1.0101	Ebb tide.
18	9 a. m.	1	do	do	47	50	47	1.0110	1.0089	Do.
18	10 a. m.	1	do	do	47	52	47	1.0108	1.0087	Do.
18	11 a. m.	1	do	do	47	54	47	1.0108	1.0087	Do.
18	12 m	1	do	do	47	53	47	1.0105	1.0084	Do.
18	1 p. m.	1	do	do	48	51	48	1.0086	1.0065	Low water.
18	2 p. m.	1	do	do	48	51	48	1.0088	1.0067	Flood water.
18	3 p. m.	1	do	do	48	48	48	1.0094	1.0073	Do.
18	4 p. m.	1	do	do	48	50	48	1.0104	1.0083	Do.
18	5 p. m.	1	do	do	47	50	47	1.0110	1.0089	Do.
18	6 p. m.	1	do	do	47	48	47	1.0124	1.0103	Do.
18	7 p. m.	1	do	do	47	48	47	1.0132	1.0111	High water.
19	8 a. m.	1	do	do	47	47	47	1.0144	1.0123	Do.
19	9 a. m.	1	do	do	48	48	48	1.0142	1.0121	Ebb tide.
19	10 a. m.	1	do	do	48	49	48	1.0138	1.0117	Do.
19	11 a. m.	1	do	do	48	49	48	1.0134	1.0113	Do.
19	12 m	1	do	do	48	49	48	1.0134	1.0113	Do.
19	1 p. m.	1	do	do	48	49	48	1.0124	1.0103	Do.
19	2 p. m.	1	do	do	47	49	47	1.0122	1.0101	Do.
19	3 p. m.	1	do	do	47	48	47	1.0114	1.0123	Do.
19	4 p. m.	1	do	do	47	48	47	1.0102	1.0081	Low water.
19	5 p. m.	1	do	do	47	46	47	1.0110	1.0089	Flood tide.
19	6 p. m.	1	do	do	47	46	47	1.0116	1.0095	Do.
19	7 p. m.	1	do	do	47	45	47	1.0120	1.0099	Do.
20	8 a. m.	2	Toke Point	do	48	47	48	1.0220	1.0205	High water.
20	9 a. m.	2	do	do	47	47	47	1.0218	1.0197	Ebb tide.
20	10 a. m.	2	do	do	47	48	47	1.0214	1.0193	Do.
20	11 a. m.	2	do	do	47	48	47	1.0210	1.0189	Do.
20	12 m	2	do	do	47	49	47	1.0200	1.0179	Do.
20	1 p. m.	2	do	do	47	51	47	1.0194	1.0173	Do.
20	2 p. m.	2	do	do	47	53	47	1.0180	1.0159	Do.
20	3 p. m.	2	do	do	47	50	47	1.0162	1.0141	Low water.
20	4 p. m.	2	do	do	47	49	47	1.0166	1.0145	Flood tide.
21	8 a. m.	2	do	do	46	47	46	1.0220	1.0198	Do.
21	9 a. m.	2	do	do	46	47	46	1.0224	1.0209	High water.
21	10 a. m.	2	do	do	46	48	46	1.0216	1.0194	Ebb tide.
21	11 a. m.	2	do	do	46	48	46	1.0210	1.0188	Do.
21	12 m	2	do	do	46	50	46	1.0204	1.0182	Do.
21	1 p. m.	2	do	do	46	51	46	1.0194	1.0172	Do.
21	2 p. m.	2	do	do	46	53	46	1.0182	1.0160	Do.
21	3 p. m.	2	do	do	46	52	46	1.0160	1.0138	Do.
21	4 p. m.	2	do	do	46	49	46	1.0158	1.0136	Low water.
22	10 a. m.	3	Bay Center	do	46	45	46	1.0194	1.0172	Flood tide.
22	11 a. m.	3	do	do	46	45	46	1.0202	1.0180	Do.
22	12 m	3	do	do	46	45	46	1.0204	1.0182	High water.
22	1 p. m.	3	do	do	46	45	46	1.0200	1.0178	Ebb tide.
22	2 p. m.	3	do	do	46	45	46	1.0192	1.0120	Do.
22	3 p. m.	3	do	do	46	45	46	1.0174	1.0152	Do.
22	4 p. m.	3	do	do	46	45	46	1.0162	1.0140	Do.
22	5 p. m.	3	do	do	46	45	46	1.0154	1.0132	Do.
22	6 p. m.	3	do	do	46	45	46	1.0132	1.0110	Low water.
23	8 a. m.	3	do	do	46	48	46	1.0180	1.0158	Flood tide.
23	9 a. m.	3	do	do	46	48	46	1.0188	1.0167	Do.
23	10 a. m.	3	do	do	46	52	46	1.0194	1.0173	High water.
23	11 a. m.	3	do	do	46	54	46	1.0194	1.0172	Ebb tide.
23	12 m	3	do	do	46	56	46	1.0192	1.0170	Do.
23	1 p. m.	3	do	do	46	53	46	1.0190	1.0170	Do.
23	2 p. m.	3	do	do	46	53	46	1.0186	1.0164	Do.
23	3 p. m.	3	do	do	46	53	46	1.0172	1.0150	Do.
23	4 p. m.	3	do	do	46	50	46	1.0158	1.0136	Do.
23	5 p. m.	3	do	do	46	49	46	1.0140	1.0118	Do.
23	6.30 p. m.	3	do	do	46	45	46	1.0124	1.0102	Low water.
24	8 a. m.	3	do	do	46	48	46	1.0172	1.0150	Flood tide.
24	9 a. m.	3	do	do	46	48	46	1.0184	1.0162	Do.
24	10 a. m.	3	do	do	46	51	46	1.0188	1.0166	Do.
24	11 a. m.	3	do	do	46	52	46	1.0190	1.0174	High water.
24	12 m	3	do	do	46	55	46	1.0194	1.0172	Ebb tide.
24	1 p. m.	3	do	do	46	56	46	1.0186	1.0164	Do.
24	2 p. m.	3	do	do	46	56	46	1.0182	1.0160	Do.
24	3 p. m.	3	do	do	46	55	46	1.0174	1.0152	Do.
24	4 p. m.	3	do	do	46	53	46	1.0160	1.0138	Do.

Record of temperatures and specific gravities—Continued.

Date.	Time of day.	Station.	Locality.	Depth.	Temperature of water.	Temperature of air.	Temp. of specimen at time specific gravity was taken.	Specific gravity observed.	Specific gravity reduced to 15° C.	Remarks.
1895.					°F.	°F.	°F.			
Mar. 24	5 p. m.	3	Bay Center	Surface.	46	49	46	1.0146	1.0124	Ebb tide.
24	6 p. m.	3	do	do	46	47	46	1.0128	1.0106	Do.
24	7 p. m.	3	do	do	46	47	46	1.0122	1.0100	Low water.
25	7 a. m.	4	Channel, Bay Center.	do	46	48	46	1.0126	1.0104	Do.
25	7.15 a. m.	5	do	do	46	48	46	1.0126	1.0104	Do.
25	7.30 a. m.	6	do	do	46	48	46	1.0124	1.0102	Do.
25	7.50 a. m.	7	do	do	46	49	46	1.0124	1.0102	Do.
25	8.10 a. m.	8	do	do	46	49	46	1.0120	1.0098	Do.
25	12 m	9	do	do	46	51	46	1.0198	1.0176	High water.
25	do	9	do	18 feet	.....	53	46	1.0202	1.0180	Do.
25	12.20 p. m.	10	do	Surface.	46	53	46	1.0198	1.0176	Do.
25	do	10	do	18 feet	.....	53	46	1.0200	1.0178	Do.
25	12.40 p. m.	11	do	Surface.	46	55	46	1.0196	1.0174	Do.
25	do	11	do	18 feet	.....	55	46	1.0200	1.0178	Do.
25	1.20 p. m.	12	do	Surface.	46	56	46	1.0190	1.0168	Do.
25	do	12	do	18 feet	.....	56	46	1.0208	1.0186	Do.
26	12 m	13	Sealand	Surface.	48	57	48	1.0190	1.0169	Flood tide.
26	1 p. m.	13	do	do	48	57	48	1.0192	1.0171	Do.
26	2 p. m.	13	do	do	48	57	48	1.0194	1.0173	High water.
26	3 p. m.	13	do	do	48	56	48	1.0192	1.0171	Ebb tide.
26	4 p. m.	13	do	do	48	56	48	1.0190	1.0169	Do.
26	5 p. m.	13	do	do	48	55	48	1.0186	1.0165	Do.
26	6 p. m.	13	do	do	48	54	48	1.0182	1.0161	Do.
26	7 p. m.	13	do	do	48	52	48	1.0176	1.0155	Do.
27	7 a. m.	13	do	do	49	51	49	1.0175	1.0155	Do.
27	8 a. m.	13	do	do	49	53	49	1.0172	1.0152	Low water.
27	9 a. m.	13	do	do	49	53	49	1.0180	1.0160	Flood tide.
27	10 a. m.	13	do	do	49	53	49	1.0184	1.0164	Do.
27	11 a. m.	13	do	do	49	54	49	1.0186	1.0166	Do.
27	12 m	13	do	do	49	55	49	1.0190	1.0170	Do.
27	1 p. m.	13	do	do	49	56	49	1.0194	1.0174	Do.
27	2 p. m.	13	do	do	49	56	49	1.0194	1.0174	Do.
27	3 p. m.	13	do	do	49	56	49	1.0196	1.0176	High water.
27	4 p. m.	13	do	do	49	55	49	1.0196	1.0176	Ebb tide.
27	5 p. m.	13	do	do	49	53	49	1.0190	1.0170	Do.
27	6 p. m.	13	do	do	49	51	49	1.0184	1.0164	Do.
27	7 p. m.	13	do	do	49	51	49	1.0178	1.0158	Do.
28	7 a. m.	14	Channel, Sealand.	do	49	50	49	1.0180	1.0160	Do.
28	do	14	do	25 feet	.....	50	49	1.0182	1.0162	Do.
28	8 a. m.	15	do	Surface.	49	52	49	1.0180	1.0160	Do.
28	do	15	do	35 feet	.....	52	49	1.0182	1.0162	Do.
28	9 a. m.	16	do	Surface.	49	53	49	1.0174	1.0154	Low water.
28	do	16	do	35 feet	.....	53	49	1.0176	1.0156	Do.
28	9.30 a. m.	17	do	Surface.	49	53	49	1.0174	1.0151	Do.
28	do	17	do	35 feet	.....	53	49	1.0177	1.0157	Do.
28	10.15 a. m.	18	do	Surface.	49	54	49	1.0176	1.0156	Do.
28	do	18	do	35 feet	.....	54	49	1.0178	1.0158	Do.
28	11.05 a. m.	19	do	Surface.	49	54	49	1.0178	1.0158	Do.
28	do	19	do	35 feet	.....	54	49	1.0180	1.0160	Do.
28	1 p. m.	20	Channel, off Oysterville.	Surface.	49	55	49	1.0184	1.0164	Flood tide.
28	do	20	do	35 feet	.....	55	49	1.0185	1.0165	Do.
28	1.30 p. m.	21	do	Surface.	49	56	49	1.0188	1.0168	Do.
28	do	21	do	35 feet	.....	56	49	1.0188	1.0168	Do.
28	2.05 p. m.	22	do	Surface.	49	55	49	1.0192	1.0172	Do.
28	do	22	do	35 feet	.....	55	49	1.0194	1.0174	Do.
28	3 p. m.	23	do	Surface.	49	54	49	1.0194	1.0174	Do.
28	do	23	do	35 feet	.....	54	49	1.0195	1.0175	Do.
28	4 p. m.	24	do	Surface.	49	52	49	1.0198	1.0178	High water.
28	do	24	do	35 feet	.....	52	49	1.0198	1.0178	Do.
29	10 a. m.	25	do	Surface.	48	46	48	1.0180	1.0159	Low water.
29	11 a. m.	25	do	do	48	46	48	1.0182	1.0161	Flood tide.
29	12 m	25	do	do	48	48	48	1.0182	1.0161	Do.
29	1 p. m.	25	do	do	48	50	48	1.0184	1.0163	Do.
29	2 p. m.	25	do	do	48	51	48	1.0186	1.0165	Do.
29	3 p. m.	25	do	do	49	51	49	1.0190	1.0170	Do.
29	4 p. m.	25	do	do	49	49	49	1.0192	1.0172	Do.
29	5 p. m.	25	do	do	49	47	49	1.0194	1.0174	High water.
31	8 a. m.	26	Sunshine	do	49	53	49	1.0120	1.0100	Ebb tide.
31	9 a. m.	26	do	do	49	54	49	1.0114	1.0094	Do.

Record of temperatures and specific gravities—Continued.

Date.	Time of day.	Station.	Locality.	Depth.	Temperature of water.	Temperature of air.	Temp. of specimen at time specific gravity was taken.	Specific gravity observed.	Specific gravity reduced to 15° C.	Remarks.
1895.					°F.	°F.	°F.			
Mar. 31	10 a. m.	26	Sunshine	Surface.	49	54	49	1.0090	1.0070	Ebb tide.
31	11 a. m.	26	do	do	49	53	49	1.0082	1.0062	Do.
31	12 m	26	do	do	49	53	49	1.0082	1.0062	Low water.
31	1 p. m.	26	do	do	49	53	49	1.0086	1.0066	Flood tide.
31	2 p. m.	26	do	do	49	53	49	1.0094	1.0074	Do.
31	3 p. m.	26	do	do	49	52	49	1.0112	1.0092	Do.
31	4 p. m.	26	do	do	49	52	49	1.0122	1.0102	Do.
31	5 p. m.	26	do	do	49	50	49	1.0128	1.0108	High water.
31	6 p. m.	26	do	do	49	49	49	1.0116	1.0096	Ebb tide.
Apr. 1	8 a. m.	26	do	do	49	48	49	1.0126	1.0106	Do.
1	9 a. m.	26	do	do	49	49	49	1.0122	1.0102	Do.
1	10 a. m.	26	do	do	49	49	49	1.0106	1.0086	Do.
1	11 a. m.	26	do	do	49	49	49	1.0092	1.0072	Do.
1	12 m	26	do	do	49	49	49	1.0082	1.0062	Do.
1	1 p. m.	26	do	do	49	49	49	1.0082	1.0062	Low water.
1	2 p. m.	26	do	do	49	51	49	1.0088	1.0068	Flood tide.
1	3 p. m.	26	do	do	49	50	49	1.0092	1.0072	Do.
1	4 p. m.	26	do	do	49	50	49	1.0116	1.0096	Do.
1	5 p. m.	26	do	do	49	50	49	1.0134	1.0114	Do.
1	6 p. m.	26	do	do	49	48	49	1.0136	1.0116	High water.
2	9 a. m.	26	Channel, Sunshine.	do	49	48	49	1.0126	1.0106	Ebb tide.
2	do	27	do	20 feet		48	49	1.0126	1.0106	Do.
2	9.20 a. m.	28	do	Surface.	49	48	49	1.0126	1.0106	Do.
2	do	28	do	20 feet		48	49	1.0128	1.0108	Do.
2	10 a. m.	29	do	Surface.	49	48	49	1.0122	1.0102	Do.
2	do	29	do	20 feet		48	49	1.0126	1.0106	Do.
2	11.10 a. m.	30	do	Surface.	49	49	49	1.0118	1.0098	Do.
2	do	30	do	20 feet		49	49	1.0119	1.0099	Do.
2	12 m	31	do	Surface.	49	51	49	1.0096	1.0076	Do.
3	9 a. m.	32	Channel, High Point.	do	49	48	49	1.0104	1.0084	High water.
3	9.30 a. m.	33	do	do	49	48	49	1.0102	1.0082	Do.
3	10 a. m.	34	do	do	49	50	49	1.0104	1.0084	Do.
3	11 a. m.	35	do	do	49	52	49	1.0096	1.0076	Ebb tide.
3	11.30 a. m.	36	do	do	49	52	49	1.0094	1.0074	Do.
3	12.10 p. m.	37	do	do	49	53	49	1.0090	1.0070	Do.
3	2.30 p. m.	38	High Point	do	48	53	48	1.0054	1.0033	Low water.
3	3 p. m.	38	do	do	48	52	48	1.0054	1.0033	Flood tide.
3	4 p. m.	38	do	do	48	50	48	1.0060	1.0039	Do.
3	5 p. m.	38	do	do	48	48	48	1.0068	1.0047	Do.
3	6 p. m.	38	do	do	48	47	48	1.0082	1.0061	Do.
3	7 p. m.	38	do	do	48	46	48	1.0088	1.0067	High water.
4	8 a. m.	38	do	do	48	49	48	1.0082	1.0061	Ebb tide.
4	9 a. m.	38	do	do	48	49	48	1.0076	1.0055	Do.
4	10 a. m.	38	do	do	48	49	48	1.0072	1.0051	Do.
4	11 a. m.	38	do	do	48	49	48	1.0070	1.0049	Do.
4	12 m	38	do	do	48	50	48	1.0068	1.0047	Do.
4	1 p. m.	38	do	do	48	51	48	1.0060	1.0039	Do.
4	2 p. m.	38	do	do	48	53	48	1.0052	1.0031	Do.
4	3 p. m.	38	do	do	48	53	48	1.0048	1.0027	Low water.
4	4 p. m.	38	do	do	48	51	48	1.0050	1.0029	Flood tide.
4	5 p. m.	38	do	do	48	48	48	1.0064	1.0043	Do.
4	6 p. m.	38	do	do	48	47	48	1.0082	1.0061	Do.
4	7 p. m.	38	do	do	48	46	48	1.0102	1.0081	Do.
5	2.30 p. m.	39	Channel near entrance of bay.	do	49	53	49	1.0168	1.0148	Low water.
5	2.40 p. m.	40	do	do	49	53	49	1.0168	1.0148	Do.
5	2.50 p. m.	41	do	do	49	53	49	1.0170	1.0150	Do.
5	3.05 p. m.	42	do	do	49	52	49	1.0172	1.0152	Do.
5	3.20 p. m.	43	do	do	49	52	49	1.0170	1.0150	Do.

4.—DESCRIPTION OF A NEW SPECIES OF SHAD (ALOSA ALABAMÆ) FROM ALABAMA.

By Barton Warren Evermann, Ph. D.,

Ichthyologist of the United States Fish Commission.

On April 10, 1896, the United States Fish Commission received from Tuscaloosa, Ala., through the kindness of Mr. J. H. Fitts, of that city, four specimens of shad which had been caught in the Black Warrior River. Upon comparing these specimens with numerous examples of the common shad (*Alosa sapidissima*) from the Potomac and other shad streams of the Atlantic coast, they were found to belong to an entirely distinct and undescribed species.

In view of the importance of this discovery, it is thought desirable to publish this preliminary description in advance of a more complete report upon the species.

Alosa alabamæ Jordan & Evermann, new species.

Types: No. 47689, U. S. National Museum, a female, total length 15 inches; and No. 47690, U. S. National Museum, a male, total length 15 inches.

Type locality: Black Warrior River, Tuscaloosa, Ala.

Collector: J. H. Fitts, esq.

Description of female: Head $4\frac{2}{5}$; depth 3; snout $4\frac{1}{2}$; eye $4\frac{1}{3}$; maxillary $2\frac{1}{8}$. Dorsal 15; anal 20; scales 55, —16 in a crosswise series; scutes 21+15; vertebræ 54; gillrakers 24+44 and 25+43=68.

Body deep; back gently and evenly arched from tip of snout to origin of dorsal fin, thence descending in a regular curve to base of caudal fin; ventral outline nearly straight from tip of mandible to ventrals, and also from there to base of caudal. Head small, snout pointed; upper lip with a small notch, into which fits the tip of the slightly projecting lower jaw; maxillary narrow; cheek much deeper than long; teeth on tongue and maxillary scarcely perceptible.

Origin of dorsal nearer snout than base of caudal, the fin low, the longest ray shorter than the base, or about equal to snout and eye; base of anal somewhat greater than that of dorsal, or equal to length of pectoral. Gillrakers 68, the longest about equal to length of snout. Peritoneum pale.

Color as in *Alosa sapidissima;* the caudal, dorsal, and pectoral fins rather darker tipped.

The male differs from the female only in being somewhat more slender.

This species differs from *Alosa sapidissima* chiefly in the fewer gill-rakers, its sharper, more pointed snout, smaller notch in upper jaw, more projecting mandible, and more slender maxillary. It seems to reach maturity at a much smaller size than the common shad.

The difference in the number of gillrakers is remarkable, and, with the other differences, shows clearly that the Alabama shad is a perfectly distinct species.

In 1882, Dr. Jordan collected a number of young shad at Pensacola, Fla., and believing them to be new, sent a description of the supposed new species to the National Museum. The manuscript was subsequently withdrawn and has never been published, though he has never had much doubt as to the distinctness of the species.

An examination of the Pensacola specimens, now in the National Museum, shows them to be identical with those from Black Warrior River.

This is undoubtedly the native shad of the Gulf of Mexico and tributary streams, though it is probably less abundant in those waters than *Alosa sapidissima*, which has been extensively introduced there by the United States Fish Commission.

While studying the specimens of the Alabama shad, a large number of shad from the Atlantic coast streams were examined.

The following table shows the number of gillrakers in the various specimens examined:

Table showing number of gillrakers in shad from different waters.

River.	No.	Number on first arch on right side.	Number on first arch on left side.
Black Warrior River	1	24+44= 68	23+45= 68
	2	24+44= 68	24+45= 69
	3	24+42= 66	24+43= 67
	4	*24+40=	23+41= 64
Pensacola, Fla	1	22+34= 56	22+36= 58
	2	23+36= 59	23+39= 62
	3	22+38= 60	22+36= 58
	4	20+40= 60	20+40= 60
	5	20+38= 58	21+39= 60
	6	22+38= 60	21+38= 59
	7	20+39= 59	20+40= 60
North Carolina	1	40+58= 98	41+59=100
	2	43+61=104	43+63=106
	3	40+58= 98	39+58= 97
	4	35+62= 97	34+61= 95
	5	37+62= 99	39+57= 96
	6	36+60= 96	37+60= 97
Potomac River	1	36+60= 96	36+60= 96
	2	37+67=104	36+66= 99
	3	37+67=104	38+68=106
	4	37+67=104	37+68=105
	5	37+56= 93	37+56= 93
	6	37+64=101	37+65=102
	7	37+57= 94	37+60= 97
	8	40+62=102	39+66=105

Table showing number of gillrakers in shad from different waters—Continued.

River.	No.	Number on first arch on right side.	Number on first arch on left side.
Susquehanna River	1	36+66=102	35+64= 99
	2	36+67=103	39+67=106
	3	36+66=102	37+68=105
	4	34+64= 98	34+64= 98
Delaware River	1	35+65=100	35+64= 99
	2	36+64=100	37+68=105
	3	39+70=109	38+69=107
	4	36+65=101	37+68=105
	5	39+66=105	37+64=101
	6	34+63= 97	38+60= 98
	7	39+68=107	40+68=108
	8	43+73=116	45+73=118
Hudson River	1	37+58= 95	38+62=100
	2	37+56= 93	38+59= 97
	3	*37+46= 83	*37+47= 84
	4	41+68=109	41+66=107
	5	40+69=109	40+69=109
	6	43+76=119	44+75=119
	7	42+69=111	40+68=108
Connecticut River	1	40+68=108	38+68=106
	2	34+66=101	36+68=104
	3	35+66=101	34+67=101
	4	37+70=107	40+65=105
	5	39+67=106	38+68=106
	6	39+70=109	39+68=107
	7	40+69=109	42+67=109
	8	39+70=109	43+67=110
	9	40+68=108	39+69=108
	10	41+75=116	41+75=116

*Mutilated; count uncertain.

WASHINGTON, D. C., *August 1, 1896.*

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A CHECK-LIST

OF THE

FISHES AND FISH-LIKE VERTEBRATES

OF

NORTH AND MIDDLE AMERICA.

BY

DAVID STARR JORDAN, PH. D.,
President of Leland Stanford Jr. University and of the California Academy of Sciences,

AND

BARTON WARREN EVERMANN, PH. D.,
Ichthyologist of the United States Fish Commission.

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5.—A CHECK-LIST OF THE FISHES AND FISH-LIKE VERTEBRATES OF NORTH AND MIDDLE AMERICA.

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DAVID STARR JORDAN, PH. D.,
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Ichthyologist of the United States Fish Commission.

PREFACE.

The present paper is a list of all the species of fishes and fish-like vertebrates thus far recorded as occurring in American waters north of the Isthmus of Panama. For the sake of greater completeness the marine fishes of Guiana, Ecuador, and the Galapagos Islands are included, as all of these are sure, sooner or later, to be found within our limits. In like manner the few species known from Kamchatka are included as part of the fauna of the Alaskan Sea.

The sequence and nomenclature is that of Jordan & Evermann, "Fishes of North and Middle America," a descriptive catalogue forming Bulletin 47 of the United States National Museum. Of this work, Volume I, *Branchiostomatidæ* to *Priacanthidæ*, is now printed, but not published; Volume II is still in manuscript. It is expected that both will be published within the present year. The differences between the nomenclature given in this check-list and that of the work in question arise from the incorporation of new material into the one work after the printing of the other.

In both these memoirs, the rules of nomenclature as laid down by the American Ornithologists' Union have been followed implicitly, with two exceptions. The first of these exceptions concerns Canon XVII, 2, which gives to specific names applied to males precedence over names used for females, when the two occur on the same page. In such cases of synchronous names we have awarded priority to the name standing first on the page, regardless of other considerations. The other exception is the rule abandoning a name (as *Scaphirhynchus*,

Xiphidion, *Canthidermis*, etc.) when a prior generic name is of like etymology and of nearly the same spelling (as *Scaphorhynchus*, *Xiphidium*, or *Acanthoderma*). We regard all generic names as different unless originally spelled alike, and the original orthography (misprints aside) is in all cases retained.

With each species is given its geographical range, so far as known, and a reference to the first description under the specific name adopted by us. The locality following this reference is the type locality of the species. The name in parenthesis following the reference to the generic name is that of the species taken by the describer as the type of the genus.

At the end of the catalogue of native species will be found a list of the principal introduced species, especially those which have become well established in American waters.

The authors desire to acknowledge their indebtedness to Dr. Theodore Gill for valuable assistance in various ways in the preparation of this catalogue. His wide acquaintance with zoological literature has enabled them to complete and verify many references which otherwise might have remained incomplete or erroneous.

Thanks are also due Mr. Barton A. Bean for assistance in the verification of references.

DAVID STARR JORDAN.
BARTON WARREN EVERMANN.

PALO ALTO, CALIFORNIA, *May 21, 1896.*

CHECK-LIST OF THE FISHES AND FISH-LIKE VERTEBRATES OF NORTH AND MIDDLE AMERICA.

Class I. LEPTOCARDII. The Lancelets.

Order A. AMPHIOXI. The Cirrostomes.

Family I. BRANCHIOSTOMATIDÆ. The Lancelets.

Genus 1. BRANCHIOSTOMA Costa.

Branchiostoma Costa, Cenni Zoologici Napol., 49, 1834 (*lubricum* = *lanceolatum*).

1. **Branchiostoma lanceolatum** (Pallas). *European Lancelet; Amphioxus.*

Mediterranean; southern England; Scandinavia; Chesapeake Bay.
Limax lanceolatus Pallas, Spicilegia Zool., x, 19, 1774, Cornwall.

2. **Branchiostoma caribæum** Sundevall. *West Indian Lancelet.*

Atlantic coast of America from Beaufort, N. C., to the mouth of the La Plata; abundant off the Carolina coast and in localities in Florida (Port Tampa), Jamaica, Brazil, etc.
Branchiostoma caribæum Sundevall, Ölfers, Vet. Akad. Förhandl. 1853, 12, St. Thomas; Rio Janeiro.

3. **Branchiostoma californiense** Gill. *California Lancelet.*

Pacific coast of North America from San Diego Bay southward.
Branchiostoma californiensis Gill, in Andrews, Studies Biol. Lab. Johns Hopkins Univ., v, 241, 1893, San Diego, California.

Genus 2. ASYMMETRON Andrews.

Asymmetron Andrews, Studies Biol. Lab. Johns Hopkins Univ., v, 237, 1893 (*lucayanum*).

4. **Asymmetron lucayanum** Andrews. *Bahama Lancelet.*

Bemini and Nassau, Bahamas.
Asymmetron lucayanum Andrews, Studies Biol. Lab. Johns Hopkins Univ., v, 237, 1893, Bemini, Bahama Islands.

Class II. MARSIPOBRANCHII. The Lampreys.

Order B. HYPEROTRETI. The Hagfishes.

Family II. HEPTATREMIDÆ. The Borers.

Genus 3. POLISTOTREMA Gill.

Polistotrema Gill, Proc. U. S. Nat. Mus. 1880, 30 (*dombey*).

5. **Polistotrema stouti** (Lockington). *California Hagfish; Lamperina.*

Coast of California; Monterey.
Bdellostoma stouti Lockington, Amer. Nat. 1878, 793, Eel River, California.

Family III. MYXINIDÆ. The Hagfishes.

Genus 4. MYXINE Linnæus.

Myxine Linnæus, Systema Naturæ, ed. x, 650, 1758 (*glutinosa*).

6. **Myxine glutinosa** Linnæus. *Hagfish; Borer.*

North Atlantic, on both coasts. Not abundant in America; south to Delaware.
Myxine glutinosa Linnæus, Syst. Nat., ed. x, 650, 1758, Atlantic Ocean.

Order C. HYPEROARTII. The Lampreys.

Family IV. PETROMYZONIDÆ. The Lampreys.

Genus 5. BATHYMYZON Gill.

Bathymyzon Gill, Proc. U. S. Nat. Mus. 1883, 254 (*bairdii*).

7. Bathymyzon bairdii Gill.

Gulf Stream.

Petromyzon (*Bathymyzon*) *bairdii* Gill, Proc. U. S. Nat. Mus. 1883, 254, Gulf Stream at lat. 49° N., in 547 fathoms.

Genus 6. PETROMYZON (Artedi) Linnæus.

Petromyzon (Artedi) Linnæus, Systema Naturæ, ed. x, 230, 1758 (*marinus*).

8. Petromyzon marinus Linnæus. *Great Sea Lamprey; Lamprey Eel.*

Atlantic coasts of Europe and North America, southward to Chesapeake Bay.

Petromyzon marinus Linnæus, Syst. Nat., ed. x, 230, 1758, European seas; after Artedi.

8a. Petromyzon marinus unicolor (DeKay).

Lakes of northern and central New York.

Ammocœtes unicolor DeKay, N. Y. Fauna: Fishes, 383, 1842, Lake Champlain.

Genus 7. ICHTHYOMYZON Girard. *River Lampreys.*

Ichthyomyzon Girard, Pac. R. R. Surv., x, 381, 1858 (*argenteus*).

9. Ichthyomyzon concolor (Kirtland). *Silvery Lamprey.*

Great Lakes, Upper Mississippi Valley, and Rainy River.

Ammocœtes concolor Kirtland, Bost. Jour. Nat. Hist., III, 1840, 473, with plate, Mahoning and Scioto rivers, Ohio.

10. Ichthyomyzon castaneus Girard.

Mississippi Valley.

Ichthyomyzon castaneus Girard, Pac. R. R. Surv., x, 381, 1858, Galena, Minn.

Genus 8. ENTOSPHENUS Gill.

Entosphenus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 331 (*tridentatus*).

11. Entosphenus tridentatus (Gairdner).

Pacific Coast of America, Unalaska to southern California.

Petromyzon tridentatus Gairdner, in Richardson, Fauna Bor.-Am., 293, 1836, Falls of the Walamet (now Willamette) River, Oregon.

Genus 9. LAMPETRA Gray. *Brook Lampreys.*

Lampetra Gray, Proc. Zool. Soc. Lond. 1851, 235 (*fluvialis*).

12. Lampetra aurea (Bean).

Yukon River and streams of Alaska and Kamchatka.

Ammocœtes aureus Bean, Proc. U. S. Nat. Mus. 1881, 159, Yukon River

13. Lampetra spadicea Bean.

Guanajuato, Mexico.

Lampetra spadicea Bean, Proc. U. S. Nat. Mus. 1887, 374, Guanajuato.

14. Lampetra ciburia (Girard).

Pacific slope of America, from Fraser River to the Sacramento.

Ammocœtes cibarius Girard, Pac. R. R. Surv., x, 383, 1858, Puget Sound.

15. Lampetra wilderi (Gage). *Small Black Lamprey; Pride; Prick.*

Western New York to Iowa, in tributaries of the Great Lakes and the Mississippi.

Ammocœtes wilderi Gage, in Wilder Quarter-Century Book, 436, 1893, Cayuga Lake, New York.

Class III. PISCES. The Fishes.

Subclass SELACHII. The Sharks and Skates.

Order D. DIPLOSPONDYLI. The Notidanoid Sharks.

Family V. CHLAMYDOSELACHIDÆ. The Frilled Sharks.

Genus 10. CHLAMYDOSELACHUS Garman.

Chlamydoselachus Garman, Bull. Essex Inst., Jan. 17, 1884, 47 (*anguineus*).

16. **Chlamydoselachus anguineus** Garman.

Seas about Japan; also off Madeira; not certainly American.
Chlamydoselachus anguineus Garman, Bull. Essex Inst., Jan. 17, 1884, 47, off Japan.

Family VI. HEXANCHIDÆ. The Cow Sharks.

Genus 11. NOTORHYNCHUS Ayres.

Notorhynchus Ayres, Proc. Cal. Ac. Sci., I, 1856, 72 (*maculatus*).

17. **Notorhynchus maculatus** Ayres.

Pacific coast of United States from Monterey northward to Washington.
Notorhynchus maculatus Ayres, Proc. Cal. Ac. Sci., I, 1856, 72, San Francisco.

Genus 12. HEXANCHUS Rafinesque.

Hexanchus Rafinesque, Caratteri, 14, 1810 (*griseus*).

18. **Hexanchus corinus** Jordan & Gilbert. *Shovel-nosed Shark.*

Monterey Bay to Puget Sound; not common.
Hexanchus corinus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 352, Neah Bay, Washington, and Soquel, California.

19. **Hexanchus griseus** (Gmelin). *Cow Shark; Caña-Bota.*

Deep water, Mediterranean to the west coast of Scotland; frequently taken in Cuba (Poey).
Squalus griseus Gmelin, Syst. Nat., I, 1495, 1788, Mediterranean; after Broussonet.

Order E. ASTEROSPONDYLI. The Typical Sharks.

Suborder PROARTHRI. The Cestraciont Sharks.

Family VII. HETERODONTIDÆ. The Bullhead Sharks.

Genus 13. GYROPLEURODUS Gill.

Gyropleurodus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 489 (*francisci*).

20. **Gyropleurodus francisci** (Girard). *Bullhead Shark.*

Coast of California; abundant south of Point Conception.
Cestracion francisci Girard, Proc. Ac. Nat. Sci. Phila. 1854, 196, Monterey.

21. **Gyropleurodus quoyi** (Fréminville).

Galapagos Islands.
Cestracion quoyi Fréminville, Mag. Zool. 1840, pl. 3, Galapagos Islands.

Suborder GALEI. The True Sharks.

Family VIII. SCYLLIORHINIDÆ. The Cat Sharks.

Genus 14. SCYLLIORHINUS Blainville. *Roussettes.*

Scylliorhinus Blainville, Journ. Phys. 1816, 263 (*canicula*, etc.).

22. **Scylliorhinus profundorum** Goode & Bean.

Deep water, North Atlantic.
Scylliorhinus profundorum Goode & Bean, Oceanic Ichthyology, 17, 1896, Gulf Stream.

Genus 15. CATULUS Smith.

Catulus Andrew Smith, Proc. Zool. Soc. Lond. 1837, 85 (*stellaris*).

Subgenus CATULUS Smith.

23. Catulus xaniurus Gilbert.

Pacific Coast of southern California.
Catulus xaniurus Gilbert, Proc. U. S. Nat. Mus. 1891, 540, off southern and lower California, in 184 to 684 fathoms.

24. Catulus brunneus Gilbert.

Gulf of California, in deep water.
Catulus brunneus Gilbert, Proc. U. S. Nat. Mus. 1891, 542, Gulf of California.

25. Catulus cephalus Gilbert.

Gulf of California and southward, in deep water.
Catulus cephalus Gilbert, Proc. U. S. Nat. Mus. 1891, 541, deep water near the Revillagigedo Islands, Mexico, and in the Gulf of California.

26. Catulus retifer (Garman).

Gulf Stream, in deep water.
Scyllium retiferum Garman, Bull. Mus. Comp. Zool., XI, 233, 1881, off coast of Virginia, in deep water.

Subgenus CEPHALOSCYLLIUM Gill.

Cephaloscyllium Gill, Ann. Lyc. Nat. Hist. N. Y. 1861, 407 (*laticeps*).

27. Catulus uter Jordan & Evermann. *Swell Shark.*

Monterey to San Diego; very abundant in Santa Barbara Channel.
Catulus uter Jordan & Evermann, Fishes North and Middle America, 25, 1896, Monterey, San Diego, and Santa Barbara Channel.

Family IX. GINGLYMOSTOMIDÆ. The Nurse Sharks.

Genus 16. GINGLYMOSTOMA Müller & Henle.

Ginglymostoma Müller & Henle, Wiegmann's Archiv, 1837, I, 396.

28. Ginglymostoma cirratum (Gmelin). *Nurse Shark; Gata.*

West Indies and the west coast of Mexico; occasional on our South Atlantic Coast.
Squalus cirratus Gmelin, Syst. Nat., I, 1492, 1788, American seas; after Broussonet.

Family X. PSEUDOTRIAKIDÆ.

Genus 17. PSEUDOTRIAKIS Capello.

Pseudotriakis Capello, Jour. Sci. Math. Phys. Nat. Lisb. 1868, 321 (*microdon*).

29. Pseudotriakis microdon Capello.

Portugal; Amagansett, Long Island.
Pseudotriakis microdon Capello, Jour. Sci. Math., etc., Lisb. 1868, 321, Portugal.

Family XI. GALEIDÆ. The Requiem Sharks.

Genus 18. MUSTELUS Cuvier.

Mustelus Cuvier, Règne Animal, ed. 1, 128, 1817 (*mustelus* and *canis*).

30. Mustelus lunulatus Jordan & Gilbert. *Gato.*

West coast of Mexico.
Mustelus lunulatus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 108, Mazatlan.

31. Mustelus canis (Mitchill). *Smooth Hound; Dog Shark; Boca Dulce.*

Cape Cod to Cuba, and in southern Europe.
Squalus canis Mitchill, Trans. Lit. Phil. Soc. N. Y., I, 1815, 486, New York.

Genus 19. GALEUS Rafinesque.

Galeus Rafinesque, Caratteri Alcuni Nuovi Generi, 13, 1810 (*mustelus*, etc.; the intended type is apparently *Squalus galeus* L., though that species is not mentioned by name).

32. Galeus dorsalis (Gill).

Panama and neighboring waters, north to the Gulf of California.
Mustelus dorsalis Gill, Proc. Ac. Nat. Sci. Phila. 1864, 149, Panama.

33. Galeus californicus (Gill).

California, north to San Francisco.
Mustelus californicus Gill, Proc. Ac. Nat. Sci. Phila. 1864, 148, San Francisco.

Genus 20. RHINOTRIACIS Gill.

Rhinotriacis Gill, Proc. Ac. Nat. Sci. Phila. 1862, 486 (*henlei*).

34. Rhinotriacis henlei Gill.

Coast of California, from Humboldt Bay to Monterey; rather rare.
Rhinotriacis henlei Gill, Proc. Ac. Nat. Sci. Phila. 1862, 486, San Francisco.

Genus 21. TRIAKIS Müller & Henle.

Triakis Müller & Henle, Magazine of Natural History, n. s., II, 1838, 36.

35. Triakis semifasciatum Girard. *Cat Shark; Leopard Shark.*

Cape Mendocino to San Diego; common.
Triakis semifasciatum Girard, Proc. Ac. Nat. Sci. Phila. 1854, 196, Presidio de San Francisco.

Genus 22. GALEORHINUS Blainville.

Galeorhinus Blainville, Bull. Sci. Philom. 1816, 121 (*galeus*).

36. Galeorhinus zyopterus Jordan & Gilbert. *Oil Shark; Soup-fin Shark.*

Coast of southern California, from San Francisco to Cerros Island; very abundant.
Galeorhinus zyopterus Jordan & Gilbert, Synopsis, 871, 1883, San Pedro, Cal.

Genus 23. GALEOCERDO Müller & Henle.

Galeocerdo Müller & Henle, Plagiostomen, 59, 1838 (*tigrinus*).

37. Galeocerdo tigrinus Müller & Henle. *Tiger Shark; Alecrin; Tigrone.*

Tropical seas; not rare; occasionally northward to Cape Cod and to San Diego.
Galeocerdo tigrinus Müller & Henle, Plagiostomen, 59, 1838, Pondichery.

Genus 24. PRIONACE Cantor.

Prionace Cantor, Malayan Fishes, 399, 1850 (substitute for *Prionodon*).

38. Prionace glauca (Linnæus). *Great Blue Shark.*

Warm seas, occasionally taken on our coasts; more common in Europe.
Squalus glaucus Linnæus, Syst. Nat., ed. x, 235, 1758, seas of Europe.

Genus 25. CARCHARHINUS Blainville.

Carcharhinus Blainville, Jour. Phys. 1816, 264 (*commersoni*).

Subgenus PLATYPODON Gill.

Platypodon Gill, Ann. Lyc. Nat. Hist. N. Y. 1861, 401 (*menisorrah*).

39. Carcharhinus obscurus (LeSueur). *Dusky Shark.*

North Atlantic; frequently taken on our coast.
Squalus obscurus LeSueur, Journ. Ac. Nat. Sci. Phila. 1818, 223, New York.

40. Carcharhinus platyrhynchus (Gilbert).

Magdalena Bay to Galapagos Islands.
Eulamia platyrhynchus Gilbert, Proc. U. S. Nat. Mus. 1891, 544, Clarion Island; Socorro Island; Magdalena Bay.

41. Carcharhinus falciformis (Bibron). *Cazon de Playa.*
Cuba and neighboring waters.
Carcharias falciformis Bibron, in Müller & Henle, Plagiostomen, 47, 1838, Cuba.

42. Carcharhinus acronotus (Poey).
Cuba.
Squalus acronotus Poey, Memorias, II, 335, 1861, Havana.

43. Carcharhinus perezi (Poey).
Cuba.
Platypodon perezi Poey, Enumeratio, 195, 1875, Cuba.

44. Carcharhinus remotus (Valenciennes).
Martinique.
Carcharias remotus Valenciennes, in Duméril, Hist. Nat. Poiss., I, 374, 1870, Martinique.

45. Carcharhinus henlei (Valenciennes).
Coast of Brazil northward to Guiana.
Carcharias henlei Valenciennes, in Müller & Henle, Plagiostomen, 46, 1838, Guiana.

Subgenus **CARCHARHINUS** Blainville.

46. Carcharhinus milberti (Müller & Henle).
Cape Cod to Florida; not rare.
Carcharias (Prionodon) milberti Müller & Henle, Plagiostomen, 38, 1838, New York.

47. Carcharhinus lamiella (Jordan & Gilbert). *Bay Shark.*
San Diego Bay and southward along the Mexican coast.
Carcharias lamiella Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 110, San Diego.

48. Carcharhinus lamia (Rafinesque). *Cub Shark; Requin; Requiem; Lamia.*
Tropical parts of the Atlantic northward to Florida Keys.
Carcharias lamia Rafinesque, Indice d'Ittiol. Sicil., 44, 1810, Sicily; after Lacépède.

49. Carcharhinus platyodon (Poey).
Cuba to Texas.
Squalus platyodon Poey, Memorias, II, 331, 1861, Havana.

50. Carcharhinus fronto (Jordan & Gilbert). *Tiburon.*
Pacific Coast of Mexico.
Carcharias fronto Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 102, Mazatlan.

51. Carcharhinus nicaraguensis (Gill & Bransford). *Tigrone.*
Lake Nicaragua and its outlet, Rio San Juan; abundant.
Eulamia nicaraguensis Gill & Bransford, Proc. Ac. Nat. Sci. Phila. 1877, 190, Lake Nicaragua.

Subgenus **ISOGOMPHODON** Gill.
Isogomphodon Gill, Ann. Lyc. Nat. Hist. N. Y. 1861, 401 (*oxyrhynchus*).

52. Carcharhinus æthalorus (Jordan & Gilbert).
Mazatlan to Panama.
Carcharias æthalorus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 104, Mazatlan.

53. Carcharhinus limbatus (Müller & Henle). *Caçonetta.*
Tropical seas, north to Florida; a stray specimen taken at Woods Hole, Mass.
Carcharias (Prionodon) limbatus Müller & Henle, Plagiost., 49, 1838, Martinique.

54. Carcharhinus oxyrhynchus (Müller & Henle).
Surinam.
Carcharias oxyrhynchus Müller & Henle, Plagiostomen, 41, 1838, Surinam.

Genus 26. **HYPOPRION** Müller & Henle.

Hypoprion Müller & Henle, Plagiostomen, 34, 1838 (*macloti*).

55. **Hypoprion brevirostris** Poey.

West Indies, north to Charleston, South Carolina.
Hypoprion brevirostris Poey, Repertorio, II, 451, tab. 4, 1868, Cuba.

56. **Hypoprion signatus** Poey.

Cuba.
Hypoprion signatus Poey, Synopsis, 452, 1868, Cuba.

Genus 27. **APRIONODON** Gill.

Aprionodon Gill, Ann. Lyc. Nat. Hist. N. Y., VII, 1861, 411 (*punctatus* = *isodon*).

57. **Aprionodon isodon** (Müller & Henle).

Atlantic Ocean.
Carcharias isodon Müller & Henle, Plagiostomen, 32, 1838, New York.

Genus 28. **SCOLIODON** Müller & Henle.

Scoliodon Müller & Henle, Wiegmann's Archiv f. Naturg., I, 398, 1837 (*laticaudus*).

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

Pacific Coast of Mexico.
Carcharias longurio Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 106, Mazatlan.

59. **Scoliodon terræ-novæ** (Richardson). *Sharp-nosed Shark; Tiger Shark.*

Cape Cod to Brazil; very common southward along the Atlantic Coast.
Squalus (Carcharias) terræ-novæ Richardson, Fauna Bor.-Amer., III, 289, 1836, Newfoundland.

Family XII. SPHYRNIDÆ. The Hammer-headed Sharks.

Genus 29. **SPHYRNA** Rafinesque.

Sphyrna Rafinesque, Indice d'Ittiol. Siciliana, 60, 1810 (*zygæna*).

Subgenus **RENICEPS** Gill.

Reniceps Gill, Ann. Lyc. Nat. Hist. N. Y., VIII, 1861, 412 (*tiburo*).

60. **Sphyrna tiburo** (Linnæus). *Shovel-head Shark; Bonnet-head.*

Atlantic Ocean; abundant on our coast from Long Island southward, ranging to China and Mazatlan.
Squalus tiburo Linnæus, Syst. Nat., ed. X, 234, 1758, America.

Subgenus **PLATYSQUALUS** Swainson.

Platysqualus Swainson, Class. Anim., II, 318, 1839 ("*tiburo*" = *tudes*).

61. **Sphyrna tudes** (Cuvier).

Gulf of California, West Indies, Mediterranean, and Indian Ocean.
Zygæna tudes Cuvier, in Valenciennes, Mém. Mus., IX, 225, 1822, Nice; after *Pantouflier* of Risso.

Subgenus **SPHYRNA** Rafinesque.

62. **Sphyrna zygæna** (Linnæus). *Hammer-headed Shark.*

From Cape Cod and Point Conception southward.
Squalus zygæna Linnæus, Syst. Nat., ed. X, 234, 1758, Europe; America.

Family XIII. ALOPIIDÆ. The Thresher Sharks.

Genus 30. **ALOPIAS** Rafinesque.

Alopias Rafinesque, Caratteri di Alcuni Generi, etc., 12, 1810 (*macrurus* = *vulpes*).

63. **Alopias vulpes** (Gmelin). *Thresher; Fox Shark; Swingle-tail; Long-tail Shark.*

Mediterranean and Atlantic; Pacific Coast.
Squalus vulpes Gmelin, Syst. Nat., I, 1496, 1788, Mediterranean; after Pennant.

Family XIV. CARCHARIIDÆ. The Sand Sharks.

Genus 31. CARCHARIAS Rafinesque.
Carcharias Rafinesque, Caratteri di Alcuni Nuovi Generi, 10, 1810 (*taurus*).

Subgenus EUGOMPHODUS Gill.
Eugomphodus Gill, Proc. Ac. Nat. Sci. Phila. 1864, 260 (*littoralis*).

64. Carcharias littoralis (Mitchill). *Sand Shark.*
Atlantic Coast between Cape Cod and Cape Hatteras.
Squalus littoralis Mitchill, Am. Monthly Mag., II, 1818, 328, New York.

Family XV. LAMNIDÆ. The Mackerel Sharks.

Genus 32. ISURUS Rafinesque.
Isurus Rafinesque, Caratteri di Alcuni Nuovi Generi, 11, 1810 (*oxyrhynchus*).

Subgenus ISUROPSIS Gill.
Isuropsis Gill, Ann. Lyc. Nat. Hist. N. Y., VII, 1862, 409 (*dekayi*).

65. Isurus dekayi (Gill). *Mackerel Shark.*
Cape Cod to West Indies.
Isuropsis dekayi Gill, Ann. Lyc. N. Y., VII, 1862, 409; after DeKay.

Subgenus ISURUS Rafinesque.

66. Isurus oxyrhynchus Rafinesque. *Mackerel Shark; Pesce Tondo; Cane di Mare.*
Mediterranean and neighboring parts of the Atlantic; occasional on Atlantic coast of North America.
Isurus oxyrhynchus Rafinesque, Caratteri, etc., 12, 1810, Palermo

Genus 33. LAMNA Cuvier. *Porbeagles.*
Lamna Cuvier, Règne Animal, ed. I, 126, 1817 (*cornubicus*).

67. Lamna cornubica (Gmelin). *Porbeagle; Mackerel Shark.*
North Atlantic and North Pacific.
Squalus cornubicus Gmelin, Syst. Nat., I, 1497, 1788, shores of Cornwall.

Genus 34. CARCHARODON Smith. *Man-eater Sharks.*
Carcharodon Andrew Smith, Proc. Geol. Soc. Lond., V, 86, 1837 (*capensis* = *carcharias*).

68. Carcharodon carcharias (Linnæus). *Man-eater Shark; Great White Shark.*
Temperate and tropical parts of the Atlantic and the Pacific.
Squalus carcharias Linnæus, Syst. Nat., ed. X, 235, 1758, Europe.

Family XVI. CETORHINIDÆ. The Basking Sharks.

Genus 35. CETORHINUS Blainville.
Cetorhinus Blainville, Journ. Phys. 1816, 264 (*gunneri* = *maximus*).

69. Cetorhinus maximus (Gunner). *Basking Shark; Pelerin; Elephant Shark.*
Arctic seas, Portugal, Virginia, and California.
Squalus maximus Gunner, Trondhjem Selskabskr., III, 33, 1765, coast of Norway.

Family XVII. RHINODONTIDÆ. The Whale Sharks.

Genus 36. MICRISTODUS Gill.
Micristodus Gill, Proc. Ac. Nat. Sci. Phila. 1865, 177 (*punctatus*).

70. Micristodus punctatus Gill.
Gulf of California.
Micristodus punctatus Gill, Proc. Ac. Nat. Sci. Phila. 1865, 177, Gulf of California.

Order F. CYCLOSPONDYLI. The Cyclospondylous Sharks.

Suborder CYCLOSPONDYLI.

Family XVIII. SQUALIDÆ. The Dogfishes.

Genus 37. SQUALUS (Artedi) Linnæus.

Squalus (Artedi) Linnæus, Syst. Nat., ed. x, 233, 1758 (includes all sharks).

71. Squalus acanthias Linnæus. *Dogfish; Picked Dogfish; Bonedog; Skittle-dog.*

North Atlantic on both coasts and about Cuba.
Squalus acanthias Linnæus, Syst. Nat., ed. x, 233, 1758, coast of Europe.

72. Squalus sucklii (Girard). *California Dogfish*

Aleutian Islands to Santa Barbara.
Spinax (Acanthias) sucklii Girard, Proc. Ac. Nat. Sci. Phila. 1854, 196, Fort Steilacoom, Washington.

Genus 38. CENTROSCYMNUS Bocage & Capello.

Centroscymnus Bocage & Capello, Proc. Zool. Soc. Lond. 1864, 263 (*cœlolepis*).

73. Centroscymnus cœlolepis Bocage & Capello.

Coast of Portugal and neighboring parts of the Atlantic; Gloucester, Mass., and Nova Scotia Banks.
Centroscymnus cœlolepis Bocage & Capello, Proc. Zool. Soc. Lond. 1864, 263, Portugal.

Genus 39. ETMOPTERUS Rafinesque.

Etmopterus Rafinesque, Caratteri, etc., 14, 1810 (*aculeatus*).

74. Etmopterus pusillus (Lowe).

Madeira, Cuba, and Cape Verdes.
Acanthidium pusillum Lowe, Proc. Zool. Soc. Lond. 1839, 91, Madeira.

Genus 40. CENTROSCYLLIUM Müller & Henle.

Centroscyllium Müller & Henle, Plagiostomen, 191, 1838 (*fabricii*).

75. Centroscyllium fabricii (Reinhardt).

Greenland seas, Gloucester, and the Nova Scotia Banks.
Spinax fabricii Reinhardt, Dansk. Vid. Selsk. Forh., 1828, III, XVI, Greenland.

Family XIX. SOMNIOSIDÆ. The Scymnoid Sharks.

Genus 41. SOMNIOSUS LeSueur.

Somniosus LeSueur, Jour. Ac. Nat. Sci. Phila. 1818, 222 (*brevipinna=microcephalus*).

76. Somniosus microcephalus (Bloch). *Sleeper Shark; Nurse.*

Arctic seas, south to Cape Cod, Oregon, and France.
Squalus microcephalus Bloch & Schneider, Syst. Ichth., 135, 1801, northern seas.

Family XX. ECHINORHINIDÆ. The Bramble Sharks.

Genus 42. ECHINORHINUS Blainville.

Echinorhinus Blainville, Bull. Soc. Philom. 1816, 121 (*spinosus*).

77. Echinorhinus spinosus (Gmelin).

Atlantic coasts of Europe, America, and Africa.
Squalus spinosus Gmelin, Syst. Nat., I, 1500, 1788, "the ocean."

Suborder TECTOSPONDYLI.

Family XXI. SQUATINIDÆ. The Angel Sharks.

Genus 43. SQUATINA Duméril.

Squatina Duméril, Zool. Analyt., 102, 1806 (*angelus=squatina*).

78. Squatina squatina (Linnæus). *Monk-fish; Angel-fish; Squato.*
Atlantic and Pacific coasts of the United States southward from Cape Cod and San Francisco; Mediterranean.
Squalus squatina Linnæus, Syst. Nat., ed. x, 233, 1758, coasts of Europe.

Order G. BATOIDEI. The Rays.

Suborder SARCURA. The Thick-tailed Rays.

Family XXII. PRISTIDÆ. The Sawfishes.

Genus 44. PRISTIS Latham.

Pristis Latham, Trans. Linn. Soc., II, 1794, 276 (*pristis*).

79. Pristis zephyreus Jordan & Starks. *Pez de Espada.*
Tropical seas, north to Mazatlan on the Pacific Coast; the West Indies.
Pristis zephyreus Jordan & Starks, Fishes of Sinaloa, 11, 1895, Mazatlan, Mexico.

80. Pristis pectinatus Latham. *Common Sawfish; Pez Sierra; Pez de Espada.*
Tropical seas; north to West Indies and Florida.
Pristis pectinatus Latham, Trans. Linn. Soc., II, 1794, 278, "in the ocean."

Family XXIII. RHINOBATIDÆ. The Guitar-Fishes.

Genus 45. RHINOBATUS Bloch & Schneider. *Guitar-fishes.*

Rhinobatus Bloch & Schneider, Syst. Ichth., 353, 1801 (*rhinobatus*).

81. Rhinobatus lentiginosus Garman.
From Charleston, South Carolina, southward.
Rhinobatus lentiginosus Garman, Bull. M. C. Z., VI, 168, 1880, coast of Florida.

82. Rhinobatus stellio Jordan & Rutter.
Jamaica.
Rhinobatus stellio Jordan & Rutter, Fishes of Jamaica, 1896, Jamaica.

83. Rhinobatus glaucostigma Jordan & Gilbert. *Guitarro.*
Gulf of California and southward.
Rhinobatus glaucostigma Jordan & Gilbert, Proc. U. S. Nat. Mus. 1883, 210, Mazatlan.

84. Rhinobatus leucorhynchus Günther.
Panama and vicinity.
Rhinobatus leucorhynchus Günther, Proc. Zool. Soc. Lond. 1866, 604, Panama.

85. Rhinobatus productus Ayres. *Guitar-fish.*
San Francisco to San Diego.
Rhinobatus productus Ayres, in Girard, Proc. Ac. Nat. Sci. Phila. 1854, 196, Monterey.

86. Rhinobatus percellens (Walbaum). *Fiddler-fish; Puraque.*
West Indies to southern Brazil.
Raja percellens Walbaum, Artedi Piscium, 525, 1792; after Marcgrave.

87. Rhinobatus spinosus Günther.
Mexico.
Rhinobatus spinosus Günther, Cat., VIII, 518, 1870, Mexico.

88. Rhinobatus planiceps Garman.
Coast of Peru and Galapagos Islands.
Rhinobatus planiceps Garman, Bull. M. C. Z, VI, 168, 1880, Peru; Galapagos.

Genus 46. ZAPTERYX Jordan & Gilbert.

Zapteryx Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 53 (*exasperatus*).

89. Zapteryx exasperatus (Jordan & Gilbert).

San Diego Bay.

Platyrhina exasperata Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 32, San Diego.

90. Zapteryx xyster Jordan & Evermann.

Panama.

Zapteryx xyster Jordan & Evermann, Fishes North and Middle America, 65, 1896, Panama.

Genus 47. PLATYRHINOIDIS Garman.

Platyrhinoidis Garman, Proc. U. S. Nat. Mus. 1880, 522 (*triseriatus*).

91. Platyrhinoidis triseriatus (Jordan & Gilbert).

Coast of California from Point Conception southward.

Platyrhina triseriata Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 36, Santa Barbara, California.

Family XXIV. RAJIDÆ. The Skates.

Genus 48. RAJA (Artedi) Linnæus.

Raja (Artedi) Linnæus, Syst. Nat., ed. x, 231, 1758 (*batis*).

92. Raja erinacea Mitchill. *Common Skate; Little Skate; Tobacco Box.*

Very abundant from Virginia northward to Maine.

Raia erinacea Mitchill, Am. Jour. Sci. Arts, XI, 1825, 290, New York.

93. Raja ocellata Mitchill. *Big Skate.*

Coast of New York, Massachusetts, and northward.

Raja ocellata Mitchill, Trans. Lit. Phil. Soc., I, 1815, 477, New York.

94. Raja fyllæ Lütken.

Davis Straits, Greenland.

Raja fyllæ Lütken, Vid. Medd. Naturh. Foren. Kjöbenh. 1887, 1, pl. 1, Davis Straits.

95. Raja radiata Donovan.

North Atlantic; both in America and Europe; not common on our coast.

Raia radiata Donovan, Hist. Brit. Fishes, V, pl. 114, 1820, Great Britain.

96. Raja plutonia Garman.

Deep water off South Carolina.

Raja plutonia Garman, Bull. Mus. Comp. Zool., XI, 236, 1881, off South Carolina.

97. Raja ackleyi Garman.

Yucatan Banks.

Raja ackleyi Garman, Bull. Mus. Comp. Zool., XI, 235, 1881, Yucatan Banks.

98. Raja ornata Garman.

Coast of South Carolina and Florida.

Raja ornata Garman, Bull. Mus. Comp. Zool., XI, 235, 1881, off South Carolina.

99. Raja eglanteria Bosc.

Cape Cod, southward to Florida; not very common.

Raia eglanteria Bosc, in Lacépède, Hist. Nat. Poiss., II, 103, 1800, Charleston, S. C.

100. Raja senta Garman.

Banks of Newfoundland to Cape Cod; in deep water.

Raja senta Garman, Proc. U. S. Nat. Mus. 1885, 43, Cape Cod Bay; Le Have Bank.

101. Raja lævis Mitchill. *Barndoor Skate.*

New England to Florida; not uncommon northward.

Raja lævis Mitchill, Amer. Monthly Mag., II, 1817, 327, New York.

102. Raja rhina Jordan & Gilbert.

Monterey to Alaska; not rare, especially northward.
Raja rhina Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 251, Monterey; San Francisco.

103. Raja binoculata Girard. *Big Skate of California.*

Pacific Coast from Monterey to Sitka; abundant.
Raja binoculata Girard, Proc. Ac. Nat. Sci. Phila. 1854, 196, San Francisco.

104. Raja inornata Jordan & Gilbert. *Common Skate of California.*

Coast of California; very abundant.
Raja inornata Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 457, San Francisco.

105. Raja equatorialis Jordan & Bollman.

West coast of Colombia, between Panama and the Galapagos Islands.
Raja equatorialis Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 150, off Colombia.

106. Raja parmifera Bean.

Coast of Alaska.
Raja parmifera Bean, Proc. U. S. Nat. Mus. 1881, 157, Unalaska.

107. Raja stellulata Jordan & Gilbert.

Coast of California and northward.
Raja stellulata Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 133, Monterey.

108. Raja aleutica Gilbert & Thoburn.

Unalaska, Aleutian Islands.
Raja aleutica Gilbert, Rept. U. S. Fish. Com. 1893 (1896), 397, pl. 21, Samnak Pass, Aleutian Islands, at Albatross Station 3257, in 81 fathoms.

109. Raja trachura Gilbert.

Santa Barbara Channel.
Raja trachura Gilbert, Proc. U. S. Nat. Mus. 1891, 539, off Santa Barbara, at Albatross Station 2923, in 822 fathoms.

110. Raja abyssicola Gilbert.

Queen Charlotte Island, British Columbia, in deep water.
Raja abyssicola Gilbert, Rept. U. S. Fish. Com. 1893 (1896), 396, pl. 20, off Queen Charlotte Island, at Albatross Station 3342, in 1,588 fathoms.

Family XXV. NARCOBATIDÆ. The Electric Rays.

Genus 49. TETRANARCE Gill.

Tetranarce Gill, Ann. Lyc. Nat. Hist. N. Y., VII, 1861, 387 (*occidentalis*).

111. Tetranarce occidentalis (Storer). *Cramp-fish; Torpedo; Numb-fish.*

Atlantic Coast of United States, Cape Cod to Cuba; not very common.
Torpedo occidentalis Storer, Am. Jour. Sci. Arts 1843, 165, Massachusetts

112. Tetranarce californica (Ayres). *California Torpedo.*

Coast of California; not noticed south of Monterey.
Torpedo californica Ayres, Proc. Cal. Ac. Sci. 1854, 70, San Francisco.

Genus 50. NARCINE Henle.

Narcine Henle, Ueber Narcine, 31, 1834 (*brasiliensis*).

113. Narcine brasiliensis (Ölfers). *Trembler.*

West Indies and Brazil, occasionally northward to Key West and Pensacola.
Torpedo brasiliensis Ölfers, Torpedo, 19, 1831, Brazil.

Genus 51. DISCOPYGE Tschudi.

Discopyge Tschudi, Fauna Peruana, 32, 1844 (*tschudii*).

114. Discopyge ommata Jordan & Gilbert.

Panama; rare.
Discopyge ommata Jordan & Gilbert, Proc. U. S. Nat. Mus. 1889, 151, Panama.

Suborder MASTICURA. The Whip-tailed Rays.

Family XXVI. DASYATIDÆ. The Sting Rays.

Genus 52. **UROLOPHUS** Müller & Henle. *Round Sting Rays.*

Urolophus Müller & Henle, Plagiostomen, 173, 1838 (*aurantiacus* = *cruciatus*).

115. **Urolophus halleri** Cooper.

Coast of California from Point Conception southward.

Urolophus halleri Cooper, Proc. Cal. Ac. Sci., III, 1863, 95, San Diego.

116. **Urolophus nebulosus** Garman.

Gulf of California to Panama.

Urolophus nebulosus Garman, Proc. U. S. Nat. Mus. 1885, 41, Colima.

117. **Urolophus umbrifer** Jordan & Starks.

West coast of Mexico.

Urolophus umbrifer Jordan & Starks, in Jordan, Fishes of Sinaloa, 17, 1895, Mazatlan, Mexico.

118. **Urolophus jamaicensis** (Cuvier). *Maid.*

West Indies, generally common; once (perhaps doubtfully) recorded from New Jersey.

Raja jamaicensis Cuvier, Règne Animal, ed. 1, 137, 1817, Jamaica.

119. **Urolophus mundus** (Gill).

Panama.

Urotrygon mundus Gill, Proc. U. S. Nat. Mus. 1863, 173, Panama.

120. **Urolophus goodei** Jordan & Bollman.

Panama.

Urolophus goodei Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 151, near Panama.

121. **Urolophus aspidurus** Jordan & Gilbert.

Panama.

Urolophus aspidurus Jordan & Gilbert, Bull. U. S. Fish Com. 1881, 307, Panama.

122. **Urolophus asterias** Jordan & Gilbert.

Mazatlan to Panama.

Urolophus asterias Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 579, Mazatlan; Panama.

123. **Urolophus rogersi** Jordan & Starks.

West coast of Mexico.

Urolophus rogersi Jordan & Starks, in Jordan, Fishes of Sinaloa, 16, 1895, Mazatlan, Mexico.

Genus 53. **DASYATIS** Rafinesque. *Sting Rays.*

Dasyatis Rafinesque, Caretteri di Alcuni Nuovi Gen., 16, 1810 (*ujo* = *pastinaca*).

Subgenus **HEMITRYGON** Müller & Henle.

Hemitrygon Müller & Henle, Mag. Nat. Hist. 1837, 90 (*bennetti*).

124. **Dasyatis centrura** (Mitchill). *Common Sting Ray; Stingaree; Clam Cracker.*

Coast of Maine to Cape Hatteras; abundant.

Raja centrura Mitchill, Trans. Lit. Phil. Soc. N. Y., I, 1815, 479, New York.

Subgenus **DASYATIS** Rafinesque.

125. **Dasyatis hastata** (DeKay). *Kit.*

West Indies to Brazil, north to Florida and Rhode Island.

Trygon hastata DeKay, N. Y. Fauna: Fishes, 373, pl. 65, fig. 214, 1842, Rhode Island.

126. Dasyatis gymnura (Müller).
Surinam to Brazil, recorded from Grenada by Günther.
Trygon gymnura Müller, Ermann's Reise um die Erde, 25, taf. 13, 1830, Brazil.

127. Dasyatis sabina (LeSueur).
Streams and estuaries of Florida, abundant on both coasts.
Trygon sabina LeSueur, Jour. Ac. Nat. Sci. Phila., IV, 1824, 109, Florida.

128. Dasyatis longa (Garman).
Gulf of California to Panama.
Dasibatis longa Garman, Bull. Mus. Comp. Zool., VI, 170, 1880, Acapulco, Panama.

129. Dasyatis dipterura (Jordan & Gilbert).
Bay of San Diego, and southward; locally abundant.
Dasybatis dipterurus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 31, San Diego.

130. Dasyatis say (LeSueur). *Southern Sting Ray.*
Carolina to Brazil; common in Florida, occasional northward to New York.
Raja say LeSueur, Jour. Ac. Nat. Sci. Phila., I, 1817, 42, New Jersey.

Genus 54. PTEROPLATEA Müller & Henle.
Pteroplatea Müller & Henle, Plagiostomen, 168, 1838 (*altavela*).

131. Pteroplatea maclura (LeSueur). *Butterfly Ray.*
Rhode Island to Brazil.
Raia maclura LeSueur, Jour. Ac. Nat. Sci. Phila. 1817, 41, Rhode Island.

132. Pteroplatea crebripunctata Peters.
Gulf of California southward, along the west coast of Mexico; common.
Pteroplatea crebripunctata Peters, Monatsber. Berl. Akad. 1869, 703, Mazatlan.

133. Pteroplatea rava Jordan & Starks. *Manataria Colorada; Manta Raia.*
West coast of Mexico.
Pteroplatea rava Jordan & Starks, in Jordan, Fishes of Sinaloa, 18, 1895, Mazatlan, Mexico.

134. Pteroplatea marmorata Cooper.
Coast of California, from Point Conception southward to Cerros Island; common.
Pteroplatea marmorata Cooper, Proc. Cal. Ac. Sci., III, 1863, 112, San Diego.

Family XXVII. MYLIOBATIDÆ. The Eagle Rays.

Genus 55. AETOBATUS Blainville.
Aëtobatus Blainville, Jour. de Phys., LXXXIII, 1816, 261 (*vulgaris, narinari*, etc.).

135. Aetobatus narinari (Euphrasen). *Spotted Sting Ray.*
Tropical seas, north on Atlantic Coast to Virginia; not common on our shores.
Raia narinari Euphrasen, Vet. Ak. Nya. Handl., XI, 1790, 217, Brazil.

Genus 56. MYLIOBATIS Duméril.
Myliobatis Duméril, in Cuvier, Règne Animal, II, 137, 1817 (*aquila*).

Subgenus MYLIOBATIS Duméril.

136. Myliobatis freminvillei LeSueur.
Cape Cod to Brazil; not uncommon.
Myliobatis freminvillei LeSueur, Jour. Ac. Nat. Sci. Phila., IV, 1824, 111, Rhode Island.

137. Myliobatis goodei Garman.
Central America.
Myliobatis goodei Garman, Proc. U. S. Nat. Mus. 1885, 39, Central America.

Subgenus **HOLORHINUS** Gill.

Holorhinus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 331 (*vespertilio* = *californious*).

138. **Myliobatis californicus** Gill. *California Sting Ray; Batfish.*

California, from Cape Mendocino southward.

Myliobatis californicus Gill, Ann. Lyc. Nat. Hist. N. Y. 1865, 137; after Girard.

Genus 57. **RHINOPTERA** Kuhl.

Rhinoptera Kuhl, in Cuvier, Règne Animal, ed. 2, vol. II, 401, 1829 (*marginata*).

Subgenus **RHINOPTERA** Kuhl.

139. **Rhinoptera bonasus** (Mitchill). *Cow-nose Ray.*

Cape Cod to Florida.

Raja bonasus Mitchill, Trans. Lit. and Phil. Soc. N. Y. 1815, 479, New York.

140. **Rhinoptera steindachneri** Evermann & Jenkins. *Gabilan.*

Gulf of California.

Rhinoptera steindachneri Evermann & Jenkins, Proc. U. S. Nat. Mus. 1891, 130, pl. 1, fig. 1, Guaymas, Sonora, Mexico.

Subgenus **MICROMESUS** Gill.

Micromesus Gill, Ann. Lyc. Nat. Hist. N. Y. 1865, 136 (*adspersus*).

141. **Rhinoptera ensenadæ** Rosa Smith.

West coast of Lower California.

Rhinoptera ensenadæ Rosa Smith, Proc. U. S. Nat. Mus. 1886, 220, Ensenada, Lower California.

Family XXVIII. MANTIDÆ. The Sea Devils.

Genus 58. **AODON** Lacépède.

Aodon Lacépède, Hist. Nat. Poiss., I, 300, 1798 (*massassa*).

142 **Aodon hypostomus** (Bancroft).

Jamaica.

Cephalopterus hypostomus Bancroft, Proc. Comm. Zool. Soc. 1830, 134, Jamaica.

Genus 59. **MANTA** Bancroft.

Manta Bancroft, Zool. Jour., IV, 1828–29, 444 (*manta* = *birostris*).

143. **Manta birostris** (Walbaum). *Sea Devil; Devil-fish; Manta.*

Tropical waters of America; north to New Jersey and San Diego; not rare on the Florida coast.

Raia birostris Walbaum, Artedi Piscium, 535, 1792; after *Diabolus marinus* Willughby, etc.

Subclass HOLOCEPHALI. The Chimæras.

Order H. CHIMÆROIDEI. The Chimæroids.

Family XXIX. CHIMÆRIDÆ. The Chimæras.

Genus 60. **CHIMÆRA** Linnæus. *Elephant-fishes.*

Chimæra Linnæus, Syst. Nat., ed. X, 236, 1758 (*monstrosa*).

144. **Chimæra monstrosa** Linnæus. *Chimæra.*

Deep waters off the coast of Europe; also recorded by Poey at Matanzas, Cuba.

Chimæra monstrosa Linnæus, Syst. Nat., ed. X, 236, 1758, Atlantic.

145. **Chimæra affinis** Capello.

Deep waters of the Atlantic, off Portugal and off the American coast from Cape Cod northward.

Chimæra affinis Capello, Jour. Soc. Math. Lisb., IV, 1868, 314, pl. III, coast of Portugal.

Genus 61. **HYDROLAGUS** Gill.

Hydrolagus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 331 (*colliei*).

146. Hydrolagus colliei (Lay & Bennett). *Rat-fish; Elephant-fish.*

Pacific Coast from Monterey northward to Alaska.

Chimæra colliei Lay & Bennett, Beechey's Voy., Zool., 71, 1849, North Pacific.

Genus 62. **HARRIOTTA** Goode & Bean.

Harriotta Goode & Bean, Proc. U. S. Nat. Mus. 1894 (Jan. 26, 1895), 471 (*raleighana*).

147. Harriotta raleighana Goode & Bean.

Deep water off the North Atlantic Coast of the United States.

Harriotta raleighana Goode & Bean, Proc. U. S. Nat. Mus. 1894 (Jan. 26, 1895), 472, pl. 19, Gulf Stream at 39° N., 70° W.

Subclass TELEOSTOMI. The True Fishes.

Series GANOIDEI. The Ganoid Fishes.

Superorder CHONDROGANOIDEA. The Cartilaginous Ganoids.

Order I. SELACHOSTOMI. The Paddle-fishes.

Family XXX. POLYODONTIDÆ. The Paddle-fishes.

Genus 63. **POLYODON** Lacépède.

Polyodon Lacépède, Hist. Nat. Poiss., I, 402, 1798 (*feuille*).

148. Polyodon spathula (Walbaum). *Paddle-fish; Spoon-bill Cat; Duck-bill Cat; Spade-fish.*

Mississippi Valley and rivers of the Southern States; Lake Erie.

Squalus spathula Walbaum, Artedi Piscium, 522, 1792, no locality given.

Order J. CHONDROSTEI. The Sturgeons.

Family XXXI. ACIPENSERIDÆ. The Sturgeons.

Genus 64. **ACIPENSER** Linnæus. *Sturgeons.*

Acipenser (Artedi) Linnæus, Syst. Nat., ed. x, 237, 1758 (*sturio*).

149. Acipenser transmontanus Richardson. *White Sturgeon; Oregon Sturgeon; Sacramento Sturgeon.*

Pacific Coast, from Alaska south to Monterey; ascending the Sacramento, Columbia, and Fraser rivers in large numbers in spring.

Acipenser transmontanus Richardson, Fauna Bor.-Amer., III, 278, 1836, Fort Vancouver.

150. Acipenser medirostris Ayres. *Green Sturgeon.*

Pacific Coast; ascending the rivers from San Francisco northward.

Acipenser medirostris Ayres, Proc. Cal. Ac. Sci., I, 1854, 15, San Francisco.

151. Acipenser sturio Linnæus. *Common Sturgeon.*

Atlantic coasts; ascending rivers of northern Europe and the United States.

Acipenser sturio Linnæus, Syst. Nat., ed. x, 237, 1758, seas of Europe.

152. Acipenser rubicundus LeSueur. *Lake Sturgeon; Ohio Sturgeon; Stone Sturgeon; Rock Sturgeon; Red Sturgeon.*

Upper Mississippi Valley, Great Lakes, and northward.

Acipenser rubicundus LeSueur, Trans. Amer. Phil. Soc., I, 1818, 388, Lakes Ontario, Erie, and all the upper lakes.

153. **Acipenser brevirostris** LeSueur. *Short-nosed Sturgeon.*
Cape Cod to Florida; rare northward.
Acipenser brevirostrum LeSueur, Trans. Amer. Phil. Soc., 1, 1818, 390, Delaware River.

Genus 65. SCAPHIRHYNCHUS Heckel. *Shovel-nose Sturgeons.*
Scaphirhynchus Heckel, Ann. Wiener Mus. Naturgesch., 1, 1835, 71 (*rafinesquei* = *platorhynchus*).

154. **Scaphirhynchus platorhynchus** (Rafinesque). *Shovel-nose Sturgeon; White Sturgeon.*
Mississippi Valley, and streams of Western and Southern States; common.
Acipenser platorhynchus Rafinesque, Ichth. Ohiensis, 80, 1820, Ohio River.

Subclass HOLOSTEI. The Bony Ganoids.

Order K. RHOMBOGANOIDEA. The Gar Pikes.

Family XXXII. LEPISOSTEIDÆ. The Gar Pikes.

Genus 66. LEPISOSTEUS Lacépède.
Lepisosteus Lacépède, Hist. Nat. Poiss., v, 331, 1803 (*gavialis* = *osseus*).

Subgenus LEPISOSTEUS Rafinesque.

155. **Lepisosteus osseus** (Linnæus). *Long-nosed Gar; Billfish; Common Gar Pike.*
Great Lakes and rivers of United States from Vermont to the Rio Grande.
Esox osseus Linnæus, Syst. Nat., ed. x, 313, 1758; after Artedi, based on *Acus maxima squamosa viridis.*

Subgenus CYLINDROSTEUS Rafinesque.
Cylindrosteus Rafinesque, Ichth. Ohiensis, 72, 1820 (*platostomus*).

156. **Lepisosteus platostomus** Rafinesque. *Short-nosed Gar.*
Great Lakes and Southern and Western rivers; less abundant northward.
Lepisosteus platostomus Rafinesque, Ichth. Ohiensis, 72, 1820, Ohio River.

Subgenus ATRACTOSTEUS Rafinesque.
Atractosteus Rafinesque, Ichth. Ohiensis, 72, 1820 (*ferox*).

157. **Lepisosteus tristœchus** (Bloch & Schneider). *Alligator Gar; Great Gar; Manjuari.*
Rivers of the Southern States; Cuba and northern Mexico; north to St. Louis and Cincinnati.
Esox tristachus Bloch & Schneider, Syst. Ichth., 395, 1801, Cuba; after *Manjuari* of Para.

158. **Lepisosteus tropicus** (Gill).
Streams of the Pacific Coast of Central America.
Atractosteus tropicus Gill, Proc. Ac. Nat. Sci. Phila. 1863, 172, streams near Panama.

Order L. CYCLOGANOIDEA. The Bowfins.

Family XXXIII. AMIIDÆ. The Bowfins.

Genus 67. AMIA Linnæus. *Bowfins.*
Amia Linnæus, Syst. Nat., ed. xii, 500, 1766 (*calva*).

159. **Amia calva** Linnæus. *Mudfish; Dogfish; Bowfin; Grindle; "John A. Grindle"; Lawyer; Poisson de Marais.*
Great Lakes and sluggish waters from Minnesota to Virginia, Florida, and Texas; abundant.
Amia calva Linnæus, Syst. Nat., ed. xii, 500, 1766, Charleston, South Carolina.

Series TELEOSTEI. The Bony Fishes.

Subclass OSTARIOPHYSI.

Order M. NEMATOGNATHI. The Catfishes.

Family XXXIV. SILURIDÆ. The Catfishes.

Genus 68. **FELICHTHYS** Swainson. *Gaff-topsail Catfishes.*
Felichthys Swainson, Nat. Hist. Fishes, II, 305, 1839, substitute for *Breviceps* (*bagre*).

160. Felichthys panamensis (Gill).
Mazatlan to Panama; common.
Ailurichthys panamensis Gill, Proc. Ac. Nat. Sci. Phila. 1863, 172, Panama.

161. Felichthys bagre (Linnæus).
Coast of Brazil, accredited to the West Indies, but rare north of Surinam.
Silurus bagre Linnæus, Syst. Nat., ed. XII, 505, 1766, South America; after Gronow.

162. Felichthys pinnimaculatus (Steindachner).
Mazatlan to Panama.
Ailurichthys pinnimaculatus Steindachner, Ichth. Beitr., IV, 15, 1875, Panama, Altata, Costa Rica.

163. Felichthys eydouxii (Cuvier & Valenciennes).
Guayaquil.
Galeichthys eydouxii Cuvier & Valenciennes, Hist. Nat. Poiss., XV, 43, 1840, Guayaquil.

164. Felichthys filamentosus Swainson.
Atlantic Coast of tropical America.
Felichthys filamentosus Swainson, Nat. Hist. Anim., II, 305, 1839; after Bloch, pl. 365.

165. Felichthys marinus (Mitchill). *Sea Catfish; Gaff Topsail.*
Cape Cod to Texas.
Silurus marinus Mitchill, Trans. Lit. and Phil. Soc. N. Y., I, 1815, 433, New York.

166. Felichthys bahiensis (Castelnau).
Mexico to Bahia.
Galeichthys bahiensis Castlenau, Anim. Amer. Sud, 37, 1855, Bahia.

Genus 69. **GALEICHTHYS** Cuvier & Valenciennes. *Sea Catfishes.*
Galeichthys Cuvier & Valenciennes, Hist. Nat. Poiss., XV, 28, 1840 (*felicepS*).

167. Galeichthys lentiginosus (Eigenmann & Eigenmann).
Panama.
Tachisurus lentiginosus Eigenmann & Eigenmann, Proc. Cal. Ac. Sci. 1888, 139, Panama.

168. Galeichthys peruvianus Lütken.
Pacific Coast of Mexico to Peru.
Galeichthys peruvianus Lütken, Vidensk. Med. 1874, 204, Callao, Peru.

Subgenus **HEXANEMATICHTHYS** Bleeker.
Hexanematichthys Bleeker, Ichthyol. Archip. Indici Siluri, 61, 1858 (*sundaicus*).

169. Galeichthys felis (Linnæus). *Sea Catfish.*
Cape Cod to Texas.
Silurus felis Linnæus, Syst. Nat., ed. XII, 503, 1766, Charleston, South Carolina.

170. Galeichthys seemani (Günther).
Panama.
Arius seemani Günther, Cat., V, 147, 1864, "Central America."

171. **Galeichthys gilberti** Jordan & Williams.

Coast of Sinaloa, Mexico.

Galeichthys gilberti Jordan & Williams, Fishes of Sinaloa, in Proc. Cal. Ac. Sci. 1895, 395, pl. 26, Mazatlan, Sinaloa.

172. **Galeichthys jordani** (Eigenmann & Eigenmann).

Panama.

Tachisurus jordani Eigenmann & Eigenmann, Proc. Cal. Ac. Sci. 1888, 142, Panama.

173. **Galeichthys cærulescens** (Günther).

West coast of Guatemala.

Arius cærulescens Günther, Cat., v, 149, 1864, Rio Huamuchal, Guatemala.

174. **Galeichthys guatemalensis** (Günther).

Mazatlan to Central America.

Arius guatemalensis Günther, Cat., v, 145, 1864, Guatemala; Chiapas.

175. **Galeichthys assimilis** (Günther).

Atlantic Coast of Central America.

Arius assimilis Günther, Cat., v, 146, 1864, Lake Yzabal, Guatemala.

176. **Galeichthys surinamensis** (Bleeker).

Surinam.

Hexanematichthys surinamensis Bleeker, Versl. Med. Akad. Wet. Amsterd. 1862, 380, Surinam.

177. **Galeichthys azureus** Jordan & Williams. *Bagre Azul.*

Coast of Sinaloa, Mexico.

Galeichthys azureus Jordan & Williams, Fishes of Sanaloa, in Proc. Cal. Ac. Sci. 1895, 398, pl. 27, Mazatlan, Mexico.

178. **Galeichthys dasycephalus** (Günther).

Panama.

Arius dasycephalus Günther, Cat., v, 157, 1864, Oahu; apparently an error.

179. **Galeichthys longicephalus** (Eigenmann & Eigenmann).

Panama.

Tachisurus longicephalus Eigenmann & Eigenmann, Proc. Cal. Ac. Sci. 1888, 143, Panama.

180. **Galeichthys rugispinis** (Cuvier & Valenciennes).

Surinam to Para.

Arius rugispinis Cuvier & Valenciennes, Hist. Nat. Poiss., xv, 77, 1840, Cayenne.

181. **Galeichthys phrygiatus** (Cuvier & Valenciennes).

Surinam to Maranhão.

Arius phrygiatus Cuvier & Valenciennes, Hist. Nat. Poiss., xv, 79, 1810, Cayenne.

Genus 70. **SCIADEICHTHYS** Bleeker.

Sciadeichthys Bleeker, Ichthyol. Archip. Indici Siluri, 62, 1858 (*emphysetus*).

182. **Sciadeichthys troscheli** (Gill). *Bagre Colorado.*

Mazatlan to Panama.

Sciades troscheli Gill, Proc. Ac. Nat. Sci. Phila. 1863, 171, Panama.

183. **Sciadeichthys emphysetus** (Müller & Troschel).

Surinam.

Bagrus (*Sciades*) *emphysetus* Müller & Troschel, Horæ Ichthyol., III, 8, 1849, Surinam.

184. **Sciadeichthys temminckianus** (Cuvier & Valenciennes).

Cayenne, French Guiana.

Bagrus temminckianus Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 463, 1839, Cayenne, French Guiana.

185. Sciadeichthys flavescens (Cuvier & Valenciennes).
Cayenne, French Guiana.
Bagrus flavescens Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 462, 1839, Cayenne, French Guiana.

186. Sciadeichthys mesops (Cuvier & Valenciennes).
French Guiana.
Bagrus mesops Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 456, 1839, French Guiana.

187. Sciadeichthys proops (Cuvier & Valenciennes).
West Indies from Porto Rico to Surinam and south to Pernambuco.
Bagrus proöps Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 457, 1839, Cayenne, French Guiana; Surinam; Porto Rico.

188. Sciadeichthys passany (Cuvier & Valenciennes).
Cayenne, French Guiana.
Bagrus passany Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 458, 1830, Cayenne, French Guiana.

189. Sciadeichthys albicans (Cuvier & Valenciennes).
Guiana to the Amazon.
Bagrus albicans Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 461, pl. 420, 1839, Cayenne, French Guiana.

Genus 71. SELENASPIS Bleeker.
Selenaspis Bleeker, Ichthyol. Archip. Indici Siluri, 62, 1858 (*herzbergii*).

190. Selenaspis herzbergii (Bloch).
Coasts of South America from Cayenne to Para; common.
Silurus herzbergii Bloch, Ichthyol., VIII, 33, pl. 367, 1801, Surinam.

191. Selenaspis dowii (Gill).
Panama to Guayquil.
Leptarius dowii Gill, Proc. Ac. Nat. Sci. Phila. 1863, 170, Panama.

192. Selenaspis parkeri (Traill). *Bresson.*
Guiana to Para.
Silurus parkeri Traill, Mem. Werner. Soc., VI, 1832, 377, pl. 6, Guiana.

193. Selenaspis luniscutis (Cuvier & Valenciennes).
Surinam to Rio Janeiro; common.
Arius luniscutis Cuvier & Valenciennes, Hist. Nat. Poiss., XV, 109, 1840, Brazil.

Genus 72. NETUMA Bleeker.
Netuma Bleeker, Ichthyol. Archip. Indici Siluri, 62, 1858 (*nasuta*).

Subgenus NOTARIUS Gill.
Notarius Gill, Proc. Ac. Nat. Sci. Phila. 1863, 170 (*dowi*).

194. Netuma grandicassis (Cuvier & Valenciennes).
Guiana to Bahia.
Arius grandicassis Cuvier & Valenciennes, Hist. Nat. Poiss., XV, 53, pl. 427, 1840, Guiana.

195. Netuma stricticassis (Cuvier & Valenciennes).
Surinam to Bahia.
Arius stricticassis Cuvier & Valenciennes, Hist. Nat. Poiss., XV, 58, 1840, Cayenne, French Guiana.

196. Netuma dubia (Bleeker).
Surinam.
Netuma dubia Bleeker, Versl. Med. Ac. Wet. Amsterd., XIV, 1862, 382, Surinam.

197. **Netuma kessleri** (Steindachner).
Altata to Panama.
Arius kessleri Steindachner, Ichth. Beitr., IV, 24, 1876, Altata; Panama.

198. **Netuma insculpta** (Jordan & Gilbert).
Panama.
Arius insculptus Jordan & Gilbert, Bull. U. S. Fish Com. 1882 (1883), 41, Panama.

199. **Netuma planiceps** (Steindachner).
Altata to Panama.
Arius planiceps Steindachner, Ichth. Beitr., IV, 1876, 26, Altata; Panama.

200. **Netuma platypogon** (Günther).
Gulf of California to Peru.
Arius platypogon Günther, Cat., V, 147, 1864, San José de Guatemala.

201. **Netuma oscula** (Jordan & Gilbert).
Panama.
Arius osculus Jordan & Gilbert, Bull. U. S. Fish Com. 1882 (1883), 46, Panama.

202. **Netuma elattura** (Jordan & Gilbert).
Panama.
Arius elatturus Jordan & Gilbert, Bull. U. S. Fish Com. 1882 (1883), 45, Panama.

203. **Netuma insularum** Flora Hartley Greene.
Galapagos Islands.
Netuma insularum Flora Hartley Greene, in Jordan & Evermann, Fishes North and Middle America, 73, 1896, Galapagos Islands.

Genus 73. **TACHYSURUS** Lacépède.
Tachysurus Lacépède, Hist. Nat. Poiss., V, 151, 1803 (*chinensis*).

204. **Tachysurus nuchalis** (Günther).
Guiana.
Arius nuchalis Günther, Cat., V, 171, 1864, British Guiana.

205. **Tachysurus fissus** (Cuvier & Valenciennes).
Surinam.
Arius fissus Cuvier & Valenciennes, Hist. Nat. Poiss., XV, 107, 1840, Cayenne.

206. **Tachysurus spixii** (Agassiz).
Coast of Guiana and Brazil, south to Santos.
Pimelodus spixii Agassiz, Gen. Spec. Pisc. Brasil., 19, 1829; after Spix.

207. **Tachysurus melanopus** (Günther).
Both coasts of Central America; Rio Motagua; Panama.
Arius melanopus Günther, Cat., V, 172, 1864, Rio Motagua.

208. **Tachysurus furthii** (Steindachner).
Panama.
Arius furthii Steindachner, Ich. Beitr., IV, 29, 1876, Panama.

209. **Tachysurus liropus** Bristol.
San Juan Lagoon, Rio Ahome, Sonora.
Tachysurus liropus Bristol MS., San Juan Lagoon, Rio Ahome, Sonora.

210. **Tachysurus variolosus** (Cuvier & Valenciennes).
Cayenne, French Guiana.
Arius variolosus Cuvier & Valenciennes, Hist. Nat. Poiss., XV, 107, 1840, Cayenne, French Guiana.

211. **Tachysurus multiradiatus** (Günther).
Rio Bayano, near Panama.
Arius multiradiatus Günther, Cat., V, 173, 1864, Rio Bayano; after Kner.

Genus 74. CATHOROPS Jordan & Gilbert.

Cathorops Jordan & Gilbert, Bull. U. S. Fish. Com. 1882, 54 (*hypophthalmus*).

212. Cathorops hypophthalmus (Steindachner).

Panama.

Arius hypophthalmus Steindachner, Ichth. Beitr., IV, 31, pl. 10, 1875, Panama.

213. Cathorops gulosus (Eigenmann & Eigenmann).

Panama.

Tachisurus gulosus Eigenmann & Eigenmann, Proc. Cal. Ac. Sci. 1888, 146, Panama.

Genus 75. ICTALURUS Rafinesque. *Channel Cats.*

Ictalurus Rafinesque, Ichth. Ohiensis, 61, 1820 (*maculatus*=*punctatus*).

214. Ictalurus furcatus (LeSueur). *Chuckle-head Cat.*

Ohio to Iowa and Texas.

Pimelodus furcatus LeSueur, in Cuvier & Valenciennes, Hist. Nat. Poiss., IX, 136, 1840, New Orleans.

215. Ictalurus punctatus (Rafinesque). *Channel Cat; White Cat; Blue Cat.*

Rivers of Great Lakes region and Mississippi Valley and streams tributary to the Gulf of Mexico.

Silurus punctatus Rafinesque, Amer. Month. Mag. 1818, 359, Ohio River.

216. Ictalurus meridionalis (Günther).

Rio Usumacinta, Guatemala.

Amiurus meridionalis Günther, Cat., V, 102, 1864, Rio Usumacinta.

Genus 76. VILLARIUS Rutter.

Villarius Rutter, Proc. Cal. Ac. Sci. 1896, 256 (*pricei*).

217. Villarius pricei Rutter.

Northwestern Mexico.

Villarius pricei Rutter, Proc. Cal. Ac. Sci. 1896, 257, Rio Yaqui, Sonora.

218. Villarius dugesi (Bean).

Rio Turbio, Guanajuato, Mexico, west of the Sierra Madre.

Amiurus dugesi Bean, Proc. U. S. Nat. Mus. 1879, 304, Rio Turbio, Mexico.

Genus 77. AMEIURUS Rafinesque.

Ameiurus Rafinesque, Ichth. Ohiensis, 65, 1820 (*cupreus*=*natalis*).

Subgenus HAUSTOR Jordan & Evermann.

Haustor Jordan & Evermann, Fishes North and Middle America, 137, 1896 (*lacustris*).

219. Ameiurus lacustris (Walbaum). *Catfish of the Lakes; Great Fork-tailed Cat; Mississippi Cat; Florida Cat; Flannel-mouth Cat; Mathemeg, or Ugly Fish.*

Saskatchewan River and Great Lakes to Florida and Texas.

Gradus lacustris Walbaum, Artedi Piscium, 144, 1792, Arctic America.

220. Ameiurus lupus (Girard).

Rio Nueces and Rio Pecos, Texas.

Pimelodus lupus Girard, Pac. R. R. Surv., X, 211, 1858, Rio Pecos, Texas.

221. Ameiurus catus (Linnæus). *White Cat; Channel Cat of the Potomac.*

Delaware River to Texas; introduced into Sacramento and San Joaquin rivers.

Silurus catus Linnæus, Syst. Nat., ed. X, 305, 1758, northern part of America.

222. Ameiurus okeechobeensis (Heilprin). *Okeechobee Catfish.*

Florida.

Ictalurus okeechobeensis Heilprin, Trans. Wagner Inst. Sci. Phila., I, 1887, 129, pl. 18, Kissimee River, Florida.

Subgenus AMEIURUS Rafinesque.

223. **Ameiurus erebennus** Jordan.

New Jersey to Florida.
Amiurus erebennus Jordan, Bull. U. S. Nat. Mus., x, 85, figs. 19 and 20, 1877, St. Johns River, Florida.

224. **Ameiurus natalis** (LeSueur). *Yellow Cat.*

Great Lakes region to Virginia and Texas.
Pimelodus natalis LeSueur, Mém. Mus., v, 154, 1819, North America.

225. **Ameiurus vulgaris** (Thompson).

Vermont to Minnesota and Illinois.
Pimelodus vulgaris Thompson, Hist. Vermont, 138, 1842, Lake Champlain.

226. **Ameiurus nebulosus** (LeSueur). *Horned Pout; Common Bullhead; Schuylkill Cat; Small Catfish; Sacramento Cat.*

Great Lakes, Ohio Valley, eastward to Maine, southwestward to Texas, and southeastward to Florida; introduced into the Sacramento, San Joaquin, Humboldt, and Gila rivers.
Pimelodus nebulosus LeSueur, Mém. Mus., v, 149, 1819, Lake Ontario.

226a. **Ameiurus nebulosus catulus** (Girard).

Texas and northward into Arkansas.
Pimelodus catulus Girard, Pac. R. R. Surv., x, 208, 1858, Fort Smith, Arkansas.

226b. **Ameiurus nebulosus marmoratus** (Holbrook).

Indiana to Florida.
Pimelodus marmoratus Holbrook, Jour. Ac. Nat. Sci. Phila. 1855, 54, South Carolina.

227. **Ameiurus melas** (Rafinesque). *Black Bullhead; Small Catfish.*

Northern New York to Kansas and Texas.
Silurus melas Rafinesque, Quart. Jour. Sci. Lit. Arts Lond. 1820, 51, Ohio River.

228. **Ameiurus platycephalus** (Girard). *Mud Cat; Brown Cat.*

Carolina and eastern Georgia, from Cape Fear River to the Chattahoochee.
Pimelodus platycephalus Girard, Proc. Ac. Nat. Sci. Phila. 1859, 161, Anderson, South Carolina.

Subgenus GRONIAS Cope.

Gronias Cope, Proc. Ac. Nat. Sci. Phila. 1864, 231 (*nigrilabris*).

229. **Ameiurus nigrilabris** (Cope).

Cave streams tributary to Conestoga River in eastern Pennsylvania.
Gronias nigrilabris Cope, Proc. Ac. Nat. Sci. Phila. 1864, 231, Conestoga River, Pennsylvania.

Genus 78. **LEPTOPS** Rafinesque.

Leptops Rafinesque, Ichth. Ohiensis, 64, 1820 (*viscosus* = *olivaris*).

230. **Leptops olivaris** (Rafinesque). *Mud Cat; Yellow Cat; Bashaw; Russian Cat.*

Rivers of the Mississippi Valley and Southern States, southwest to Chihuahua, Mexico.
Silurus olivaris Rafinesque, Amer. Month. Mag. 1818, 355, Ohio River.

Genus 79. **NOTURUS** Rafinesque. *Stone Cats.*

Noturus Rafinesque, Amer. Month. Mag., November, 1818, 41 (*flavus*).

231. **Noturus flavus** Rafinesque. *Stone Cat.*

Great Lakes region, westward and south to Montana, Wyoming, and Texas.
Noturus flavus Rafinesque, Amer. Month. Mag. 1818, 41, Falls of Ohio River.

Genus 80. **SCHILBEODES** Bleeker. *Mad Toms.*

Schilbeodes Bleeker, Ichth. Archip. Indici. Prodr. Siluri., 258, 1858 (*gyrinus*).

Subgenus **SCHILBEODES** Bleeker.

232. Schilbeodes gyrinus (Mitchill).

Hudson River and westward through the Mississippi Valley, the upper lake region, and Rainy River.

Silurus gyrinus Mitchill, Amer. Month. Mag. 1818, 322, Walkill River, New York.

233. Schilbeodes leptacanthus (Jordan).

Gulf States.

Noturus leptacanthus Jordan, Ann. Lyc. Nat. Hist. N. Y. 1876, 352, Etowah River, Rome, Georgia.

Subgenus **RABIDA** Jordan & Evermann.

Rabida Jordan & Evermann, Fishes North and Middle America, 146, 1896 (*furiosus*).

234. Schilbeodes nocturnus (Jordan & Gilbert).

Lower Wabash River in Indiana, and the Poteau, Washita, and Saline rivers, Arkansas.

Noturus nocturnus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1886, 6, Saline River at Benton, Arkansas.

235. Schilbeodes funebris (Gilbert & Swain).

Tributary of Black Warrior River, Tuscaloosa, Alabama.

Noturus funebris Gilbert & Swain, Bull. U. S. Fish. Com. 1889, 153, North River, Tuscaloosa, Alabama.

236. Schilbeodes exilis (Nelson).

Wisconsin to Missouri and Kansas.

Noturus exilis Nelson, Bull. Ill. Lab. Nat. Hist., vol. 1, No. 1, 51, 1876, Illinois River.

237. Schilbeodes insignis (Richardson). *Mad Tom.*

Pennsylvania to South Carolina.

Pimelodus insigne Richardson, Fauna Bor.-Amer., III, 132, 1836; based on *Pimelode livrée* LeSueur.

238. Schilbeodes gilberti (Jordan & Evermann).

Roanoke River in southwestern Virginia.

Noturus gilberti Jordan & Evermann, Proc. U. S. Nat. Mus. 1888, 352, Roanoke River, Roanoke, Virginia.

239. Schilbeodes eleutherus (Jordan).

Mississippi Valley.

Noturus eleutherus Jordan, Ann. Lyc. Nat. Hist. N. Y., XI, 1876 (1877), 371, Big Pigeon River, Newport, Tennessee.

240. Schilbeodes miurus (Jordan).

Mississippi Valley and tributaries of Lake Michigan, south to Louisiana.

Noturus miurus Jordan, Ann. Lyc. Nat. Hist. N. Y. 1877, 371, White River, Indiana.

241. Schilbeodes furiosus (Jordan & Meek).

Eastern and central North Carolina.

Noturus furiosus Jordan & Meek, Proc. U. S. Nat. Mus. 1888, 351, Neuse River, Milburnie, North Carolina.

Genus 81. **RHAMDIA** Bleeker. *Bagres de Rio.*

Rhamdia Bleeker, Ichth. Arch. Ind. Siluri., 197, 1858 (*quelen*).

Subgenus **RHAMDIA** Bleeker.

242. Rhamdia wagneri (Günther). *Barbudo.*

Rivers of Central America.

Pimelodus wagneri Günther, Fishes Cent. Am., 474, 1869, Atlantic and Pacific rivers of Panama.

Subgenus RHAMDELLA Eigenmann & Eigenmann.

Rhamdella Eigenmann & Eigenmann, Proc. Cal. Ac. Sci., 2d series, I, 1888, 129 (*eriarcha*).

243. Rhamdia baronis-mulleri (Troschel).

"Pacific Ocean" in Mexico.

Pimelodus baronis-mülleri Troschel, in Müller's Beiträge zur Geschichte, Statistik und Zoologie von Mexico, III, 636, 1865, no definite locality.

244. Rhamdia motaguensis (Günther).

Rio Motagua, Guatemala.

Pimelodus motaguensis Günther, Cat., V, 127, 1864, Rio Motagua, Guatemala.

245. Rhamdia brachyptera (Cope).

Orizaba, Mexico.

Pimelodus brachypterus Cope, Trans. Am. Phil. Soc. 1866, 404, Orizaba, Mexico.

246. Rhamdia salvini (Günther).

Rio San Geronimo, Guatemala.

Pimelodus salvini Günther, Cat., V, 130, 1864, Rio San Geronimo, Guatemala.

247. Rhamdia hypselura (Günther).

Mexico.

Pimelodus hypselurus Günther, Cat., V, 126, 1864, Mexico.

248. Rhamdia laticauda (Heckel).

Mexico.

Pimelodus laticaudus Heckel, in Kner, Sitz. Wien. Ac., XXVI, 420, 1757, Mexico.

249. Rhamdia godmani (Günther).

Valley of Rio Usumacinta, Guatemala.

Pimelodus godmani Günther, Cat., V, 124, 1864, Rio Usumacinta, Guatemala.

250. Rhamdia guatemalensis (Günther).

Rio Huamuchal, Guatemala.

Pimelodus guatemalensis Günther, Cat., V, 122, 1864, Rio Huamuchal, Guatemala.

251. Rhamdia nicaraguensis (Günther).

Lake Nicaragua, Nicaragua.

Pimelodus nicaraguensis Günther, Cat., V, 125, 1864, Lake Nicaragua, Nicaragua.

252. Rhamdia microptera (Günther).

Rio San Geronimo, Guatemala.

Pimelodus micropterus Günther, Cat., V, 124, 1864, Rio San Geronimo, Guatemala.

253. Rhamdia managuensis (Günther).

Lake Managua, Nicaragua.

Pimelodus managuensis Günther, Fishes Cent. Am., 474, 1869, Lake Managua, Nicaragua.

254. Rhamdia polycaula (Günther).

Rio San Geronimo, Guatemala.

Pimelodus polycaulus Günther, Cat., V, 131, 1864, Rio San Geronimo, Guatemala.

255. Rhamdia petenensis (Günther).

Lake Peten, Yucatan.

Pimelodus petenensis Günther, Cat., V, 126, 1864, Lake Peten, Yucatan.

256. Rhamdia parryi (Eigenmann).

Rio Zanalenco, Chiapas.

Rhamdella parryi Eigenmann, Proc. Cal. Ac. Sci. 1888, 130, Rio Zanalenco, Chiapas.

Genus 82. PIMELODELLA Eigenmann & Eigenmann.

Pimelodella Eigenmann & Eigenmann, Proc. Cal. Ac. Sci. 1888, 131 (*cristatus*).

257. Pimelodella chagresi (Steindachner).

Rio Chagres, Panama.
Pimelodus chagresi Steindachner, Ichth. Beitr., IV, 34, 1876, Rio Chagres, at Obispo.

258. Pimelodella modesta (Günther).

Esmeraldas, Ecuador; also recorded, perhaps doubtfully, from Rio Chagres.
Pimelodus modestus Günther, Proc. Zool. Soc. Lond. 1860, 239, Esmeraldas, Ecuador.

Genus 83. PIMELODUS Lacépède. *Congros Barbosos.*

Pimelodus Lacépède, Hist. Nat. Poiss., V, 94, 1803 (*quadrimaculatus*, etc.; includes various genera).

259. Pimelodus maculatus Lacépède. *Congro Barboso.*

Rio Mamoni (Panama) and southeastward to Rio de la Plata.
Pimelodus maculatus Lacépède, Hist. Nat. Poiss., V, 94, 107, 1803, Rio de la Plata.

Family XXXV. LORICARIIDÆ.

Genus 84. LORICARIA Linnæus.

Loricaria Linnæus, Syst. Nat., ed. X, 307, 1758 (*cataphracta*).

Subgenus HEMIODON Kner.

Hemiodon Kner, Panzerwelse, 89, 1853 (*depressus*).

260. Loricaria panamensis Eigenmann & Eigenmann.

Panama.
Loricaria panamensis Eigenmann & Eigenmann, S. A. Nematognathi, 365, 1890, Panama.

Subgenus STURISOMA Swainson.

Sturisoma Swainson, Nat. Hist. Fishes, II, 304, 1839 (*rostrata*).

261. Loricaria rostrata Spix.

Rivers of eastern South America from Panama to Paraguay River.
Loricaria rostrata Spix, Pisc. Brasil., 5, 1829, Rio Blanco.

Subgenus RINELORICARIA Bleeker.

Rineloricaria Bleeker, Nederl. Tijdschr. Dierk., 80, 1863 (*lima*).

262. Loricaria lima Kner.

Brazil, from Parahyba River northward to Panama.
Loricaria lima Kner, Panzerwelse, 89, 1853, Brazil.

263. Loricaria bransfordi Gill.

Isthmus of Panama.
Loricaria bransfordi Gill, Proc. Ac. Nat. Sci. Phila. 1876, 338, Empire Station, Isthmus Railway, Panama.

Subgenus PARAHEMIODON Bleeker.

Parahemiodon Bleeker, Nederl. Tijdschr. Dierk., 80, 1863 (*typus*).

264. Loricaria uracantha Kner & Steindachner.

Rio Chagres, Panama.
Loricaria uracantha Kner & Steindachner, Abh. Bayer. Ac. Wiss., 56, 1865, Rio Chagres, Panama.

Subgenus LORICARIA Linnæus.

265. **Loricaria variegata** Steindachner.
Rio Mamoni, Panama.
Loricaria variegata Steindachner, Flussfische Südamer., I, 15, 1879, Rio Mamoni, Panama.

Genus 85. HEMIANCISTRUS Bleeker.
Hemiancistrus Bleeker, Tijdschr. Dierk., I, 78, 1863 (*medians*).

266. **Hemiancistrus guacharote** (Cuvier & Valenciennes).
Porto Rico.
Hypostomus guacharote Cuvier & Valenciennes, Hist. Nat. Poiss., XV, 508, 1840, Porto Rico.

267. **Hemiancistrus aspidolepis** (Günther).
Veragua.
Chætostomus aspidolepis Günther, Fishes Central Amer., 478, 1869, Veragua.

Genus 86. CHÆTOSTOMUS Kner.
Chætostomus Kner, Hypostomiden, 272, 1853 (*loborhynchus*).

268. **Chætostomus fischeri** Steindachner. *Couchu.*
Rio Mamoni, near Panama.
Chætostomus fischeri Steindachner, Flussfische Südamer., I, 14, 1879, Rio Mamoni, Panama.

Genus 87. ANCISTRUS Kner.
Ancistrus Kner, Hypostomiden, 272, 1853 (*cirrhosus*).

269. **Ancistrus chagresi** Eigenmann & Eigenmann.
Rio Chagres, Panama.
Ancistrus chagresi Eigenmann & Eigenmann, Proc. Cal. Ac. Sci. 1889, 47, Rio Chagres, Panama.

Order N. PLECTOSPONDYLI. The Carp-like Fishes.

Suborder EVENTOGNATHI. The Carps.

Family XXXVI. CATOSTOMIDÆ. The Suckers.

Genus 88. ICTIOBUS Rafinesque. *Buffalo-fishes.*
Ictiobus Rafinesque, Ichth. Ohiensis, 55, 1820 (*bubalus*).

Subgenus SCLEROGNATHUS Cuvier & Valenciennes.
Sclerognathus Cuvier & Valenciennes, Hist. Nat. Poiss., XVII, 477, 1844 (*cyprinella*).

270. **Ictiobus cyprinella** (Cuvier & Valenciennes). *Red-mouth Buffalo-fish; Common Buffalo-fish.*
Mississippi Valley.
Sclerognathus cyprinella Cuvier & Valenciennes, Hist. Nat. Poiss., XVII, 477, 1844, Lake Pontchartrain, Louisiana.

Subgenus ICTIOBUS Rafinesque.

271. **Ictiobus urus** (Agassiz). *Mongrel Buffalo.*
Mississippi Valley.
Carpiodes urus Agassiz, Amer. Jour. Sci. Arts 1854, 355, Tennessee River, Huntsville, Alabama.

272. **Ictiobus meridionalis** (Günther).
Rio Usumacinta, Guatemala.
Sclerognathus meridionalis Günther, Cat., VII, 23, 1868, Rio Usumacinta, Guatemala.

273. Ictiobus bubalus (Rafinesque). *Small-mouthed Buffalo; Razor-backed Buffalo; Sucker-mouthed Buffalo.*

Mississippi Valley and southward.
Amblodon bubalus Rafinesque, Jour. Phys. 1818, 421, Ohio River.

Genus 89. CARPIODES Rafinesque.

Carpiodes Rafinesque, Ichth. Ohiensis, 56, 1820 (*cyprinus*).

274. Carpiodes carpio (Rafinesque). *Carp Sucker.*

Ohio Valley, southwest to central Texas.
Catostomus carpio Rafinesque, Ichth. Ohiensis, 56, 1820, Falls of Ohio River.

275. Carpiodes difformis Cope.

Ohio Valley and westward.
Carpiodes difformis Cope, Proc. Am. Phil. Soc. Phila. 1870, 480, Wabash River.

276. Carpiodes thompsoni Agassiz. *Lake Carp; "Drum."*

Lake Champlain and Great Lakes region.
Carpiodes thompsoni Agassiz, Am. Jour. Sci. Arts 1855, 191, Lake Champlain.

277. Carpiodes velifer (Rafinesque). *Quillback; Spearfish; Sailfish; Skimback.*

Mississippi Valley and southwestward to Rio Grande and upper Missouri.
Catostomus velifer Rafinesque, Ichth. Ohiensis, 56, 1820, Ohio River.

278. Carpiodes cyprinus (LeSueur). *Eastern Carp Sucker.*

Streams about Chesapeake Bay.
Catostomus cyprinus LeSueur, Jour. Ac. Nat. Sci. Phila., I, 1817, 91, Elk River and other tributaries of Chesapeake Bay.

Genus 90. CYCLEPTUS Rafinesque. *Blackhorse.*

Cycleptus Rafinesque, Jour. Phys. 1819, 421 (*nigrescens*).

279. Cycleptus elongatus (LeSueur). *Blackhorse; Gourd-seed Sucker; Missouri Sucker; Suckerel.*

Upper Mississippi Valley.
Catostomus elongatus LeSueur, Jour. Ac. Nat. Sci. Phila., I, 1817, 103, Ohio River.

Genus 91. PANTOSTEUS Cope. *Mountain Suckers.*

Pantosteus Cope, Lieut. Wheeler's Expl. W. 100th Mer., V, 673, 1876 (*platyrhynchus=generosus*).

280. Pantosteus arizonæ Gilbert.

Gila Basin, Arizona.
Pantosteus arizonæ Gilbert, in Jordan & Evermann, Fish. N. and M. Amer., 170, 1896, Salt River, Tempe, Arizona.

281. Pantosteus generosus (Girard). *Mountain Sucker.*

Great Basin of Utah.
Catostomus generosus Girard, Proc. Ac. Nat. Sci. Phila. 1856, 174, Cottonwood Creek, Utah.

282. Pantosteus plebeius (Baird & Girard).

Basin of the Rio Grande.
Catostomus plebeius Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1854, 28, Rio Mimbres, a tributary of Lake Guzman, Chihuahua.

283. Pantosteus delphinus (Cope). *Blue-headed Sucker.*

Mountain streams tributary to the Colorado River in western Colorado and Wyoming.
Minomus delphinus Cope, Hayden's Geol. Surv. Wyoming for 1870 (1872), 435, probably Henry Fork of Green River, Wyoming.

284. Pantosteus guzmaniensis (Girard).

Streams of Coahuila and Chihuahua tributary to the Rio Grande.
Catostomus guzmaniensis Girard, Proc. Ac. Nat. Sci. Phila. 1856, 173, Rio Janos, a tributary of Lake Guzman, Chihuahua.

285. Pantosteus jordani Evermann.

Upper Missouri and Columbia River basins.
Pantosteus jordani Evermann, Bull. U. S. Fish Com. 1892 (January 27, 1893), 51, Whitewood Creek and other streams of the Black Hills, South Dakota.

286. Pantosteus aræopus (Jordan).

Kern River, California; Carson River and Reese River, Nevada.
Catostomus aræopus Jordan, Bull. U. S. Nat. Mus., XII, 173, 1878, Kern River, California.

287. Pantosteus clarki (Baird & Girard).

Rio Gila and tributaries in Arizona.
Catostomus clarki Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1854, 27, Rio Santa Cruz, Gila Basin, Arizona.

Genus 92. CATOSTOMUS LeSueur. *Fine-scaled Suckers.*

Catostomus LeSueur, Jour. Ac. Nat. Sci. Phila., I, 1817, 89 (*catostomus*).

Subgenus CATOSTOMUS LeSueur.

288. Catostomus latipinnis Baird & Girard. *Flannel-mouthed Sucker.*

Rio Colorado and Rio Gila and their tributaries.
Catostomus latipinnis Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1853, 388, Rio San Pedro, Gila Basin.

289. Catostomus discobolus Cope.

Upper Colorado Basin.
Catostomus discobolus Cope, Hayden's Geol. Surv. Wyo., 435, 1870 (1872), Green River, Wyoming.

290. Catostomus griseus (Girard).

Platte River and upper Missouri region.
Acomus griseus Girard, Proc. Ac. Nat. Sci. Phila. 1856, 174, Sweetwater Fork of Platte River, Wyoming.

291. Catostomus retropinnis Jordan.

Northern Montana.
Catostomus retropinnis Jordan, Bull. U. S. Nat. Mus., XII, 178, 1878, Milk River, Montana.

292. Catostomus pocatello Gilbert & Evermann. *Moogadee.*

Upper Snake River basin; the type from near Pocatello, Idaho.
Catostomus pocatello Gilbert & Evermann, Bull. U. S. Fish Com. 1894, 189, pl. 21, fig. 1, Ross Fork of Snake River, near Pocatello, Idaho.

293. Catostomus catostomus (Forster). *Long-nosed Sucker; Northern Sucker; Red Sucker.*

Great Lakes, upper Missouri River, upper Columbia, and northwestward to Alaska; very abundant northward, but not coming south of latitude 40°.
Cyprinus catostomus Forster, Phil. Trans. 1773, 155, streams about Hudson Bay.

294. Catostomus tahoensis Gill & Jordan. *Tahoe Sucker.*

Lake Tahoe and Humboldt River at Winnemucca, Nevada.
Catostomus tahoensis Gill & Jordan, in Jordan, Bull. U. S. Nat. Mus., XII, 173, 1878, Lake Tahoe, California.

295. Catostomus rex R. S. Eigenmann.

Lost River, Tule Lake, Oregon.
Catostomus rex Rosa Smith Eigenmann, Am. Nat., July, 1891, 667, Lost River, Oregon.

Subgenus DECACTYLUS Rafinesque.

Decactylus Rafinesque, Ichth. Ohiensis, 60, 1820 (*bostoniensis*=*commersonii*)

296. Catostomus labiatus Ayres.

Klamath Lake, Oregon.
Catostomus labiatus Ayres, Proc. Cal. Ac. Sci. 1855, 32, Klamath Lake, Oregon.

297. Catostomus occidentalis Ayres. *Sacramento Sucker.*

Streams of California; Sacramento and San Joaquin rivers.

Catostomus occidentalis Ayres, Proc. Cal. Ac. Sci. 1854, 18, San Francisco.

298. Catostomus bernardini Girard.

San Bernardino Creek, a tributary of Rio Yaqui, on the boundary of Arizona and Sonora.

Catostomus bernardini Girard, Proc. Ac. Nat. Sci. Phila. 1856, 175, San Bernardino Creek, Arizona.

299. Catostomus macrocheilus Girard. *Columbia River Sucker.*

Columbia River basin as far up as Flathead Lake, Montana, Upper Salmon Falls, and the headwaters of Salmon River.

Catostomus macrocheilus Girard, Proc. Ac. Nat. Sci. Phila. 1856, 175, Astoria, Oregon.

300. Catostomus commersonii (Lacépède). *Common Sucker; White Sucker; Brook Sucker; Fine-scaled Sucker.*

Quebec and the Great Lakes to Montana, Colorado, and southward to Missouri and Georgia.

Cyprinus commersonii Lacépède, Hist. Nat. Poiss., v, 502, 1803, locality unknown.

301. Catostomus ardens Jordan & Gilbert. *Mullet of Utah Lake.*

Great Basin of Utah and upper Snake River, Idaho.

Catostomus ardens Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 464, Utah Lake, Provo, Utah.

302. Catostomus gila Kirsch.

Rio Gila, Arizona.

Catostomus gila Kirsch, Proc. U. S. Nat. Mus. 1888, 555, Rio Gila, Fort Thomas, Arizona.

303. Catostomus insignis Baird & Girard.

Gila Basin, Arizona.

Catostomus insignis Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1854, 28, Rio San Pedro, Arizona.

Subgenus HYPENTELIUM Rafinesque.

Hypentelium Rafinesque, Jour. Ac. Nat. Sci. Phila. 1818, 421 (*macropterum*=*nigricans*).

304. Catostomus nigricans LeSueur. *Hog Sucker; Stone-roller; Toter; Crawl-a-bottom; Hammer Head; Stone-lugger; Hog Molly.*

New York to Minnesota, Kansas, Arkansas, and the Carolinas.

Catostomus nigricans LeSueur, Jour. Ac. Nat. Sci. Phila. 1817, 102, Lake Erie.

305. Catostomus rhothœcus Thoburn.

Eastern Tennessee or southwestern Virginia.

Catostomus rhothœcus Thoburn, in Jordan & Evermann, Fishes North and Middle America, 181, 1896, supposed to be from French Broad River, Tennessee.

Genus 93. CHASMISTES Jordan.

Chasmistes Jordan, Bull. Hayden's Geol. Surv. Terr., IV, No. 2, 417, 1878 (*liorus*).

306. Chasmistes fecundus Cope & Yarrow. *Webug Sucker.*

Utah Lake.

Catostomus fecundus Cope & Yarrow, Zool. Wheeler Surv., v, 678, 1876, Utah Lake.

307. Chasmistes brevirostris Cope.

Klamath Lake, Oregon.

Chasmistes brevirostris Cope, Am. Nat. 1879, 785, Klamath Lake, Oregon.

308. Chasmistes liorus (Jordan). *June Sucker of Utah Lake.*

Utah Lake.

Chasmistes liorus Jordan, Bull. U. S. Nat. Mus., XII, 219, 1878, Utah Lake at Provo, Utah.

309. **Chasmistes cujus** Cope. *Couia.*
Pyramid Lake, Nevada.
Chasmistes cujus Cope, Proc. Ac. Nat. Sci. Phila. 1883, 149, Pyramid Lake.

Genus 94. **DELTISTES** Seale.
Deltistes Seale, Proc. Cal. Ac. Sci. 1896 (*luxatus*).

310. **Deltistes luxatus** (Cope).
Klamath Lake and Klamath River, Oregon.
Chasmistes luxatus Cope, Am. Nat. 1879, 784, Klamath Lake.

Genus 95. **XYRAUCHEN** Eigenmann & Kirsch. *Razor-back Suckers.*
Xyrauchen Eigenmann & Kirsch, Proc. U. S. Nat. Mus. 1888, 556 (*cypho*).

311. **Xyrauchen cypho** (Lockington). *Razor-back Sucker; Hump-backed Sucker.*
Basin of the Colorado and Gila rivers.
Catostomus cypho Lockington, Proc. Ac. Nat. Sci. Phila. 1880, 237, Colorado River at mouth of the Gila, Arizona.

312. **Xyrauchen uncompahgre** Jordan & Evermann.
Uncompahgre River in the Colorado basin.
Xyrauchen uncompahgre Jordan & Evermann, Bull. U. S. Fish Com. 1889 (1891), 26, Uncompahgre River, Delta, Colorado.

Genus 96. **ERIMYZON** Jordan. *Chub Suckers.*
Erimyzon Jordan, Bull. Buffalo Soc. Nat. Hist., 95, 1876 (*oblongus*).

313. **Erimyzon sucetta** (Lacépède). *Creek-fish; Chub Sucker.*
Great Lakes, Mississippi Valley, and eastward in lakes and lowland streams.
Cyprinus sucetta Lacépède, Hist. Nat. Poiss., v, 606, 1803, South Carolina.

313a. **Erimyzon sucetta oblongus** (Mitchill).
Great Lakes region to Maine and Dakota, south to Virginia and Indian Territory.
Cyprinus oblongus Mitchill, Trans. Lit. Phil. Soc. N. Y., I, 1815, 459, New York.

Genus 97. **MINYTREMA** Jordan. *Spotted Suckers.*
Minytrema Jordan, Man. Vert. E. U. S., ed. 2, 318, 1878 (*melanops*).

314. **Minytrema melanops** (Rafinesque). *Winter Sucker; Spotted Sucker.*
Great Lakes region to North Carolina, west to Texas.
Catostomus melanops Rafinesque, Ichth. Ohiensis, 57, 1820, Ohio River.

Genus 98. **MOXOSTOMA** Rafinesque. *Redhorse.*
Moxostoma Rafinesque, Ichth. Ohiensis, 54, 1820 (*anisurum*).

315. **Moxostoma papillosum** (Cope). *White Mullet.*
Dismal Swamp in Virginia to the Ocmulgee River, Georgia.
Ptychostomus papillosus Cope, Proc. Am. Phil. Soc. Phila. 1870, 470, Catawba and Yadkin rivers, North Carolina.

316. **Moxostoma anisurum** (Rafinesque). *White-nosed Sucker.*
Ohio River and Great Lakes region.
Catostomus anisurus Rafinesque, Ichth. Ohiensis, 54, 1820, Ohio River.

317. **Moxostoma collapsum** (Cope).
Lowland streams of North Carolina.
Ptychostomus collapsus Cope, Proc. Am. Phil. Soc. 1870, 471, Neuse, Yadkin, and Catawba rivers, North Carolina.

318. **Moxostoma bucco** (Cope).
Missouri River at St. Joseph.
Ptychostomus bucco Cope, Hayden's Geol. Surv. Wyo., 437, 1872, St. Joseph, Mo.

319. Moxostoma pidiense (Cope).

Great Pedee Basin.

Ptychostomus pidiensis Cope, Proc. Am. Phil. Soc. Phila. 1870, 471, Yadkin River, North Carolina.

320. Moxostoma coregonus (Cope). *Blue Mullet.*

Catawba and Yadkin rivers, North Carolina.

Ptychostomus coregonus Cope, Proc. Am. Phil. Soc. Phila. 1870, 472, Catawba and Yadkin rivers.

321. Moxostoma album (Cope).

Rivers of North Carolina.

Ptychostomus albus Cope, Proc. Am. Phil. Soc. Phila. 1870, 472, Catawba River.

322. Moxostoma thalassinum (Cope).

Yadkin River, North Carolina.

Ptychostomus thalassinus Cope, Proc. Am. Phil. Soc. Phila. 1870, 472, Yadkin River, North Carolina.

323. Moxostoma congestum (Baird & Girard). *Texas Redhorse.*

Streams of Texas.

Catostomus congestus Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1854, 27, Rio Salado, Texas.

324. Moxostoma austrinum Bean.

Rio de Santiago, Mexico, known from Michoacan, Mexico (west of Sierra Madre); Rio Lerma, at Salamanca.

Myxostoma austrinum Bean, Proc. U. S. Nat. Mus. 1879, 302, Piedad in Morelia, Michoacan, Mexico.

325. Moxostoma aureolum (LeSueur). *Common Redhorse; Mullet; White Sucker; Large-scaled Sucker.*

Great Lakes, Mississippi Valley, and other streams west of the Allegheny Mountains, and west to the Dakotas and Manitoba.

Catostomus aureolus LeSueur, Jour. Ac. Nat. Sci. Phila., 1, 1817, 95, Lake Erie, near Buffalo, New York.

326. Moxostoma robustum (Cope).

Yadkin River, North Carolina.

Ptychostomus robustus Cope, Proc. Am. Phil. Soc. Phila. 1870, 473, Yadkin River.

327. Moxostoma macrolepidotum (LeSueur).

Streams about Chesapeake and Delaware bays, and southward to North Carolina, east of the Alleghanies.

Catostomus macrolepidotus LeSueur, Jour. Ac. Nat. Sci. Phila., 1, 1817, 94, Delaware River.

328. Moxostoma crassilabre (Cope).

Streams of eastern North Carolina.

Ptychostomus crassilabris Cope, Proc. Am. Phil. Soc. Phila. 1879, 477, Neuse River, Raleigh, North Carolina.

329. Moxostoma lesueurii (Richardson). *Picconou.*

Pine Island Lake and Albany River, British America.

Catostomus lesueurii Richardson, Franklin's Journal, 1823, 772, Pine Island Lake, British America.

330. Moxostoma breviceps (Cope).

Ohio Valley and Great Lakes region.

Ptychostomus breviceps Cope, Proc. Am. Phil. Soc. Phila. 1870, 478, Youghiogheny River, Pennsylvania.

331. Moxostoma conus (Cope).

Neuse and Yadkin rivers, North Carolina.

Ptychostomus conus Cope, Proc. Am. Phil. Soc. Phila. 1870, 478, Yadkin River.

332. Moxostoma pœcilurum Jordan.

Southern Mississippi to eastern Texas; Pearl, Tangipahoa, and Sabine rivers.

Myxostoma pœcilura Jordan, Bull. U. S. Nat. Mus., x, 66, 1877, Tangipahoa River, Louisiana.

333. Moxostoma rupiscartes Jordan & Jenkins. *Jump-rocks.*

Rivers of the Carolinas and Georgia from the Catawba to the Chattahoochee River.

Moxostoma rupiscartes Jordan & Jenkins, Proc. U. S. Nat. Mus. 1888, 353, Catawba River, at Marion, N. C., and other streams in North and South Carolina.

334. Moxostoma cervinum (Cope). *Jumping Mullet.*

Rivers of the South Atlantic States from the James to the Neuse.

Teretulus cervinus Cope, Jour. Ac. Nat. Sci. Phila. 1868, 236, headwaters of Roanoke and James rivers, Virginia.

Genus 99. PLACOPHARYNX Cope.

Placopharynx Cope, Proc. Am. Phil. Soc. Phila. 1870, 467 (*carinatus* = *duquesnii*).

335. Placopharynx duquesnii (LeSueur).

Michigan (Detroit) to Tennessee, Georgia, and Arkansas.

Catostomus duquesnii LeSueur, Jour. Ac. Nat. Sci. Phila., I, 1817, 105, Ohio River at Pittsburg.

Genus 100. LAGOCHILA Jordan & Brayton. *Rabbit-mouth Suckers.*

Lagochila Jordan & Brayton, Proc. Ac. Nat. Sci. Phila. 1877, 280 (*lacera*).

336. Lagochila lacera Jordan & Brayton. *Hare-lip Sucker; Cut-lips; Split-mouth Sucker; May Sucker; Rabbit-mouth Sucker; Pea-lip Sucker.*

Mississippi Valley, Ozark Mountains, Scioto, Tippecanoe, Clinch, Cumberland and Chickamauga rivers, and the White River of Arkansas.

Lagochila lacera Jordan & Brayton, Proc. Ac. Nat. Sci. Phila. 1877, 280, Chickamauga River, Ringgold, Georgia.

Family XXXVII. CYPRINIDÆ. The Carps.

Genus 101. CAMPOSTOMA Agassiz. *Stone-rollers.*

Campostoma Agassiz, Am. Jour. Sci. Arts 1855, 218 (*anomalum*).

337. Campostoma ornatum Girard.

Chihuahua River, Mexico.

Campostoma ornatum Girard, Proc. Ac. Nat. Sci. Phila. 1856, 176, Chihuahua River, Mexico.

338. Campostoma pricei Jordan & Thoburn.

Springs in the Chiricahua Mountains in southern Arizona, tributary to the Rio Yaqui.

Campostoma pricei Jordan & Thoburn, in Jordan & Evermann, Fishes North and Middle America, 205, 1896, Rucker Canyon, Chiricahua Mountains, Arizona.

339. Campostoma anomalum (Rafinesque). *Stone-roller; Stone-lugger; Steel-backed Chub; Mammy; Dough-belly.*

Central New York to Tennessee, Wyoming, and Texas.

Rutilus anomalus Rafinesque, Ichth. Ohiensis, 52, 1820, Licking River, Kentucky.

340. Campostoma formosulum Girard.

San Antonio River to the Rio Grande.

Campostoma formosulum Girard, Proc. Ac. Nat. Sci. Phila. 1856, 176, Rio Sabinal, near San Antonio, Texas.

Genus 102. ORTHODON Girard.

Orthodon Girard, Proc. Ac. Nat. Sci. Phila. 1856, 182 (*microlepidota*).

341. Orthodon microlepidotus (Ayres). *Blackfish.*

Lower Sacramento and San Joaquin rivers.

Gila microlepidota Ayres, Proc. Cal. Ac. Sci., I, 1855, 21, Sacramento and San Joaquin rivers, California.

Genus 103. OXYGENEUM Forbes.

Oxygeneum Forbes, Bull. Ill. Lab. Nat. Hist., II, 136, 1885 (*pulverulentum*).

342. Oxygeneum pulverulentum Forbes.

Illinois River.

Oxygeneum pulverulentum Forbes, Bull. Ill. Lab., II, 136, 1885, Illinois River.

Genus 104. ACROCHEILUS Agassiz. *Chisel-mouths.*

Acrocheilus Agassiz, Am. Jour. Sci. Arts 1855, 211 (*alutaceus*).

343. Acrocheilus alutaceus Agassiz & Pickering. *Chisel-mouth; Square-mouth; Hard-mouth.*

Lower Columbia River, as far up as Spokane and Shoshone Falls.

Acrocheilus alutaceus Agassiz & Pickering, Am. Jour. Sci. Arts, XIX, 1855, 214, Willamette Falls and Walla Walla River, Oregon.

Genus 105. LAVINIA Girard.

Lavinia Girard, Proc. Ac. Nat. Sci. Phila. 1854, 137 (*exilicauda*).

344. Lavinia exilicauda Baird & Girard. *Hitch; Chi.*

Streams of the Coast Range about San Francisco and Monterey; locally common as far north as Clear Lake, California.

Lavinia exilicauda Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1854, 137, Sacramento River, California.

Genus 106. CHROSOMUS Rafinesque.

Chrosomus Rafinesque, Ichth. Ohiensis, 47, 1820 (*erythrogaster*).

345. Chrosomus erythrogaster Rafinesque. *Red-bellied Dace.*

New Brunswick to Ohio, Michigan, Iowa, and northern Alabama.

Chrosomus erythrogaster Rafinesque, Ichth. Ohiensis, 47, 1820, Ohio River.

345a. Chrosomus erythrogaster eos Cope.

Susquehanna River.

Chrosomus eos Cope, Proc. Ac. Nat. Sci. Phila. 1861, 523, Meshoppen Creek, Susquehanna County, Pennsylvania.

346. Chrosomus dakotensis Evermann & Cox.

Missouri River basin in Nebraska and South Dakota.

Chrosomus dakotensis Evermann & Cox, Report U. S. Fish Com. 1894 (1896), 395, Crow Creek, Chamberlain, South Dakota.

347. Chrosomus oreas Cope.

Headwaters of Roanoke River, and clear tributaries of the Tennessee River.

Chrosomus oreas Cope, Jour. Ac. Nat. Sci. Phila. 1868, 233, head of Roanoke River, Montgomery County, Virginia.

Genus 107. ALGANSEA Girard.

Algansea Girard, Proc. Ac. Nat. Sci. Phila. 1856, 184 (*tincella*).

348. Algansea tincella (Cuvier & Valenciennes).

Lakes about the City of Mexico.

Leuciscus tincella Cuvier & Valenciennes, Hist. Nat. Poiss., XVII, 323, 1844, City of Mexico.

349. Algansea lacustris Steindachner.

Lake Pátzcuaro, Mexico.

Algansea lacustris Steindachner, Einige Fischarten Mexico's, 10, pl. 3, figs. 1–1*b*, 1895, Lake Pátzcuaro, near City of Mexico.

350. Algansea tarascorum Steindachner.

Lake Pátzcuaro, Mexico.

Algansea tarascorum Steindachner, Einige Fischarten Mexico's, 11, pl. 3, figs. 2-2c, Lake Pátzcuaro, near City of Mexico.

351. Algansea dugesi Bean.

Central Mexico, in streams tributary to Rio de Lerma.

Algansea dugesi Bean, Proc. U. S. Nat. Mus. 1892, 283, Lake Yuriria, Guanajuato, Mexico.

352. Algansea sallæi (Günther).

Streams of central Mexico.

Ceratichthys sallæi Günther, Cat., VII, 484, 1868, Cuernavaca, Mexico.

Genus 108. HYBOGNATHUS Agassiz.

Hybognathus Agassiz, Am. Jour. Sci. Arts 1855, 223 (*nuchalis*).

Subgenus HYBOGNATHUS Agassiz.

353. Hybognathus nuchale Agassiz. · *Silvery Minnow; Gudgeon.*

Clear streams from Delaware and Neuse rivers to Nebraska and southward to Georgia and Texas.

Hybognathus nuchalis Agassiz, Am. Jour. Sci. Arts 1855, 224, Quincy, Illinois.

353a. Hybognathus nuchale evansi (Girard).

Upper Missouri Basin

Hybognathus evansi Girard, Proc. Ac. Nat. Sci. Phila. 1856, 182, Fort Pierre, Nebraska.

354. Hybognathus argyrite Girard.

Upper Missouri region and Red River of the North.

Hybognathus argyritis Girard, Proc. Ac. Nat. Sci. Phila. 1856, 182, Milk River.

355. Hybognathus hayi Jordan.

Lower Mississippi Valley and neighboring rivers in Mississippi.

Hybognathus hayi Jordan, Proc. U. S. Nat. Mus. 1884, 548, Pearl River, Miss.

Subgenus DIONDA Girard.

Dionda Girard, Proc. Ac. Nat. Sci. Phila. 1856, 177 (*episcopa*).

356. Hybognathus serenum (Girard).

Rivers of western Texas.

Dionda serena Girard, Proc. Ac. Nat. Sci. Phila. 1856, 177, Sabinal River, Texas.

357. Hybognathus episcopum (Girard).

Rivers of western Texas and northeastern Mexico from Rio Comal to Rio Grande.

Dionda episcopa Girard, Proc. Ac. Nat. Sci. Phila. 1856, 177, headwaters of Pecos River, and Comanche Spring, tributary to Rio Grande, Texas.

358. Hybognathus nubilum (Forbes).

Western Illinois, west to Wyoming and southwest to the Ozark region.

Alburnops nubilus Forbes, Bull. Ill. Lab. Nat. Hist., II, 56, 1878, Rock River, Ogle County, Illinois.

359. Hybognathus amarum (Girard).

Rio Grande Basin.

Algoma amara Girard, Proc. Ac. Nat. Sci. Phila. 1856, 180, lagoon near Fort Brown, Texas.

360. Hybognathus melanops (Girard).

Streams of Coahuila, Chihuahua, and Nuevo Leon, Mexico.

Dionda melanops Girard, Proc. Ac. Nat. Sci. Phila. 1856, 178, Buena Vista, Coahuila, Mexico.

361. Hybognathus plumbeum (Girard).

Tributaries of Arkansas River in Indian Territory.

Dionda plumbea Girard, Proc. Ac. Nat. Sci. Phila. 1856, 178, Canadian River.

Genus 109. PIMEPHALES Rafinesque. *Fat-heads.*

Pimephales Rafinesque, Ichth. Ohiensis, 52, 1820 (*promelas*).

362. Pimephales promelas Rafinesque. *Fat-head; Black-head Minnow.*

Lake Champlain to Kentucky, the Dakotas, and Rio Grande.

Pimephales promelas Rafinesque, Ichth. Ohiensis, 53, 1820, pond near Lexington, Kentucky.

362a. Pimephales promelas maculosus (Girard).

Arkansas River; locally abundant.

Pimephales maculosus Girard, Proc. Ac. Nat. Sci. Phila. 1856, 180, sluices of Arkansas River, Fort Makee, Arkansas.

362b. Pimephales promelas confertus (Girard).

Upper Rio Grande Basin; Chihuahua River, Mexico.

Hyborhynchus confertus Girard, Proc. Ac. Nat. Sci. Phila. 1856, 179, Hurrah Creek, a tributary of Pecos River, Texas.

363. Pimephales notatus (Rafinesque). *Blunt-nosed Minnow.*

Generally very abundant in small streams west of the Alleghanies and in the St. Lawrence River basin.

Minnilus notatus Rafinesque, Ichth. Ohiensis, 47, 1820, Ohio River.

Genus 110. MYLOPHARODON Ayres.

Mylopharodon Ayres, Proc. Cal. Ac. Sci. 1855, 33 (*robustus* = *conocephalus*).

364. Mylopharodon conocephalus (Baird & Girard).

Sacramento and San Joaquin rivers, California.

Gila conocephala Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1854, 134, San Joaquin River, California.

Genus 111. MYLOCHEILUS Agassiz.

Mylocheilus Agassiz, Am. Jour. Sci. Arts 1855, 229 (*lateralis* = *caurinus*).

365. Mylocheilus caurinus (Richardson). *Columbia Chub.*

Streams of Oregon and Washington from Frazer River to the Columbia.

Cyprinus (*Leuciscus*) *caurinus* Richardson, Fauna Boreali-Amer., III, 304, 1836, Columbia River at Fort Vancouver.

Genus 112. STYPODON Garman.

Stypodon Garman, Bull. Mus. Comp. Zool., VIII, 90, 1881 (*signifer*).

366. Stypodon signifer Garman.

Lago de Parras, an isolated lagoon in Coahuila, Mexico.

Stypodon signifer Garman, Bull. Mus. Comp. Zool., VIII, 90, 1881, Lago de Parras, Coahuila, Mexico.

Genus 113. SEMOTILUS Rafinesque. *Fall-fishes.*

Semotilus Rafinesque, Ichth. Ohiensis, 49, 1820 (*dorsalis* = *atromaculatus*).

Subgenus LEUCOSOMUS Heckel.

Leucosomus Heckel, Russegger's Reisen, I, 1042, 1843 ("*chrysoleucus*" = *corporalis*).

367. Semotilus corporalis (Mitchill). *Fall-fish; Silver Chub; Wind-fish; Corporal.*

Abundant from St. Lawrence River to the James, east of the Alleghanies.

Cyprinus corporalis Mitchill, Amer. Month. Mag., I, July, 1817, 289, Wallkill River, New York.

Subgenus SEMOTILUS Rafinesque.

368. Semotilus atromaculatus (Mitchill). *Horned Dace; Creek Chub.*

Maine and western Massachusetts, westward to Kansas and Wyoming.

Cyprinus atromaculatus Mitchill, Amer. Month. Mag., II, 1818, 324, Wallkill River, New York.

368a. Semotilus atromaculatus thoreauianus (Jordan).

Streams of Georgia and Alabama.

Semotilus thoreauianus Jordan, Bull. U. S. Nat. Mus., x, 63, 1877, Flint River, Georgia.

Genus 114. POGONICHTHYS Girard.

Pogonichthys Girard, Proc. Ac. Nat. Sci. Phila. 1854, 136 (*inæquilobus*=*macrolepidotus*).

369. Pogonichthys macrolepidotus (Ayres). *Split-tail.*

Lowland streams of California.

Leuciscus macrolepidotus Ayres, Placer Times and Transcript, May 30, 1854, San Francisco.

Genus 115. PTYCHOCHEILUS Agassiz.

Ptychocheilus Agassiz, Am. Jour. Sci. Arts 1855, 229 (*gracilis*=*oregonensis*).

370. Ptychocheilus oregonensis (Richardson). *Squawfish; Chappaul; Yellowbelly; Sacramento Pike.*

Rivers of Oregon and Washington, in the Columbia basin to Montana and Idaho, and northward to British Columbia; also in the Sacramento, San Joaquin, Salinas, and Pajaro rivers of California.

Cyprinus (*Leuciscus*) *oregonensis* Richardson, Fauna Bor.-Amer., III, 305, 1836, Columbia River.

371. Ptychocheilus harfordi Jordan & Gilbert.

Lower Sacramento River, California.

Ptychochilus harfordi Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 72, Sacramento River, California.

372. Ptychocheilus lucius Girard. *"White Salmon" of the Colorado.*

Colorado Basin; abundant.

Ptychocheilus lucius Girard, Proc. Ac. Nat. Sci. Phila. 1856, 209, Rio Colorado.

Genus 116. GILA Baird & Girard.

Gila Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1853, 368 (*robusta*).

373. Gila elegans Baird & Girard. *Bony-tail; "Gila Trout."*

Colorado and Gila rivers.

Gila elegans Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1853, 369, Zuñi, Colorado, and Gila rivers.

374. Gila robusta Baird & Girard. *Round-tail.*

Tributaries of the Rio Colorado and Rio Gila.

Gila robusta Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1853, 368, Zuñi River, New Mexico.

375. Gila seminuda Cope & Yarrow.

Rio Virgen, in Utah and Nevada.

Gila seminuda Cope & Yarrow, Zool. Wheeler's Expl. W. 100th Mer., v, 666, 1875 (1876), Rio Virgen, Nevada.

Genus 117. LEUCISCUS Cuvier.

Leuciscus (Klein) Cuvier, Règne Animal, ed. I, 194, 1817 (*dobula, rutilus, leuciscus, alburnus,* and *phoxinus*).

Subgenus SIBOMA Girard.

Siboma Girard, Proc. Ac. Nat. Sci. Phila. 1856, 208 (*crassicauda*).

376. Leuciscus crassicauda (Baird & Girard). *Sacramento Chub.*

Rivers of California; generally abundant in the Sacramento and San Joaquin.

Lavinia crassicauda Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1854, 137, San Joaquin River, California.

Subgenus TIGOMA Girard.

Tigoma Girard, Proc. Ac. Nat. Sci. Phila. 1856, 205 (*pulchella*=*nigrescens*).

377. Leuciscus conformis (Baird & Girard).

Tulare Valley, California.

Lavinia conformis Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1854, 137, Poso Creek, Tulare County, California.

378. Leuciscus bicolor (Girard).

Klamath Lake, Oregon.

Tigoma bicolor Girard, Proc. Ac. Nat. Sci. Phila. 1856, 206, Klamath Lake, Oregon.

379. Leuciscus lineatus (Girard). *Great Chub; Chub of Utah Lake.*

Great Basin of Utah, and Snake River basin above Shoshone Falls.

Tigoma lineata Girard, Proc. Ac. Nat. Sci. Phila. 1856, 206, locality unknown.

380. Leuciscus nigrescens (Girard). *Pescadito; Chub of the Rio Grande.*

Rio Grande Basin.

Tigoma nigrescens Girard, Proc. Ac. Nat. Sci. Phila. 1856, 207, Boca Grande and Rio Janos, Chihuahua.

381. Leuciscus purpureus (Girard).

San Bernardino Creek in southern Arizona, a tributary of Rio Yaqui.

Tigoma purpurea Girard, Proc. Ac. Nat. Sci. Phila. 1856, 206, San Bernardino Creek, Arizona.

382. Leuciscus intermedius (Girard).

Basin of the Gila River, Arizona.

Tigoma intermedia Girard, Proc. Ac. Nat. Sci. Phila. 1856, 206, Rio San Pedro of the Gila, Arizona.

383. Leuciscus niger (Cope).

Rio Gila, Arizona.

Gila nigra Cope, Zool. Wheeler's Expl. W. 100th Mer., v, 663, 1875 (1876), Ash Creek and San Carlos, Arizona.

384. Leuciscus aliciæ (Jouy). *Leather-sided Minnow.*

Great Basin of Utah and Wood River, Idaho.

Squalius aliciæ Jouy, Proc. U. S. Nat. Mus. 1881, 19, Provo River near Utah Lake, Utah.

Subgenus CHEONDA Girard.

Cheonda Girard, Proc. Ac. Nat. Sci. Phila. 1856, 207 (*cooperi*).

385. Leuciscus cooperi (Girard).

Lower Columbia River basin.

Cheonda cooperi Girard, Proc. Ac. Nat. Sci. Phila. 1856, 207, Fort Vancouver, Washington.

386. Leuciscus humboldti (Girard).

Humboldt River, Nevada.

Tigoma humboldti Girard, Proc. Ac. Nat. Sci. Phila. 1856, 206, Humboldt River, Nevada.

387. Leuciscus egregius (Girard).

Nevada to northern California; known from the Humboldt and Truckee basins and from Napa Valley, California.

Tigoma egregia Girard, Pac. R. R. Surv., x, 291, 1858, locality unknown.

388. Leuciscus hydrophlox (Cope). *Silver-sided Minnow; "Po-he-wa."*

Salt Lake Basin and upper Snake River.

Clinostomus hydrophlox Cope, Hayden's Geol. Surv. Mont. for 1871 (1872), 475, Blackfoot Creek, Idaho.

Subgenus RICHARDSONIUS Girard.

Richardsonius Girard, Proc. Ac. Nat. Sci. Phila. 1856, 201 (*balteatus*).

389. **Leuciscus balteatus** (Richardson).

Columbia and Frazer rivers, and streams about Puget Sound.

Cyprinus (*Abramis*) *balteatus* Richardson, Fauna Bor.-Amer., III, 301, 1836, Columbia River.

Subgenus CLINOSTOMUS Girard.

Clinostomus Girard, Proc. Ac. Nat. Sci. Phila. 1856, 211 (*elongatus*).

390. **Leuciscus vandoisulus** Cuvier & Valenciennes.

Streams east of the Alleghenies from Virginia to Georgia and in the Tennessee and Cumberland rivers.

Leuciscus vandoisulus Cuvier & Valenciennes, Hist. Nat. Poiss., XVII, 317, 1844, South Carolina.

391. **Leuciscus elongatus** (Kirtland). *Red-sided Shiner.*

Great Lakes and Upper Mississippi Valley.

Luxilus elongatus Kirtland, Rept. Zool. Ohio, 169, 1836, Mahoning River, Trumbull County, Ohio, and Lake Erie near Cleveland.

Subgenus PHOXINUS Rafinesque.

Phoxinus Rafinesque, Ichth. Ohiensis, 45, 1820 (no type stated, *phoxinus* understood).

392. **Leuciscus nachtriebi** Cox.

Lakes in Mississippi Valley in Minnesota.

Leuciscus nachtriebi Cox, Rept. U. S. Fish Com. 1894 (1896), Mille Lacs, Aitkin County, Minnesota.

393. **Leuciscus neogæus** (Cope).

Upper Mississippi Valley and neighboring waters.

Phoxinus neogæus Cope, Cypr. Penn., 375, 1866, New Hudson, Michigan.

394. **Leuciscus margarita** (Cope).

Susquehanna River to James River and headwaters of the Kanawha.

Clinostomus margarita Cope, Cypr. Penn., 377, 1866, Conestoga River, Lancaster, Pennsylvania.

395. **Leuciscus orcutti** (Eigenmann & Eigenmann).

Temecula, San Luis Rey, San Jacinto, and Santa Ana rivers, California.

Phoxinus orcutti Eigenmann & Eigenmann, Proc. Cal. Ac. Sci., 2d series, III, 1890, 2, Temecula River, Riverside County, California.

Subgenus HEMITREMIA Cope.

Hemitremia Cope, Proc. Amer. Philos. Soc. 1870, 462 (*vittata* = *flammeus*).

396. **Leuciscus milnerianus** (Cope).

Upper Missouri River basin.

Phoxinus milnerianus Cope, Am. Nat., July, 1879, 440, upper Missouri River basin, probably Battle Creek, Montana.

397. **Leuciscus flammeus** (Jordan & Gilbert).

Tributaries of Tennessee River; common in clear streams in northern Alabama.

Phoxinus flammeus Jordan & Gilbert, in Jordan, Man. Vert. E. U. S., ed. 2, 303, 1878, Elk River, Estill Springs, Tennessee.

Subgenus IOTICHTHYS Jordan & Evermann.

Iotichthys Jordan & Evermann, Fishes North and Middle America, 228, 1896 (*phlegethontis*).

398. **Leuciscus phlegethontis** (Cope).

Tributaries of Great Salt Lake and Sevier Lake, Utah.

Clinostomus phlegethontis Cope, Proc. Amer. Philos. Soc. Phila. 1874, 137, Beaver River, Utah.

Genus 118. RUTILUS Rafinesque. *The Roaches.*
Rutilus Rafinesque, Ichth. Ohiensis, 48, 50, 1820 (*rutilus*).

Subgenus LEUCOS Heckel.
Leucos Heckel, Russegger's Reisen, 1, 1038, 1843 (*cisalpinus*).

399. Rutilus olivaceus (Cope).
Lake Tahoe; Pyramid Lake.
Leucus olivaceus Cope, Proc. Ac. Nat. Sci. Phila. 1883, 145, Pyramid Lake, Nevada.

Subgenus MYLOLEUCUS Cope.
Myloleucus Cope, Bull. Hayden's Geol. Surv. Mont. for 1871 (1872), 475 (*pulverulentus = symmetricus*).

400. Rutilus bicolor (Girard).
Lakes of southeastern Oregon (Klamath, Warner, Goose, etc.).
Algansea bicolor Girard, Proc. Ac. Nat. Sci. Phila. 1856, 183, Klamath Lake, Oregon.

401. Rutilus symmetricus (Baird & Girard).
Rivers of California and Nevada.
Pogonichthys symmetricus Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1854, 136, Fort Miller, San Joaquin Valley, California.

402. Rutilus boucardi (Günther).
Cuernavaca, Mexico.
Leuciscus boucardi Günther, Cat., VII, 485, 1868, Cuernavaca, Mexico.

403. Rutilus thoburni Scofield.
Rio San Lorenzo, Santa Cruz, California.
Rutilus thoburni Scofield, Proc. Cal. Ac. Sci. 1896, Santa Cruz, California.

404. Rutilus columbianus Scofield.
Lower Columbia Basin.
Rutilus columbianus Scofield, Proc. Cal. Ac. Sci. 1896, Lower Columbia Basin.

Genus 119. LUXILINUS Jordan.
Luxilinus Jordan, Catalogue Fishes N. A., 33, 1885 (*occidentalis*).

405. Luxilinus occidentalis (Baird & Girard).
San Joaquin Valley, California.
Leucosomus occidentalis Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1854, 137, Poso Creek and Four Creeks, tributaries of Tulare Lake, California.

Genus 120. OPSOPŒODUS Hay.
Opsopœodus Hay, Proc. U. S. Nat. Mus. 1880, 507 (*emiliæ*).

Subgenus OPSOPŒODUS Hay.

406. Opsopœodus osculus Evermann.
Rio Neches and other streams about Palestine and Houston, Texas.
Opsopœodus osculus Evermann, Bull. U. S. Fish Com. 1891 (1892), 82, Neches River, near Palestine, Texas.

407. Opsopœodus emiliæ Hay.
Lake Erie and southern Indiana to Georgia and Mississippi.
Opsopœodus emiliæ Hay, Proc. U. S. Nat. Mus. 1880, 507, Artesia, Macon, and Enterprise, Mississippi.

408. Opsopœodus megalops (Forbes).
Western Ohio to Illinois.
Trycherodon megalops Forbes, in Jordan & Gilbert, Synopsis, 247, 1883, Illinois River at Pekin and Peoria, Illinois.

Subgenus OPSOPŒA Jordan & Evermann.

Opsopœa Jordan & Evermann, Fishes North and Middle America, 247, 1896 (*bollmani*).

409. **Opsopœodus bollmani** Gilbert.

Swamp streams of Georgia, and Obion River, Cypress, Tennessee.
Opsopœodus bollmani Gilbert, Bull. U. S. Fish Com., VIII, 1888 (1890), 226, Buckland Creek, Millen, Georgia.

Genus 121. **ABRAMIS** Cuvier.

Abramis Cuvier, Règne Animal, ed. I, 111, 1817 (*brama*).

Subgenus NOTEMIGONUS Rafinesque.

Notemigonus Rafinesque, Jour. Phys. 1819, 421 (*auratus*).

410. **Abramis crysoleucas** (Mitchill). *Golden Shiner; Roach; Bream.*

Nova Scotia and Maryland to Dakota and Texas.
Cyprinus crysoleucas Mitchill, Rept. Fish. N. Y., 23, 1814, New York.

410a. **Abramis crysoleucas bosci** (Cuvier & Valenciennes).

Rivers of the South Atlantic States.
Leuciscus bosci Cuvier & Valenciennes, Hist. Nat. Poiss., XVII, 313, 1844, Carolina, Pennsylvania, and New York.

411. **Abramis gardoneus** (Cuvier & Valenciennes).

South Carolina.
Leuciscus gardoneus Cuvier & Valenciennes, Hist. Nat. Poiss., XVII, 316, 1844, Charleston, South Carolina.

Genus 122. **COCHLOGNATHUS** Baird & Girard.

Cochlognathus Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1854, 158 (*ornatum*).

412. **Cochlognathus ornatum** Baird & Girard.

Rio Grande basin.
Cochlognathus ornatus Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1854, 158, Brownsville, Texas.

413. **Cochlognathus biguttatum** Cope.

Trinity River, Texas.
Cochlognathus biguttata Cope, Bull. U. S. Nat. Mus., XVII, 37, 1880, Trinity River, Fort Worth, Texas.

Genus 123. **CLIOLA** Girard.

Cliola Girard, Proc. Ac. Nat. Sci. Phila. 1856, 192 (*vigilax*).

414. **Cliola vigilax** (Baird & Girard).

Ohio to Georgia, Iowa, and Texas.
Ceratichthys vigilax Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1853, 390, Otter Creek, North Fork of Red River, Arkansas.

415. **Cliola smithii** Evermann & Cox.

Prairie Creek near Scotland, South Dakota.
Cliola smithii Evermann & Cox, Rept. U. S. Fish Com. 1894 (1896), 400, Prairie Creek, Scotland, South Dakota.

Genus 124. **NOTROPIS** Rafinesque.

Notropis Rafinesque, Amer. Month. Mag., II, 1818, 204 (*atherinoides*).

Subgenus AZTECA Jordan & Evermann.

Azteca Jordan & Evermann, Fishes North and Middle America, 254, 1896 (*vittata*=*aztecus*).

416. **Notropis aztecus** Woolman.

Valley of Mexico.
Notropis aztecus Woolman, Bull. U. S. Fish Com., XIV, 1894, 63, City of Mexico.

Subgenus CHRIOPE Jordan.

Chriope Jordan, Bull. Hayden's Surv. Terr., IV, 787, 1878 (*bifrenatus*).

417. Notropis bifrenatus (Cope).

Massachusetts to Maryland.

Hybopsis bifrenatus Cope, Cypr. Penn., 384, 1866, Schuylkill River, Conshohocken, Pennsylvania.

418. Notropis maculatus (Hay).

Chickasawha River, Mississippi.

Hemitremia maculata Hay, Proc. U. S. Nat. Mus. 1880, 505, Chickasawha River, Enterprise, Mississippi.

419. Notropis anogenus Forbes.

Western New York (Cayuga Lake) to northern Illinois.

Notropis anogenus Forbes, Bull. Ill. Lab. Nat. Hist., vol. II, art. 2, 138, 1885, Fox River, McHenry, Illinois.

420. Notropis cayuga Meek.

Connecticut River, Northern New York, and Upper Mississippi Valley.

Notropis cayuga Meek, Ann. Lyc. Nat. Hist. N. Y. 1888, 305, Cayuga Lake, New York.

420a. Notropis cayuga atrocaudalis Evermann.

Rio Neches, Palestine, Texas; also in Rio Comal at New Braunfels, Texas.

Notropis cayuga atrocaudalis Evermann, Bull. U. S. Fish. Com., XI, 1891 (1892), 76, Neches River, Palestine, Texas.

421. Notropis heterodon (Cope).

New York to Michigan and Kansas.

Alburnops heterodon Cope, Proc. Ac. Nat. Sci. Phila. 1864, 281, Lansing and Grosse Isle, Michigan.

Subgenus ALBURNOPS Girard.

Alburnops Girard, Proc. Ac. Nat. Sci. Phila. 1856, 194 (*blennius*).

422. Notropis fretensis (Cope).

Detroit River, Michigan.

Hybopsis fretensis Cope, Cypr. Penn., 382, 1866, Detroit, Michigan.

423. Notropis blennius (Girard). *Straw-colored Minnow.*

Ohio and Michigan to Tennessee, Dakota, and Kansas, thence southwestward to Texas.

Alburnops blennius Girard, Proc. Ac. Nat. Sci. Phila. 1856, 194, Arkansas River near Fort Smith, Arkansas.

424. Notropis sabinæ Jordan & Gilbert.

Sabine River, Texas.

Notropis sabinæ Jordan & Gilbert, Proc. U. S. Nat. Mus. 1886, 15, Sabine River at Longview, Texas.

425. Notropis volucellus (Cope).

Michigan, Wisconsin, and northern Indiana.

Hybognathus volucellus Cope, Proc. Ac. Nat. Sci. Phila. 1864, 283, Grosse Isle, Detroit River, Michigan.

426. Notropis scylla (Cope).

Illinois River to western Kansas and Montana.

Hybopsis scylla Cope, Hayden's Geol. Surv. Wyo. for 1870 (1871), 438, Red Cloud Creek, tributary of Platte River, Nebraska.

427. Notropis procne (Cope).

Delaware River and southward, in coastwise streams, as far as the Neuse.

Hybognathus procne Cope, Proc. Ac. Nat. Sci. Phila. 1864, 279, Delaware, Schuylkill, and Conestoga rivers, and White Clay Creek, Pennsylvania.

428. **Notropis nigrotæniatus** (Günther).

Atlisco, Mexico.
Graodus nigrotæniatus Günther, Cat., VII, 485, 1868, Atlisco, Mexico.

429. **Notropis kanawha** Jordan & Jenkins.

Tributaries of Kanawha River, southwestern Virginia.
Notropis kanawha Jordan & Jenkins, Proc. U. S. Nat. Mus. 1888, 354, pl. 44, fig. 5, Reed Creek, Wytheville, Virginia.

430. **Notropis braytoni** Jordan & Evermann.

Tributaries of Rio San Juan at Cadereita in Nuevo Leon, Mexico.
Notropis braytoni Jordan & Evermann, Fishes North and Middle America, 264, 1896, Cadereita, Mexico; substitute for *Moniana nitida* Girard, preoccupied.

431. **Notropis spectrunculus** (Cope).

Headwaters of Tennessee River in Tennessee, Virginia, and North Carolina.
Hybopsis spectrunculus Cope, Jour. Ac. Nat. Sci. Phila. 1868, 231, Bear Creek, tributary of Middle Fork of Holston River, Virginia.

432. **Notropis ozarcanus** Meek.

White River, Arkansas, in the Ozark Mountains.
Notropis ozarcanus Meek, Bull. U. S. Fish. Com., IX, 1889 (1891), 129, North Fork of White River, Arkansas.

433. **Notropis chihuahua** Woolman.

Rio de los Conchos, Chihuahua, Mexico.
Notropis chihuahua Woolman, Am. Nat., March, 1892, 260, Rio de los Conchos, Chihuahua, Mexico.

434. **Notropis topeka** Gilbert.

Western Iowa and eastern South Dakota to Kansas.
Notropis topeka Gilbert, Bull. Washburn Lab. Nat. Hist., I, 13, 1884, Shunganunga Creek, Topeka, Kansas.

Subgenus **HUDSONIUS** Girard.

Hudsonius Girard, Proc. Ac. Nat. Sci. Phila. 1856, 210 (*hudsonius*).

435. **Notropis gilberti** Jordan & Meek.

Eastern Iowa to eastern Colorado.
Notropis gilberti Jordan & Meek, Proc. U. S. Nat. Mus. 1885, 4, Des Moines River and Village Creek, Ottumwa, Iowa.

436. **Notropis piptolepis** (Cope).

North Platte River.
Photogenis piptolepis Cope, Hayden's Geol. Surv. Wyo. for 1870 (1871), 438, Red Cloud Creek, a tributary of North Platte River, Nebraska.

437. **Notropis simus** (Cope).

Rio Grande at San Ildefonso, New Mexico.
Alburnellus simus Cope, Zool. Wheeler Surv., V, 649, 1875 (1876), San Ildefonso, New Mexico.

438. **Notropis longirostris** (Hay).

Chickasawha River, Mississippi, to Escambia River, Florida.
Alburnops longirostris Hay, Proc. U. S. Nat. Mus. 1880, 504, Chickasawha River at Enterprise, Mississippi.

439. **Notropis nux** Evermann.

Neches and Trinity rivers near Palestine, Texas.
Notropis nux Evermann, Bull. U. S. Fish Com., XI, 1891 (1892), 77, Neches River, Palestine, Texas.

440. **Notropis nocomis** Evermann.

Trinity, San Marcos, and Comal rivers, Texas.
Notropis nocomis Evermann, Bull. U. S. Fish Com., XI, 1891 (1892), 78, Trinity River, Palestine, Texas, and San Marcos River, San Marcos, Texas.

441. Notropis shumardi (Girard).

Ohio and Tennessee basins to Iowa and the Ozark region.
Alburnops shumardi Girard, Proc. Ac. Nat. Sci. Phila. 1856, 194, Arkansas River, Fort Smith, Arkansas.

442. Notropis illecebrosus (Girard).

Lower Arkansas River basin.
Alburnops illecebrosus Girard, Proc. Ac. Nat. Sci. Phila. 1856, 194, Arkansas River, Fort Smith, Arkansas.

443. Notropis hudsonius (DeWitt Clinton). *Spawn-eater; Spot-tailed Minnow; Shiner.*

The Dakotas and Lake Superior to New York, and southward to South Carolina.
Clupea hudsonia DeWitt Clinton, Ann. Lyc. Nat. Hist. N. Y., I, 1824, 49, Hudson River, New York.

443a. Notropis hudsonius selene (Jordan).

Lake Superior and neighboring waters.
Luxilus selene Jordan, Bull. U. S. Nat. Mus., x, 60, 1877, Lake Superior, Bayfield, Wisconsin.

443b. Notropis hudsonius amarus (Girard).

Delaware, Susquehanna, and Potomac rivers.
Hudsonius amarus Girard, Proc. Ac. Nat. Sci. Phila. 1856, 210, Chesapeake Bay and Potomac River at Washington.

443c. Notropis hudsonius saludanus (Jordan & Brayton).

Coastwise streams of Atlantic slope from James River to the Ocmulgee.
Alburnops saludanus Jordan & Brayton, Bull. U. S. Nat. Mus., XII, 16, 1878, tributary of Saluda River, Greenville, South Carolina.

Subgenus CODOMA Girard.

Codoma Girard, Proc. Ac. Nat. Sci. Phila. 1856, 194 (*ornata*).

444. Notropis ornatus (Girard).

Chihuahua River, Mexico.
Codoma ornata Girard, Proc. Ac. Nat. Sci. Phila. 1856, 195, Chihuahua River, Mexico.

Subgenus MONIANA Girard.

Moniana Girard, Proc. Ac. Nat. Sci. Phila. 1856, 199 (*lutrensis*).

445. Notropis formosus (Girard).

Rio Mimbres, Chihuahua, Mexico.
Moniana formosa Girard, Proc. Ac. Nat. Sci. Phila. 1856, 201, Rio Mimbres, Chihuahua, Mexico.

446. Notropis frigidus (Girard).

Rio Frio, Texas.
Moniana frigida Girard, Proc. Ac. Nat. Sci. Phila. 1856, 200, Rio Frio, Texas.

447. Notropis lutrensis (Baird & Girard).

Southern Illinois to South Dakota, Kansas, and the Rio Grande.
Leuciscus lutrensis Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1853, 391, Otter Creek, tributary of the North Fork of Red River, Arkansas.

448. Notropis proserpina (Girard).

Rio Grande region.
Moniana proserpina Girard, Proc. Ac. Nat. Sci. Phila. 1856, 200, Devil River, Texas.

449. Notropis callisema (Jordan).

Ocmulgee River, Georgia.
Episema callisema Jordan, Ann. Lyc. Nat. Hist. N. Y. 1876, 363, South Fork of Ocmulgee River, Flat Shoals, Georgia.

Subgenus CYPRINELLA Girard.

Cyprinella Girard, Proc. Ac. Nat. Sci. Phila. 1856, 196 (*bubalinus*).

450. Notropis bubalinus (Baird & Girard).

Streams of Arkansas and southwestward.

Leuciscus bubalinus Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1853, 391, Otter Creek, Arkansas.

451. Notropis ludibundus (Girard).

Locality unknown, probably Indian Territory.

Cyprinella ludibunda Girard, Proc. Ac. Nat. Sci. Phila. 1856, 199, locality unknown.

452. Notropis macrostomus (Girard).

Rio Grande region, northward to Kansas.

Cyprinella macrostoma Girard, Proc. Ac. Nat. Sci. Phila. 1856, 198, Devil River, Texas.

453. Notropis texanus (Girard).

Rivers of Texas from Trinity River to the Salado.

Cyprinella texana Girard, Proc. Ac. Nat. Sci. Phila. 1856, 198, Rio Salado and Turkey Creek, Texas.

454. Notropis notatus (Girard).

Streams of Texas from Austin westward.

Cyprinella notata Girard, Proc. Ac. Nat. Sci. Phila. 1856, 198, Rio Seco, Texas.

455. Notropis venustus (Girard).

Streams of Texas.

Cyprinella venusta Girard, Proc. Ac. Nat. Sci. Phila. 1856, 198, Rio Sabinal, Texas.

456. Notropis cercostigma (Cope).

Streams tributary to the Gulf of Mexico, from Pearl River and Red River to Rio Nueces.

Cyprinella cercostigma Cope, Proc. Ac. Nat. Sci. Phila. 1867, 157, Pearl River, Monticello, Mississippi.

457. Notropis stigmaturus (Jordan). *Spotted-tail Minnow.*

Alabama River basin.

Photogenis stigmaturus Jordan, Ann. Lyc. Nat. Hist. N. Y. 1876, 337, Etowah River, etc., Rome, Georgia.

458. Notropis trichroistius (Jordan & Gilbert).

Alabama River basin.

Codoma trichroistia Jordan & Gilbert, Bull. U. S. Nat. Mus., XII, 50, 1878, Etowah River, etc., Rome, Georgia.

459. Notropis callistius (Jordan).

Alabama River basin.

Photogenis callistius Jordan, Ann. Lyc. Nat. Hist. N. Y. 1876, 337, Etowah River, etc., Rome, Georgia.

460. Notropis eurystomus (Jordan).

Chattahoochee River.

Photogenis eurystomus Jordan, Ann. Lyc. Nat. Hist. N. Y. 1876, 356, Nancy Creek, tributary of Chattahoochee River, near Atlanta, Georgia.

461. Notropis cæruleus (Jordan).

Alabama River basin.

Photogenis cæruleus Jordan, Ann. Lyc. Nat. Hist. N. Y. 1876, 338, Etowah River, Rome, Georgia.

462. Notropis niveus (Cope).

Southern Virginia to South Carolina.

Hybopsis niveus Cope, Proc. Amer. Phil. Soc. Phila. 1870, 460, Catawba River, North Carolina.

462a. Notropis niveus chloristius (Jordan & Brayton).

Santee River and tributaries.

Codoma chloristia Jordan & Brayton, Bull. U. S. Nat. Mus., XII, 21, 1878, tributary of Saluda River, Greenville, South Carolina.

463. Notropis whipplii (Girard). *Silver-fin; Satin-fin.*

Central and northern New York to Minnesota, northern Alabama, and Arkansas.

Cyprinella whipplii Girard, Proc. Ac. Nat. Sci. Phila. 1856, 198, Sugar Loaf Creek, a tributary of Poteau River, Arkansas.

464. Notropis analostanus (Girard).

Streams about Delaware and Chesapeake bays.

Cyprinella analostana Girard, Proc. Ac. Nat. Sci. Phila. 1856, 198, Potomac River at Analostan Island, Washington, D. C.

465. Notropis galacturus (Cope).

Ozark region to Cumberland, Tennessee, and Savannah rivers.

Hypsilepis galacturus Cope, Proc. Ac. Nat. Sci. Phila. 1867, 160, Holston River, Virginia.

466. Notropis camurus (Jordan & Meek).

Arkansas River and tributaries.

Cliola camura Jordan & Meek, Proc. U. S. Nat. Mus. 1884, 474, Arkansas River, Fort Lyon, Colorado.

467. Notropis xænurus (Jordan).

Altamaha River basin, Georgia.

Minnilus xænurus Jordan, Proc. Ac. Nat. Sci. Phila. 1877, 79, Ocmulgee River, Flat Shoals, Georgia.

468. Notropis hypselopterus (Günther).

Southern Georgia and Alabama.

Leuciscus hypselopterus Günther, Cat., VII, 255, 1868, Mobile, Alabama.

469. Notropis pyrrhomelas (Cope).

North and South Carolina in the Santee Basin.

Photogenis pyrrhomelas Cope, Proc. Amer. Phil. Soc. Phila. 1870, 463, Catawba River, North Carolina.

470. Notropis garmani Jordan.

Tributaries of Lago del Muerte, Coahuila, Mexico.

Notropis garmani Jordan, Cat. Fish. N. Am., 25, 1885, Lago del Muerte, Coahuila, Mexico.

Subgenus LUXILUS Rafinesque.

Luxilus Rafinesque, Ichth. Ohiensis, 47, 1820 (*chrysocephalus*).

471. Notropis cornutus (Mitchill). *Shiner; Red-fin; Dace.*

Entire region east of the Rocky Mountains except the South Atlantic States and Texas.

Cyprinus cornutus Mitchill, Amer. Month. Mag. Crit. Review, I, 1817, 289, Wallkill River, New York.

471a. Notropis cornutus frontalis (Agassiz).

Great Lakes; everywhere common in mouths of brooks.

Leuciscus frontalis Agassiz, Lake Superior, 368, 1850, Lake Superior.

471b. Notropis cornutus cyaneus (Cope).

Northern peninsula of Michigan.

Hypsilepis cornutus cyaneus Cope, Proc. Ac. Nat. Sci. Phila. 1867, 160, Montreal River, Keweenaw, Michigan.

472. Notropis cerasinus (Cope).

Roanoke River basin, in mountain brooks.

Hypsilepis cornutus cerasinus Cope, Proc. Ac. Nat. Sci. Phila. 1867, 159, headwaters of Roanoke River, Virginia.

473. **Notropis albeolus** (Jordan).

Roanoke, Tar, and Neuse rivers.

Notropis megalops albeolus Jordan, Bull. U. S. Fish Com. 1888 (1891), 123, Roanoke River near Roanoke, Virginia.

474. **Notropis lacertosus** (Cope).

Headwaters of Tennessee River.

Hybopsis lacertosus Cope, Jour. Ac. Nat. Sci. Phila. 1868, 232, Bear Creek, tributary of the Middle Fork of Holston River.

Subgenus HYDROPHLOX Jordan.

Hydrophlox Jordan, Bull. U. S. Nat. Mus., XII, 18, 1878 (*rubricroceus*).

475. **Notropis macdonaldi** Jordan & Jenkins.

Mountain streams of Virginia tributary to James and Shenandoah rivers.

Notropis macdonaldi Jordan & Jenkins, Proc. U. S. Nat. Mus. 1888, 354, Shenandoah River, Luray, Virginia.

476. **Notropis coccogenis** (Cope).

Cumberland, Tennessee, and Savannah rivers.

Hypsilepis coccogenis Cope, Proc. Ac. Nat. Sci. Phila. 1867, 160, Holston River, Virginia.

477. **Notropis zonatus** (Agassiz).

Mountain streams in the Ozark region of Missouri and Arkansas.

Alburnus zonatus Agassiz, in Putnam, Bull. Mus. Comp. Zool., 1, 9, 1863, Osage River, Missouri.

478. **Notropis zonistius** (Jordan).

Chattahoochee River.

Luxilus zonistius Jordan, Proc. U. S. Nat. Mus. 1879, 239, Suwanee Creek, tributary of Chattahoochee River, in northern Georgia.

479. **Notropis rubricroceus** (Cope). *Red Fallfish.*

Headwaters of the Tennessee and Savannah rivers.

Hybopsis rubricroceus Cope, Jour. Ac. Nat. Sci. Phila. 1868, 231, Tumbling Creek, tributary of the North Fork of Holston River, Virginia.

480. **Notropis chlorocephalus** (Cope).

Santee Basin, in North and South Carolina.

Hybopsis chlorocephalus Cope, Proc. Amer. Phil. Soc. Phila. 1870, 461, Catawba River, North Carolina.

481. **Notropis lutipinnis** (Jordan & Brayton).

Santee and Oconee rivers, Georgia.

Hydrophlox lutipinnis Jordan & Brayton, Bull. U. S. Nat. Mus., XII, 36, 1878, Oconee River, Halls Springs, Georgia.

482. **Notropis chiliticus** (Cope).

Basin of Great Pedee River, North Carolina; common in upland streams.

Hybopsis chiliticus Cope, Proc. Amer. Phil. Soc. Phila. 1870, 462, Yadkin River, Rowan County, North Carolina.

483. **Notropis altipinnis** (Cope).

Yadkin, Great Pedee, and Cape Fear rivers, North Carolina.

Alburnellus altipinnis Cope, Proc. Amer. Phil. Soc. Phila. 1870, 464, Yadkin River, Rowan County, North Carolina.

484. **Notropis roseus** (Jordan).

Lowland streams of Gulf States from Ogeechee River to the Mississippi.

Luxilus roseus Jordan, Bull. U. S. Nat. Mus., X, 61, 1877, Notalbany River near Tickfaw, Louisiana.

485. **Notropis chalybæus** (Cope).

Delaware River to Ogeechee River.

Hybopsis chalybæus Cope, Cypr. Penn., 383, 1866, Schuylkill River, Pennsylvania.

486. Notropis chrosomus (Jordan).

Alabama Basin; very abundant in clear streams and outlets of springs.
Hybopsis chrosomus Jordan, Ann. Lyc. Nat. Hist. N. Y. 1876, 333, Etowah River, etc., Rome, Georgia.

487. Notropis xænocephalus (Jordan).

Georgia to Mississippi; common in streams of the pine woods, descending to brackish water; abundant in Perdido Bay.
Hybopsis xænocephalus Jordan, Ann. Lyc. Nat. Hist. N. Y. 1876, 334, Etowah River, etc., Rome, Georgia.

Subgenus ORCELLA Jordan & Evermann.

Orcella Jordan & Evermann, Fishes North and Middle America, 289, 1896 (*orca*).

488. Notropis orca Woolman.

Rio Grande at El Paso, Texas.
Notropis orca Woolman, Bull. U. S. Fish. Com., XIV, 1894, 56, Rio Grande, El Paso, Texas.

Subgenus NOTROPIS Rafinesque.

489. Notropis ariommus (Cope).

Ohio and Tennessee valleys.
Photogenis ariommus Cope, Cypr. Penn., 378, 1866, White River near Indianapolis.

490. Notropis scabriceps (Cope).

Kanawha River, West Virginia.
Photogenis scabriceps Cope, Proc. Ac. Nat. Sci. Phila. 1867, 166, Sinking and Walker creeks, tributaries of Kanawha River.

491. Notropis jejunus (Forbes).

Western Pennsylvania to Kansas, and north to Winnipeg.
Episema jejuna Forbes, Bull. Ill. Lab. Nat. Hist., I, 60, 1878, Illinois River.

492. Notropis swaini Jordan.

Rivers of Texas from the Colorado westward.
Notropis swaini Jordan, Proc. U. S. Nat. Mus. 1885, 123, Rio Comal, New Braunfels, Texas.

493. Notropis amabilis (Girard).

Rio Leona, a tributary of Rio Nueces, Texas.
Alburnus amabilis Girard, Proc. Ac. Nat. Sci. Phila. 1856, 193, Rio Leona, Texas.

494. Notropis leuciodus (Cope).

Tennessee River basin, in mountain streams.
Photogenis leuciodus Cope, Proc. Ac. Nat. Sci. Phila. 1867, 165, Holston River, Virginia.

495. Notropis telescopus (Cope).

Tennessee River basin; very abundant in cold mountain streams.
Photogenis telescopus Cope, Proc. Ac. Nat. Sci. Phila. 1867, 165, Holston River, Virginia.

495a. Notropis telescopus arcansanus Meek.

White River and Little Red River, Arkansas.
Notropis telescopus arcansanus Meek, Bull. U. S. Fish Com., IX, 1889 (1891), 133, White River, Eureka Springs, Arkansas; Mammoth Spring, Arkansas.

496. Notropis socius (Girard).

Live Oak Creek, southwestern Texas.
Alburnus socius Girard, Proc. Ac. Nat. Sci. Phila. 1856, 193, Live Oak Creek, Texas.

497. Notropis notemigonoides Evermann.

Rio Neches near Palestine, Texas, and streams about Houston, Texas.
Notropis notemigonoides Evermann, Bull. U. S. Fish Com., XI, 1891 (1892), 81, Neches River, Palestine, Texas, and Sims Bayou, Houston, Texas.

498. **Notropis stilbius** Jordan.

Alabama River and tributaries.

Notropis stilbius Jordan, Ann. Lyc. Nat. Hist. N. Y. 1876, 343, Etowah and Oostanaula rivers, Rome, Georgia.

499. **Notropis atherinoides** Rafinesque.

Great Lakes region, Ohio and Mississippi valleys, and north to Winnipeg.

Notropis atherinoides Rafinesque, Amer. Month. Mag. and Crit. Rev. 1818, 204, Lake Erie.

500. **Notropis arge** (Cope).

Upper Mississippi Valley.

Alburnellus arge Cope, Cypr. Penn., 388, 1866, Detroit River or St. Joseph River, Michigan.

501. **Notropis dilectus** (Girard).

Lower Ohio to the Rio Grande.

Alburnus dilectus Girard, Proc. Ac. Nat. Sci. Phila. 1856, 193, Arkansas River, Fort Smith, Arkansas.

502. **Notropis fumeus** Evermann.

Hunter Creek, Houston, Texas.

Notropis fumeus Evermann, Bull. U. S. Fish Com., XI, 1891 (1892), 81, Hunter Creek, Houston, Texas.

503. **Notropis rubrifrons** (Cope).

New York and western Pennsylvania to southern Michigan, Kansas, and Kentucky.

Alburnellus rubrifrons Cope, Proc. Ac. Nat. Sci. Phila. 1865, 85, Kiskiminitas River, a tributary of Alleghany River, Pennsylvania.

504. **Notropis photogenis** (Cope).

Alleghany region.

Squalius photogenis Cope, Proc. Ac. Nat. Sci. Phila. 1864, 280, Youghiogheny River, Pennsylvania.

505. **Notropis amœnus** (Abbott).

Clear streams east of the Alleghanies from the Raritan to the Neuse.

Alburnellus amœnus Abbott, Am. Nat., VIII, 1874, 334, Raritan River, New Jersey.

506. **Notropis scepticus** (Jordan & Gilbert).

Rivers of Carolina from the Cape Fear to the Santee.

Minnilus scepticus Jordan & Gilbert, Synopsis, 200, 1883, Saluda River, Greenville, South Carolina.

507. **Notropis micropteryx** (Cope).

Headwaters of Cumberland and Tennessee rivers; also in Ozark region.

Alburnellus micropteryx Cope, Jour. Ac. Nat. Sci. Phila. 1868, 233, Holston River, Virginia.

508. **Notropis metallicus** Jordan & Meek.

Swamp streams in Georgia and Florida, from the Suwanee Basin to the Escambia.

Notropis metallicus Jordan & Meek, Proc. U. S. Nat. Mus. 1884, 475, Allapaha River, Nashville, Georgia.

Subgenus LYTHRURUS Jordan.

Lythrurus Jordan, Man. Vert. E. U. S., ed. 1, 272, 1876 (*diplemius* = *lythrurus*).

509. **Notropis bellus** (Hay).

Tombigbee River, Mississippi.

Minnilus bellus Hay, Proc. U. S. Nat. Mus. 1880, 510, Tombigbee River, Artesia and Macon, Mississippi.

510. **Notropis lirus** (Jordan).

Alabama River basin.

Notropis lirus Jordan, Ann. Lyc. Nat. Hist. N. Y. 1876, 342, Etowah River and other small streams about Rome, Georgia.

511. Notropis roseipinnis Hay.

Sandy streams of Gulf States, from Escambia River to the Chickasawha.
Notropis roseipinnis Hay, in Jordan, Cat. Fish. N. A., 27, 1885, Chickasawha River, Enterprise, Miss.; substitute for *rubripinnis*, preoccupied.

512. Notropis umbratilis (Girard).

Arkansas River and streams of Kansas and southwestern Iowa.
Alburnus umbratilis Girard, Proc. Ac. Nat. Sci. Phila. 1856, 193, Sugar Loaf Creek, tributary of Poteau River, Arkansas.

512a. Notropis umbratilis atripes (Jordan).

Southern Illinois and Iowa.
Lythrurus atripes Jordan, Bull. Ill. Lab. Nat. Hist., vol. 1, 59, 1878, streams of Union and Johnson counties, Illinois.

512b. Notropis umbratilis lythrurus (Jordan).

Ohio Valley and rivers of neighboring States.
Notropis lythrurus Jordan, Proc. U. S. Nat. Mus. 1884, 476, White River, Indianapolis, Indiana.

512c. Notropis umbratilis cyanocephalus (Copeland).

Rivers of southern Wisconsin and northern Illinois and Indiana.
Lythrurus cyanocephalus Copeland, Proc. Ac. Nat. Sci. Phila. 1877, 70, Racine River, Wisconsin.

512d. Notropis umbratilis ardens (Cope).

Roanoke River, Virginia.
Hypsilepis ardens Cope, Proc. Ac. Nat. Sci. Phila. 1867, 163, headwaters of Roanoke River, Montgomery County, Virginia.

512e. Notropis umbratilis fasciolaris Gilbert.

Southern bend of Tennessee River, in limestone streams.
Notropis umbratilis fasciolaris Gilbert, Bull. U. S. Fish Com., IX, 1889 (1891), 148, streams about Florence, Alabama.

512f. Notropis umbratilis matutinus (Cope).

Neuse and Pamlico rivers; common in sandy brooks.
Alburnellus matutinus Cope, Proc. Amer. Phil. Soc. Phila. 1870, 465, Neuse River, Wake County, North Carolina.

512g. Notropis umbratilis punctulatus (Hay).

Tributaries of Big Hatchee River, northern Mississippi.
Minnilus punctulatus Hay, Proc. U. S. Nat. Mus. 1880, 508, Tuscumbia River, a tributary of the Big Hatchee, near Corinth, Mississippi.

Genus 125. ERICYMBA Cope.

Ericymba Cope, Proc. Ac. Nat. Sci. Phila. 1865, 88 (*buccata*).

513. Ericymba buccata Cope.

Michigan and western Pennsylvania to Kansas, and southward to western Florida.
Ericymba buccata Cope, Proc. Ac. Nat. Sci. Phila. 1865, 88, Kiskiminitas River, a tributary of the Monongahela, western Pennsylvania.

Genus 126. PHENACOBIUS Cope.

Phenacobius Cope, Proc. Ac. Nat. Sci. Phila. 1867, 96 (*teretulus*).

514. Phenacobius teretulus Cope.

Kanawha River, West Virginia.
Phenacobius teretulus Cope, Proc. Ac. Nat. Sci. Phila. 1867, 96, Kanawha River, Eggleston Springs, West Virginia.

515. Phenacobius mirabilis (Girard).

Illinois River to Arkansas.
Exoglossum mirabile Girard, Proc. Ac. Nat. Sci. Phila. 1856, 191, Arkansas River, Fort Smith, Arkansas.

516. Phenacobius scopifer (Cope).

Illinois and Nebraska to the Rio Grande.

Sarcidium scopiferum Cope, Hayden's Geol. Surv. Wyo. for 1870 (1871), 440, Missouri River near St. Joseph, Missouri.

517. Phenacobius uranops Cope.

Upper Tennessee Basin.

Phenacobius uranops Cope, Proc. Ac. Nat. Sci. Phila. 1867, 96, Holston River, Saltville, Virginia.

518. Phenacobius catostomus Jordan.

Alabama River basin.

Phenacobius catostomus Jordan, Ann. Lyc. Nat. Hist. N. Y. 1876, 332, Etowah and Oostanaula rivers, Rome, Georgia.

Genus 127. EVARRA Woolman.

Evarra Woolman, Bull. U. S. Fish. Com., XIV, 1894, 64 (*eigenmanni*).

519. Evarra eigenmanni Woolman.

City of Mexico.

Evarra eigenmanni Woolman, Bull. U. S. Fish Com., XIV, 1894, 64, City of Mexico.

Genus 128. TIAROGA Girard.

Tiaroga Girard, Proc. Ac. Nat. Sci. Phila. 1856, 204 (*cobitis*).

520. Tiaroga cobitis Girard.

Rio San Pedro, a tributary of Rio Gila.

Tiaroga cobitis Girard, Proc. Ac. Nat. Sci. Phila. 1856, 204, Rio San Pedro, Arizona.

Genus 129. RHINICHTHYS Agassiz.

Rhinichthys Agassiz, Lake Superior, 353, 1850 (*atronasus*).

521. Rhinichthys cataractæ (Cuvier & Valenciennes). *Long-nosed Dace.*

New England to Virginia and Wisconsin, its varieties ranging to the Pacific Coast.

Gobio cataractæ Cuvier & Valenciennes, Hist. Nat. Poiss., XVI, 315, 1842, Niagara Falls.

521a. Rhinichthys cataractæ dulcis (Girard).

Upper Missouri, Platte, Arkansas, Rio Grande, and Colorado rivers; the Columbia River; the Utah Basin, and coastwise streams of Washington and Oregon.

Argyreus dulcis Girard, Proc. Ac. Nat. Sci. Phila. 1856, 185, Sweetwater River, Wyoming.

522. Rhinichthys simus Garman.

Coahuila, Mexico.

Rhinichthys simus Garman, Science Observer, 61, 1881, Coahuila, Mexico.

523. Rhinichthys atronasus (Mitchill). *Black-nosed Dace.*

New England to Minnesota, northern Alabama, and Virginia.

Cyprinus atronasus Mitchill, Trans. Lit. Phil. Soc. N. Y., I, 460, 1815, Wallkill River; brooks of New York.

523a. Rhinichthys atronasus croceus (Storer).

Tennessee Basin; abundant in clear brooks.

Leuciscus croceus Storer, Proc. Bost. Soc. Nat. Hist., II, 1845, 48, Alabama, probably Florence.

523b. Rhinichthys atronasus lunatus (Cope).

Lakes and brooks of Michigan, Indiana, Wisconsin, Minnesota, and in Rainy River.

Rhinichthys lunatus Cope, Proc. Ac. Nat. Sci. Phila. 1864, 278, Grosse Isle, Michigan.

523c. Rhinichthys atronasus meleagris (Agassiz).

Illinois and Iowa.

Rhinichthys meleagris Agassiz, Am. Jour. Sci. Arts 1854, 357, Burlington, Iowa.

Genus 130. AGOSIA Girard.

Agosia Girard, Proc. Ac. Nat. Sci. Phila. 1856, 186 (*chrysogaster*).

Subgenus APOCOPE Cope.

Apocope Cope, Hayden's Geol. Surv. Mont. for 1871 (1872), 472 (*carringtoni*).

524. Agosia oscula (Girard).

Lower Colorado and Gila rivers.

Argyreus osculus Girard, Proc. Ac. Nat. Sci. Phila. 1856, 186, Babocomori Creek, a tributary of the Rio San Pedro, Arizona.

525. Agosia yarrowi Jordan & Evermann.

Streams of Colorado in the Colorado River basin.

Agosia yarrowi Jordan & Evermann, Bull. U. S. Fish Com., IX, 1889 (1891), 28, Tomichi Creek and Gunnison River, Gunnison, Colorado.

526. Agosia couesii (Yarrow).

Colorado River basin.

Apocope couesii Yarrow, Field and Forest, 1876, and Zool. Wheeler Surv., 648, 1875 (1876), Camp Apache, Arizona.

527. Agosia adobe Jordan & Evermann.

Sevier River, Utah.

Agosia adobe Jordan & Evermann, Bull. U. S. Fish. Com., IX, 1889 (1891) 36, Sevier River, Juab, Utah.

528. Agosia nevadensis (Gilbert).

Warm Springs in the deserts of southwestern Nevada; Ash Meadows, Indian Creek, and Vegas Creek, Nevada.

Rhinichthys (*Apocope*) *nevadensis* Gilbert, Death Valley Expedition, 230, pl. 6, fig. 1, 1893, Ash Meadows, Amargosa Desert, Nevada.

529. Agosia nubila (Girard).

Basin of the Columbia River from western Idaho, below Shoshone Falls of Snake River to the coast, and in coastwise streams from Washington southward into Oregon.

Argyreus nubilus Girard, Proc. Ac. Nat. Sci. Phila. 1856, 180, Fort Steilacoom, Puget Sound.

529a. Agosia nubila carringtonii (Cope).

Upper Snake River basin to Heart Lake in Yellowstone Park; thence extending southward in the Great Basin and the Coast Ranges.

Apocope carringtonii Cope, Hayden's Fifth Annual Report U. S. Geological Survey for 1871 (1872), 472, Warm Springs, Box Elder County, Utah.

530. Agosia velifera (Gilbert).

Pahranagat Valley, southwestern Nevada.

Rhinichthys (*Apocope*) *velifer* Gilbert, Death Valley Expedition, 229, pl. 6, fig. 2, 1893, Pahranagat Valley, Nevada.

531. Agosia umatilla Gilbert & Evermann.

Columbia River at Umatilla, Oregon, and the Payette and Salmon rivers, Idaho.

Agosia umatilla Gilbert & Evermann, Investigations in the Columbia River Basin, 42, pl. 9, fig. 2, 1894, Columbia River, Umatilla, Oregon.

532. Agosia falcata Eigenmann & Eigenmann.

Columbia River basin; Boise River at Caldwell, Idaho; Payette River at Payette, Idaho; Columbia River at Pasco and Umatilla, and Mill Creek at Walla Walla.

Agosia falcata Eigenmann & Eigenmann, Am. Nat., XXVII, February 4, 1893, 153, Boise River at Caldwell, Idaho.

Subgenus AGOSIA Girard.

533. **Agosia chrysogaster** Girard.

Tributaries of the Gila River.

Agosia chrysogaster Girard, Proc. Ac. Nat. Sci. Phila. 1856, 187, Rio Santa Cruz, Sonora, Mexico.

Genus 131. **HYBOPSIS** Agassiz.

Hybopsis Agassiz, Am. Jour. Sci. Arts 1854, 358 (*gracilis* = *amblops*).

Subgenus ERIMYSTAX Jordan.

Erimystax Jordan, Geol. Surv. Ohio, IV, Zool., 858, 1882 (*dissimilis*).

534. **Hybopsis tetranema** Gilbert.

Tributaries of Arkansas River in Kansas and Arkansas.

Hybopsis tetranemus Gilbert, Bull. Washburn College Lab., vol. 1, No. 7, 208, 1886, Elm and Spring creeks, Medicine Lodge, Kansas.

535. **Hybopsis æstivalis** (Girard).

Arkansas River to the Rio Grande.

Gobio æstivalis Girard, Proc. Ac. Nat. Sci. Phila. 1856, 189, Rio San Juan, Monterey, New Leon, Mexico.

535a. **Hybopsis æstivalis marconis** Jordan & Gilbert.

Abundant in Rio San Marcos, San Marcos, Texas; also known from the Guadalupe River near San Marcos and the Rio Comal at New Braunfels, Texas.

Hybopsis æstivalis marconis Jordan & Gilbert, Proc. U. S. Nat. Mus. 1886, 22, Rio San Marcos, San Marcos, Texas.

536. **Hybopsis hyostoma** (Gilbert).

Indiana to Iowa, and south to the Alabama River.

Nocomis hyostomus Gilbert, Proc. U. S. Nat. Mus. 1884, 203, White River, Bedford, Indiana.

537. **Hybopsis gelida** (Girard).

Middle Missouri River basin from Wyoming to eastern Nebraska.

Gobio gelidus Girard, Proc. Ac. Nat. Sci. Phila. 1856, 188, Milk River, Montana.

538. **Hybopsis meeki** Jordan & Evermann.

Missouri River at St. Joseph and elsewhere, in the river channel.

Hybopsis meeki Jordan & Evermann, Fishes North and Middle America, 317, 1896, Missouri River at St. Joseph, Missouri.

539. **Hybopsis montana** Meek.

Types supposed to be from the upper Missouri.

Hybopsis montanus Meek, Proc. U. S. Nat. Mus. 1884, 526, locality unknown, but collected by Dr. F. V. Hayden.

540. **Hybopsis cumingii** (Günther).

California; only the type known.

Ceratichthys cumingii Günther, Cat., VII, 177, 1868, California.

541. **Hybopsis monaca** (Cope).

Tennessee Basin, in the river channels.

Ceratichthys monacus Cope, Jour. Ac. Nat. Sci. Phila. 1867, 227, Holston River, Washington County, Virginia.

542. **Hybopsis dissimilis** (Kirtland). *Spotted Shiner.*

Lake Erie to the headwaters of the Tennessee and west to Arkansas and Iowa.

Luxilus dissimilis Kirtland, Bost. Jour. Nat. Hist., III, 1840, 341, pl. 4, fig. 2, Mahoning River, Ohio, and Lake Erie near Cleveland, Ohio.

543. Hybopsis watauga Jordan & Evermann.

Holston River, Virginia; Watauga River, Tennessee; White River, Arkansas; Big Barren River, Kentucky, and Tippecanoe River, Indiana.

Hybopsis watauga Jordan & Evermann, Proc. U. S. Nat. Mus. 1888, 355, Watauga River, Elizabethtown, Tennessee; North Fork of Holston River, Saltville, Virginia.

Subgenus **HYBOPSIS** Agassiz.

544. Hybopsis labrosa (Cope).

Basin of the Santee in North and South Carolina.

Ceratichthys labrosus Cope, Proc. Amer. Phil. Soc. 1870, 458, tributaries of Catawba River, McDowell and Burke counties, North Carolina.

545. Hybopsis hypsinota (Cope).

Santee Basin, in North and South Carolina.

Ceratichthys hypsinotus Cope, Proc. Amer. Phil. Soc. Phila. 1870, 458, tributaries of Catawba River, McDowell County, North Carolina.

546. Hybopsis rubrifrons (Jordan).

Basin of the Altamaha, Georgia.

Nocomis rubrifrons Jordan, Ann. Lyc. Nat. Hist. N. Y. 1876, 330, Ocmulgee River, Flat Shoals, Georgia.

547. Hybopsis amblops (Rafinesque). *Silver Chub.*

New York to Iowa, and southward to Alabama; very common in the Ohio and Tennessee valleys.

Rutilus amblops Rafinesque, Ichth. Ohiensis, 51, 1820, Ohio River at the Falls.

548. Hybopsis storeriana (Kirtland).

Lake Erie to Nebraska and eastern Wyoming, Tennessee, and Arkansas; abundant in the larger streams, especially in Iowa and Nebraska.

Rutilus storerianus Kirtland, Proc. Bost. Soc. Nat. Hist., I, 1842, 71, Lake Erie.

Subgenus **YURIRIA** Jordan & Evermann.

Yuriria Jordan & Evermann, Fishes North and Middle America, 321, 1896 (*altus*).

549. Hybopsis alta (Jordan). *Pesca Blanca.*

Lakes and streams of Guanajuato, tributary to Rio Lerma, Mexico, in Pacific drainage.

Hudsonius altus Jordan, Proc. U. S. Nat. Mus. 1879, 301, Lake Tupataro, Guanajuato, Mexico.

Subgenus **NOCOMIS** Girard.

Nocomis Girard, Proc. Ac. Nat. Sci. Phila. 1856, 190 (*nebrascensis* = *kentuckiensis*).

550. Hybopsis kentuckiensis (Rafinesque). *Horny Head; River Chub; Jerker; Indian Chub.*

Pennsylvania to Wyoming and Alabama, on both sides of the Alleghanies; everywhere abundant in the larger streams, seldom ascending small brooks.

Luxilus kentuckiensis Rafinesque, Ichth. Ohiensis, 48, 1820, Ohio River.

Genus 132. **COUESIUS** Jordan.

Couesius Jordan, Bull. Hayden's Geol. Surv. Terr., IV, 785, 1878 (*milneri*).

551. Couesius squamilentus (Cope).

Henry Fork of Green River in southwestern Wyoming.

Ceratichthys squamilentus Cope, Hayden's Geol. Surv. Wyo. for 1870 (1872), 442, Henry Fork of Green River, Wyoming, Colorado Basin.

552. Couesius plumbeus (Agassiz).

Streams and lakes, from Lake Superior east to the Adirondack region and New Brunswick.

Gobio plumbeus Agassiz, Lake Superior, 366, 1856, Lake Superior.

553. **Couesius dissimilis** (Girard).

Upper Missouri and Black Hills region.

Leucosomus dissimilis Girard, Proc. Ac. Nat. Sci. Phila. 1856, 189, Milk River and Little Muddy River, Montana.

554. **Couesius greeni** Jordan.

Stuart Lake, headwaters of Fraser River in British Columbia, and Lake Pend Oreille, Idaho.

Couesius greeni Jordan, Proc. U. S. Nat. Mus. 1893, 313, Stuart Lake, British Columbia.

555. **Couesius adustus** Woolman.

Rio de los Conchos, Chihuahua, Mexico.

Couesius adustus Woolman, Bull. U. S. Fish Com., XIV, 1894, 57, Rio de los Conchos, Chihuahua, Mexico.

Genus 133. PLATYGOBIO Gill.

Platygobio Gill, Trans. Amer. Phil. Soc. Phila., V, 1863, 178 (*communis* = *gracilis*).

556. **Platygobio physignathus** (Cope).

Upper waters of Arkansas River; very abundant in the channels, the most common fish at Pueblo, Colorado.

Ceratichthys physignathus Cope, Wheeler Surv., Zool., V, 651, 1875 (1876), Arkansas River, Pueblo, Colorado.

557. **Platygobio gracilis** (Richardson). *Flat-headed Chub.*

East slope of the Rocky Mountains, from Missouri and Yellowstone rivers to the Saskatchewan.

Cyprinus (*Leuciscus*) *gracilis* Richardson, Fauna Bor.-Amer., Fishes, 120, pl. 78, 1836, Saskatchewan River at Carlton-house, Canada.

558. **Platygobio pallidus** Forbes.

One specimen from Ohio River at Cairo.

Platygobio pallidus Forbes, in Jordan & Gilbert, Synopsis, 220, 1883, Ohio River at Cairo, Illinois.

Genus 134. EXOGLOSSUM Rafinesque.

Exoglossum Rafinesque, Jour. Ac. Nat. Sci. Phila., I, 1818, 420 (*lesueurianum*).

559. **Exoglossum maxillingua** (LeSueur). *Cut-lips; Nigger Chub; Nigger Dick.*

Lake Ontario, St. Lawrence River, Lake Champlain, Hudson River, and Cayuga Lake, and southward to Virginia; abundant in the basins of the Susquehanna, Hudson, Potomac, James, Roanoke, and Kanawha.

Cyprinus maxillingua LeSueur, Jour. Ac. Nat. Sci. Phila., I, 1817, 85, Pipe Creek, Maryland.

Genus 135. LEPIDOMEDA Cope.

Lepidomeda Cope, Proc. Amer. Phil. Soc. Phila. 1874, 131 (*vittata*).

560. **Lepidomeda vittata** Cope.

Known only from the Colorado Chiquito River, Arizona, and from Pahranagat Valley, Nevada.

Lepidomeda vittata Cope, Proc. Amer. Phil. Soc. Phila. 1874, 131, Rio Colorado Chiquito, Arizona.

561. **Lepidomeda jarrovii** Cope.

Colorado Chiquito River, Arizona; also in southern Nevada, in springs in the desert.

Lepidomeda jarrovii Cope, Proc. Amer. Phil. Soc. Phila. 1874, 132, Rio Colorado Chiquito, Arizona.

Genus 136. MEDA Girard.

Meda Girard, Proc. Ac. Nat. Sci. Phila. 1856, 191 (*fulgida*).

562. **Meda fulgida** Girard.

Rio Gila, Arizona.

Meda fulgida Girard, Proc. Ac. Nat. Sci. Phila. 1856, 191, Rio San Pedro, Arizona.

Genus 137. **PLAGOPTERUS** Cope.

Plagopterus Cope, Proc. Amer. Phil. Soc. Phila. 1874, 130 (*argentissimus*).

563. Plagopterus argentissimus Cope.

Colorado Basin in western Colorado (Cope); Fort Yuma (Gilbert).

Plagopterus argentissimus Cope, Proc. Amer. Phil. Soc. Phila. 1874, 130, San Luis Valley, Colorado.

Suborder HETEROGNATHI.

Family XXXVIII. ERYTHRINIDÆ.

Genus 138. **MACRODON** Müller.

Macrodon Müller, Archiv Anat., 1842, 308 (*trahira*=*malabaricus*).

564. Macrodon microlepis Günther.

Panama to Ecuador, chiefly west of the Andes; known from Rio Chagres and from Ecuador.

Macrodon microlepis Günther, Cat., v, 282, 1864, western Ecuador; Chagres River, Guatemala.

Family XXXIX. CHARACINIDÆ. The Characins.

Genus 139. **CURIMATA** (Cuvier) Cloquet.

Curimata Cuvier, in Cloquet, Dict. Hist. Nat., XII, 240, 1818 (*edentula*).

565. Curimata magdalenæ Steindachner. *Sardina Blanca.*

Rio Magdalena and Rio Mamoni, Colombia.

Curimatus magdalenæ Steindachner, Fisch-Fauna des Magdalenen-Stromes, 34, 1878, Rio Magdalena, Colombia.

Genus 140. **PIABUCINA** Cuvier & Valenciennes.

Piabucina Cuvier & Valenciennes, Hist. Nat. Poiss., XXII, 161, 1849 (*erythrinoides*).

566. Piabucina panamensis Gill.

Rio Frijoli, Atlantic Slope of Isthmus of Panama.

Piabucina panamensis Gill, Proc. Ac. Nat. Sci. Phila. 1876, 336, Rio Frijoli, Isthmus of Panama.

Genus 141. **TETRAGONOPTERUS** Cuvier.

Tetragonopterus (Artedi) Cuvier, Règne An., II, 166, 1817 (*argenteus*).

Subgenus **ASTYANAX** Baird & Girard.

Astyanax Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1854, 26 (*argentatus*).

567. Tetragonopterus æneus Günther.

Oaxaca, Mexico, and Rio Chagres, south to Brazil.

Tetragonopterus æneus Günther, Proc. Zool. Soc. Lond. 1860, 319, Oaxaca, Mexico.

568. Tetragonopterus rutilus Jenyns.

Mexico to Ecuador and Rio de la Plata; recorded as common in Central America.

Tetragonopterus rutilus Jenyns, Zool. Beagle, Fishes, 125, 1842, Rio Parana, South America.

569. Tetragonopterus panamensis Günther.

Streams about Panama and Lake Yzabal.

Tetragonopterus panamensis Günther, Cat., v, 324, 1864, Panama; Lake Yzabal.

570. Tetragonopterus microphthalmus Günther.

Guatemala (Lake Amatitlan) to Peru.

Tetragonopterus microphthalmus Günther, Cat., v, 324, 1864, Lake Amatitlan; Rio Rimac, Peru.

571. **Tetragonopterus œrstedii** Kroyer.

Rio San Juan, Nicaragua.
Tetragonopterus œrstedii Kroyer, in Lütken, Ict. Bidrag, III, 229, 1874, Rio San Juan, Nicaragua.

572. **Tetragonopterus petenensis** Günther.

Lake Peten to western Ecuador; southeast to Argentine Republic.
Tetragonopterus petenensis Günther, Cat., V, 326, 1864, Lake Peten.

573. **Tetragonopterus scabripinnis** Jenyns.

Jamapa, Mexico, to Rio Janeiro.
Tetragonopterus scabripinnis Jenyns, Zool. Beagle, Fishes, 125, 1842, Rio Janeiro, Brazil.

574. **Tetragonopterus humilis** Günther.

Lake Amatitlan, Guatemala.
Tetragonopterus humilis Günther, Cat., V, 327, 1864, Lake Amatitlan, Guatemala.

575. **Tetragonopterus brevimanus** Günther.

Guatemala.
Tetragonopterus brevimanus Günther, Cat., V, 325, 1864, Yzabal; Rio San Geronimo, Guatemala.

576. **Tetragonopterus mexicanus** Filippi.

Lakes about the City of Mexico.
Tetragonopterus mexicanus Filippi, in Guerin's Rev. Mag. Zool., 166, 1853, City of Mexico.

577. **Tetragonopterus argentatus** (Baird & Girard).

Southern Texas and Mexico (Rio Nueces, Rio Leona, and Rio Grande); also recorded, probably by error, from Arkansas.
Astyanax argentatus Baird & Girard, Proc. Ac. Nat. Sci. Phila., VII, 1854, 27, Rio Nueces, Rio Leona, Zoquito, Comanche Spring, Elm Creek, Turkey Creek, San Felipe, Devil River, Brownsville, and Rio Sabinal.

Genus 142. BRYCON Müller & Troschel.

Brycon Müller & Troschel, Horæ Ichthyologicæ, I, 15, 1845 (*falcatus*).

Subgenus CHALCINOPSIS Kner.

Chalcinopsis Kner, Sitzber. Akad. Wiss. München, 226, 1863 (*striatulus*).

578. **Brycon dentex** Günther.

Yucatan to Ecuador.
Brycon dentex Günther, Proc. Zool. Soc. Lond. 1860, 240, Esmeraldas, Ecuador.

579. **Brycon striatulus** (Kner).

Rio Chagres and streams about Panama.
Chalcinopsis striatulus Kner, Sitzber. Akad. Wiss. München, 223, 1863, Panama.

Genus 143. GASTEROPELECUS (Gronow) Pallas.

Gasteropelecus Gronow, Mus. Ichthyol., II, 7, 1763 (nonbinomial).

580. **Gasteropelecus maculatus** Steindachner. *Peche Peche.*

Rio Mamoni, near Panama.
Gasteropelecus maculatus Steindachner, Fluss-Fische Südamerikas, 168, 1879, Rio Mamoni, at Chepo, Panama.

Genus 144. RŒBOIDES Günther.

Rœboides Günther, Cat., V, 347, 1864 (*microlepis*).

581. **Rœboides guatemalensis** (Günther).

Rio Chagres and streams of Guatemala.
Anacyrtus guatemalensis Günther, Cat., V, 347, 1864, Rio Chagres; Huamuchal.

Genus 145. **BRAMOCHARAX** Gill.

Bramocharax Gill, Proc. Ac. Nat. Sci. Phila. 1877, 189 (*bransfordi*).

582. **Bramocharax bransfordi** Gill.

Lake Nicaragua.

Bramocharax bransfordi Gill, Proc. Ac. Nat. Sci. Phila. 1877, 190, Lake Nicaragua.

Genus 146. **LUCIOCHARAX** Steindachner.

Luciocharax Steindachner, Fisch-Fauna des Magdalenen-Stromes, 67, 1878 (*insculptus*).

583. **Luciocharax insculptus** Steindachner.

Rio Magdalena, and Rio Mamoni near Panama.

Luciocharax insculptus Steindachner, Fisch-Fauna des Magdalenen-Stromes, 67, 1878, Rio Magdalena, and Rio Mamoni near Panama.

Suborder GYMNONOTI.

Family XL. GYMNOTIDÆ.

Genus 147. **GITON** Kaup.

Giton Kaup, in Duméril, Analyt. Ichth., 201, 1856 (*fasciatus*).

584. **Giton fasciatus** (Pallas). *Carapo.*

Guatemala to Rio de la Plata; recorded from Rio Matagua and Grenada.

Gymnotus fasciatus Pallas, Spicilegia Zool., VII, 35, 1769, "fresh waters of America."

Genus 148. **EIGENMANNIA** Jordan & Evermann.

Eigenmannia Jordan & Evermann, Fishes North and Middle America, 341, 1896 (*humboldti*).

585. **Eigenmannia humboldti** (Steindachner). *Macana.*

Rio Magdalena, and Rio Mamoni near Panama.

Sternopygus humboldti Steindachner, Fisch-Fauna des Magdalenen-Stromes, 55, 1878, Rio Magdalena, Venezuela.

Order O. SYMBRANCHIA.

Family XLI. SYMBRANCHIDÆ. The Symbranchoid Eels.

Genus 149. **SYMBRANCHUS** Bloch.

Symbranchus Bloch, Ichthyologia, IX, 87, 1795 (*marmoratus*).

586. **Symbranchus marmoratus** Bloch.

Tropical America, in streams from the Amazon northward to southern Mexico and St. Lucia.

Symbranchus marmoratus Bloch, Ichthyologia, IX, 87, pl. 418, 1795, Tropical America.

Order P. CARENCHELYI. The Long-necked Eels.

Family XLII. DERICHTHYIDÆ.

Genus 150. **DERICHTHYS** Gill.

Derichthys Gill, Am. Nat., XVIII, 1884, 433 (*serpentinus*).

587. **Derichthys serpentinus** Gill.

Gulf Stream.

Derichthys serpentinus Gill, Am. Nat., XVIII, 1884, 433, Gulf Stream at Albatross Station 2094, in 1,022 fathoms.

Order Q. APODES. The Eels.

Suborder ENCHELYCEPHALI. The Eels.

Family XLIII. ANGUILLIDÆ. The True Eels.

Genus 151. ANGUILLA Shaw. *Eels.*

Anguilla Shaw, General Zoology, IV, 15, 1804 (*anguilla*).

588. **Anguilla chrysypa** Rafinesque. *American Eel; Fresh-water Eel.*

Atlantic Coast of the United States; very abundant from Maine to Mexico, ascending all rivers south of Canada and east of the Rocky Mountains and resident throughout the Mississippi Valley; common in the West Indies.

Anguilla chrysypa Rafinesque, Amer. Month. Mag. and Crit. Rev. 1817, 120, Lake George, Hudson River, and Lake Champlain.

Family XLIV. SIMENCHELYIDÆ. The Snub-nosed Eels.

Genus 152. SIMENCHELYS Gill.

Simenchelys Gill, in Goode & Bean, Bull. Essex Inst., 27, 1879 (*parasiticus*).

589. **Simenchelys parasiticus** Gill.

Offshore banks, in deep water, south of Newfoundland; also recorded from the Azores.

Simenchelys parasiticus Gill, in Goode & Bean, Bull. Essex Inst., 27, 1879, Newfoundland Banks.

Family XLV. ILYOPHIDÆ. The Ooze Eels.

Genus 153. ILYOPHIS Gilbert.

Ilyophis Gilbert, Proc. U. S. Nat. Mus. 1891, 351 (*brunneus*).

590. **Ilyophis brunneus** Gilbert.

One specimen from Chatham Island, Galapagos Archipelago, in 634 fathoms.

Ilyophis brunneus Gilbert, Proc. U. S. Nat. Mus. 1891, 352, Chatham Island; Galapagos Archipelago, at Albatross Station 2808, in 634 fathoms.

Family XLVI. SYNAPHOBRANCHIDÆ.

Genus 154. SYNAPHOBRANCHUS Johnson.

Synaphobranchus Johnson, Proc. Zool. Soc. Lond. 1862, 169 (*kaupii*).

591. **Synaphobranchus pinnatus** (Gronow).

North Atlantic and western Pacific; common about the Madeiras, Canaries, etc., and also about the banks of Newfoundland.

Muræna pinnata Gronow, Cat. Fish. Brit. Mus., 19, 1854, locality unknown.

Genus 155. HISTIOBRANCHUS Gill.

Histiobranchus Gill, Proc. U. S. Nat. Mus. 1883, 255 (*infernalis*).

592. **Histiobranchus bathybius** (Günther).

Northern and western Pacific in deep water; Bering Strait; off Japan and off Cape of Good Hope; one specimen obtained by Dr. Gilbert in Bering Sea in 1890.

Synaphobranchus bathybius Günther, Ann. and Mag. Nat. Hist., XX, 1877, 445, and in Voy. Challenger, 254, pl. 62, fig. *b*, 1887, off Yedo; North Pacific; also between Cape of Good Hope and Kerguelen Island.

593. **Histiobranchus infernalis** Gill.

Gulf Stream.

Histiobranchus infernalis Gill, Proc. U. S. Nat. Mus. 1883, 255, Gulf Stream, at Albatross Station 2037, 38° 30′ N., 69° W., in 1,731 fathoms.

Family XLVII. LEPTOCEPHALIDÆ. The Conger Eels.

Genus 156. **LEPTOCEPHALUS** (Gronow) Scopoli. *Conger Eels.*

Leptocephalus (Gronow) Scopoli, Int. Hist. Nat., 453, 1777 (*morrissi*).

594. Leptocephalus conger (Linnæus). *Conger Eel.*

Atlantic Ocean; generally common on both coasts, from Cape Cod to Brazil; also on coasts of Asia and Africa.

Muræna conger Linnæus, Syst. Nat., ed. x, 245, 1758, Mediterranean Sea.

595. Leptocephalus caudilimbatus (Poey).

Tropical parts of Atlantic; Pensacola to Cuba and Madeira.

Echelus caudilimbatus Poey, Repertorio, II, 249, 1867, Cuba.

Genus 157. **CONGERMURÆNA** Kaup.

Congermuræna Kaup, Apodes, 108, 1856 (*balearica*).

596. Congermuræna balearica (De la Roche).

Tropical parts of the Atlantic and eastern Pacific; known from the Mediterranean, Cuba, Brazil, St. Helena, Cape San Lucas, and the Galapagos.

Muræna balearica De la Roche, Ann. Mus., XIII, 1809, 327, fig. 3, Balearic Islands.

597. Congermuræna macrura (Gilbert).

Gulf of California.

Ophisoma macrurum Gilbert, Proc. U. S. Nat. Mus. 1891, 351, Gulf of California, at Albatross Station 3015.

598. Congermuræna prorigera (Gilbert).

Panama to Ecuador.

Ophisoma prorigerum Gilbert, Proc. U. S. Nat. Mus. 1891, 350, coast of Ecuador, at Albatross Station 2792, in 401 fathoms; also at station 2799, near Panama.

599. Congermuræna nitens (Jordan & Bollman).

One specimen dredged at Albatross Station 2801, off Panama, 8° 47′ N., 79° 29′ 30″ W., in 14 fathoms.

Ophisoma nitens Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 153, Panama.

600. Congermuræna flava Goode & Bean.

Albatross Stations 2121 and 2122, in 31 to 34 fathoms; Station 2402, in 111 fathoms; also Blake Station 264, in 84 fathoms.

Congermuræna flava Goode & Bean, Oceanic Ichthyology, 138, fig. 159, 1896, Gulf Stream.

Genus 158. **UROCONGER** Kaup.

Uroconger Kaup, Apodes, 110, 1856 (*lepturus*).

601. Uroconger vicinus Vaillant.

Deep waters off the coast of northern Africa; a young individual at Albatross Station 2161, in 146 fathoms.

Uroconger vicinus Vaillant, Expéd. Travailleur et Talisman, 86, pl. 6, fig. 1, 1888, Banc d'Arguin, off Soudan, off Cape Verde Islands.

Family XLVIII. MURÆNESOCIDÆ.

Genus 159. **MURÆNESOX** McClelland.

Muræncsox McClelland, Calcutta Jour. Nat. Hist., IV, 1843, 408 (*tricuspidata*).

Subgenus **MURÆNESOX** McClelland.

602. Muræncsox coniceps Jordan & Gilbert.

Cape San Lucas to the coast of Colombia; generally common.

Muræncsox coniceps Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 348, Mazatlan, Mexico.

603. Muræncsox savanna (Cuvier).

Cuba to Rio Janeiro, not common; occasional in the Mediterranean Sea.

Muræna savanna Cuvier, Règne Animal, ed. 2, vol. 2, 350, 1829, Martinique.

Genus 160. XENOMYSTAX Gilbert.

Xenomystax Gilbert, Proc. U. S. Nat. Mus. 1891, 348 (*atrarius*).

604. Xenomystax atrarius Gilbert.

Coast of Ecuador.

Xenomystax atrarius Gilbert, Proc. U. S. Nat. Mus. 1891, 348, 1° S., 81° W., at Albatross Station 2792, in 401 fathoms.

Genus 161. HOPLUNNIS Kaup.

Hoplunnis Kaup, Aale Hamb. Mus., 19, 1859 (*schmidtii*).

605. Hoplunnis schmidtii Kaup.

Caribbean Sea at Puerto Cabello, near Aspinwall.

Hoplunnis schmidtii Kaup, Aale Hamb. Mus., 19, pl. 2, fig. 4, 1859, Puerto Cabello, near Aspinwall.

606. Hoplunnis diomedianus Goode & Bean.

A single individual was obtained by the Albatross at Station 2402, Gulf of Mexico, 28° 36′ N., 86° 50′ W., 111 fathoms.

Hoplunnis diomedianus Goode & Bean, Oceanic Ichthyology, 146, 1896, Gulf of Mexico.

Genus 162. NEOCONGER Girard.

Neoconger Girard, U. S. Mex. Bound. Surv., Ichth., 77, 1859 (*mucronatus*).

607. Neoconger mucronatus Girard.

Coast of Texas.

Neoconger mucronatus Girard, U. S. Mex. Bound. Surv., Ichth., 77, 1859, St. Joseph Island, Texas.

608. Neoconger vermiformis Gilbert.

Lower California and Panama.

Neoconger vermiformis Gilbert, Proc. U. S. Nat. Mus. 1890, 57, off Lower California, at Albatross Station 3035, in about 30 fathoms.

Genus 163. LEPTOCONGER Poey.

Leptoconger Poey, Anales Hist. Nat. Esp., 250, 1880 (*perlongus*).

609. Leptoconger perlongus (Poey).

Matanzas, Cuba.

Neoconger perlongus Poey, Ann. Lyc. Nat. Hist. N. Y., 1874, 67, pl. 9, fig. 3–4, Matanzas, Cuba.

Genus 164. STILBISCUS Jordan & Bollman.

Stilbiscus Jordan & Bollman, Proc. U. S. Nat. Mus. 1888, 549 (*edwardsi*).

610. Stilbiscus edwardsi Jordan & Bollman.

Green Turtle Cay, one of the Bahamas.

Stilbiscus edwardsi Jordan & Bollman, Proc. U. S. Nat. Mus. 1888, 549, Green Turtle Cay, Bahamas.

Genus 165. GORDIICHTHYS Jordan & Davis.

Gordiichthys Jordan & Davis, Prelim. Review Apodal Fishes, in Rept. U. S. Fish Com. 1888 (1892), 644 (*irretitus*).

611. Gordiichthys irretitus Jordan & Davis.

Snapper Banks off west Florida, in rather deep water.

Gordiichthys irretitus Jordan & Davis, Apodal Fishes, 644, 1892, off Pensacola, Florida.

Family XLIX. NETTASTOMIDÆ. The Sorcerers.

Genus 166. CHLOPSIS Rafinesque.

Chlopsis Rafinesque, Indice Ittiol. Sicil., 58, 1810 (*bicolor*).

612. Chlopsis equatorialis Gilbert.

Coast of Ecuador.

Chlopsis equatorialis Gilbert, Proc. U. S. Nat. Mus. 1891, 347, off coast of Ecuador, 1° S., 81° W., at Albatross Station 2792, in 401 fathoms.

Genus 167. VENEFICA Jordan & Davis.

Venefica Jordan & Davis, Apodal Fishes, 651, 1892 (*procera*).

613. Venefica procera (Goode & Bean).

Gulf Stream; also taken off San Pedro, California.

Nettastoma procerum Goode & Bean, Bull. Mus. Comp. Zool., x, 224, 1883, Gulf Stream, at Albatross Station 325, 33° 35′ 20″ N., 76° W., in 647 fathoms; also at Station 327.

Family L. NEMICHTHYIDÆ. The Snipe Eels.

Genus 168. SERRIVOMER Gill & Ryder.

Serrivomer Gill & Ryder, Proc. U. S. Nat. Mus. 1883, 260 (*beanii*).

614. Serrivomer beanii Gill & Ryder.

Gulf Stream; also taken in the Gulf of California.

Serrivomer beanii Gill & Ryder, Proc. U. S. Nat. Mus. 1883, 261, Gulf Stream, latitude 41° 40′ 30″, longitude 65° 28′ 30″, in 855 fathoms.

Genus 169. SPINIVOMER Gill & Ryder.

Spinivomer Gill & Ryder, Proc. U. S. Nat. Mus. 1883, 261 (*goodei*).

615. Spinivomer goodei Gill & Ryder.

Gulf Stream.

Spinivomer goodei Gill & Ryder, Proc. U. S. Nat. Mus. 1883, 261, Gulf Stream, at latitude 38° 19′ 26″, longitude 68° 20′ 20″, in 2,361 fathoms.

Genus 170. AVOCETTINA Jordan & Davis.

Avocettina Jordan & Davis, Apodal Fishes, 655, 1892 (*infans*).

616. Avocettina infans (Günther).

Known from West Indies, mid-Atlantic, off Pernambuco.

Nemichthys infans Günther, Ann. and Mag. Nat. Hist. 1878, 24, and in Voy. Challenger, XXII, 264, 1887, mid-Atlantic, in 2,500 fathoms.

617. Avocettina gilli (Bean).

Coast of southeastern Alaska in deep water.

Labichthys gilli Bean, Proc. U. S. Nat. Mus. 1890, 45, east of Prince of Wales Island, Alaska.

Genus 171. LABICHTHYS Gill & Ryder.

Labichthys Gill & Ryder, Proc. U. S. Nat. Mus. 1883, 261 (*carinatus*).

618. Labichthys carinatus Gill & Ryder.

Gulf Stream.

Labichthys carinatus Gill & Ryder, Proc. U. S. Nat. Mus. 1883, 253, 255, 261, Gulf Stream, 41° 13′ N., 65° 33′ W.

619. Labichthys elongatus Gill & Ryder.

Gulf Stream.

Labichthys elongatus Gill & Ryder, Proc. U. S. Nat. Mus. 1883, 262, Gulf Stream, at Albatross Station 2100, 39° 22′ N., 68° 34′ W.

Genus 172. **NEMICHTHYS** Richardson.

Nemichthys Richardson, Voy. Samarang, 16, 1848 (*scolopaceus*).

620. **Nemichthys scolopaceus** Richardson. *Snipe Eel.*

Atlantic Ocean, in deep water; many specimens taken off the New England coast and off the Grand Banks; common about Madeira.
Nemichthys scolopacea Richardson, Voy. Samarang, 25, 1848, South Atlantic.

621. **Nemichthys avocetta** Jordan & Gilbert.

Puget Sound near Seattle; only the type known.
Nemichthys avocetta Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 409, harbor of Port Gamble, Puget Sound, near Seattle.

Family LI. MYRIDÆ. The Worm Eels.

Genus 173. **AHLIA** Jordan & Davis.

Ahlia Jordan & Davis, Apodal Fishes, 639, 1892 (*egmontis*).

622. **Ahlia egmontis** (Jordan).

Egmont Key, Florida.
Myrophis egmontis Jordan, Proc. Ac. Nat. Sci. Phila. 1884, 44, Egmont Key.

Genus 174. **MYROPHIS** Lütken.

Myrophis Lütken, Vidensk. Meddel. Naturg. Foren. Kjöbenhavn, 1, 9, 1851 (*punctatus*).

623. **Myrophis punctatus** Lütken.

West Indies; coast of Texas to Surinam; common along our Gulf Coast.
Myrophis punctatus Lütken, Vidensk. Meddel. Naturg. Foren. Kjöbenhavn, 1, 9, 1851, West Indies.

624. **Myrophis vafer** Jordan & Gilbert.

Pacific Coast of Tropical America, from Guaymas to Panama.
Myrophis vafer Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 645, Panama.

Genus 175. **CHILORHINUS** Lütken.

Chilorhinus Lütken, Vidensk. Meddel. Naturg. Foren. Kjöbenhavn, 1, 9, 1851 (*suensonii*).

625. **Chilorhinus suensonii** Lütken.

St. Croix, West Indies.
Chilorhinus suensonii Lütken, Vidensk. Meddel. Naturg. Foren. Kjöbenhavn, 1, 9, 1851, St. Croix, West Indies.

Family LII. OPHICHTHYIDÆ. The Snake Eels.

Genus 176. **SPHAGEBRANCHUS** Bloch.

Sphagebranchus Bloch, Ichthyologia, IX, 88, pl. 419, 1795 (*rostratus*).

626. **Sphagebranchus anguiformis** (Peters).

Open Atlantic, near the West Indies.
Ophichthys (*Sphagebranchus*) *anguiformis* Peters, Berlin. Monatsber. 1876, 849, Atlantic Ocean, 15° 40′ N., 23° 5′ W.

627. **Sphagebranchus selachops** (Jordan & Gilbert).

Rocks about Cape San Lucas.
Apterichthys selachops Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 356, Cape San Lucas.

Genus 177. **VERMA** Jordan & Evermann.

Verma Jordan & Evermann, Fishes N. and M. Amer., 374, 1896 (*kendalli*).

628. **Verma kendalli** (Gilbert).

Coast of Florida, in rather deep water.
Sphagebranchus kendalli Gilbert, Bull. U. S. Fish Com., IX, 1889 (1891), 310, off west coast of Florida, 25° 34′ N., 82° 50′ W., in 25 fathoms.

Genus 178. LETHARCHUS Goode & Bean.

Letharchus Goode & Bean, Proc. U. S. Nat. Mus. 1882, 437 (*velifer*).

629. Letharchus velifer Goode & Bean.

Coast of Florida, in rather deep water; known only from the Snapper Banks off Pensacola and Tampa.

Letharchus velifer Goode & Bean, Proc. U. S. Nat. Mus. 1882, 437, West Florida.

Genus 179. MYRICHTHYS Girard.

Myrichthys Girard, Proc. Ac. Nat. Sci. Phila. 1859, 58 (*tigrinus*).

630. Myrichthys tigrinus Girard.

Pacific Coast of Mexico; rather common about Mazatlan, and occasionally ranging northward.

Myrichthys tigrinus Girard, Proc. Ac. Nat. Sci. Phila. 1859, 58, Adair Bay, Oregon.

631. Myrichthys oculatus (Kaup).

Tropical Atlantic; Cuba to Surinam, and Cape Verde Islands.

Pisoodonophis oculatus Kaup, Apodes, 22, 1856, Curaçoa.

632. Myrichthys acuminatus (Gronow).

West Indies, occasionally northward to Florida Keys.

Murœna acuminata Gronow, Fishes Brit. Mus., 21, 1854, Insula Div. Eustachii.

Genus 180. PISOODONOPHIS Kaup.

Pisoodonophis Kaup, Apodal Fishes, 17, 1856 (*boro*).

633. Pisoodonophis cruentifer Goode & Bean.

Two specimens at Station 1035 of U. S. Fish Commission steamer *Fish Hawk*, 39° 57′ N., 69° 28′ W., in 120 fathoms; four others at nearly same region in 245 fathoms.

Pisoodonophis cruentifer Goode & Bean, Oceanic Ichthyology, 147, fig. 166, 1896, Gulf Stream.

Genus 181. CALLECHELYS Kaup.

Callechelys Kaup, Apodes, 28, 1856 (*guichenoti*).

634. Callechelys muræna Jordan & Evermann.

Snapper Banks off Pensacola.

Callechelys muræna Jordan & Evermann, Proc. U. S. Nat. Mus. 1886, 466, Snapper Banks.

Genus 182. BASCANICHTHYS Jordan & Davis.

Bascanichthys Jordan & Davis, Apodal Fishes, 621, 1892 (*bascanium*).

635. Bascanichthys scuticaris (Goode & Bean).

West coast of Florida.

Sphagebranchus scuticaris Goode & Bean, Proc. U. S. Nat. Mus. 1879, 343, Cedar Key, Florida.

636. Bascanichthys peninsulæ (Gilbert).

La Paz Bay, Gulf of California.

Callechelys peninsulæ Gilbert, Proc. U. S. Nat. Mus. 1891, 548, La Paz Bay.

637. Bascanichthys bascanium (Jordan).

Egmont Key, Florida.

Cœcula bascanium Jordan, Proc. Ac. Nat. Sci. Phila. 1884, 43, Egmont Key, Florida.

Genus 183. QUASSIREMUS Jordan & Davis.

Quassiremus Jordan & Davis, Apodal Fishes, 622, 1892 (*evionthas*).

638. **Quassiremus nothochir** (Gilbert).

San Josef Island, Gulf of California.
Ophichthys nothochir Gilbert, Proc. U. S. Nat. Mus. 1890, 58, San Josef Island, Gulf of California.

639. **Quassiremus evionthas** (Jordan & Bollman).

Hood Island, Galapagos Archipelago.
Ophichthus evionthas Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 154, Hood Island, Galapagos Archipelago.

Genus 184. OPHICHTHUS Thunberg & Ahl.

Ophichthus Thunberg & Ahl, De Muraena et Ophichtho, 1789 (*ophis*).

Subgenus CRYPTOPTERUS Kaup.

Cryptopterus Kaup, Aale Hamburg, 1859 (*puncticeps*).

640. **Ophichthus puncticeps** (Kaup).

Caribbean Sea at Puerto Cabello, near Aspinwall.
Cryptopterus puncticeps Kaup, Aale Hamb. Mus., II, pl. 1, fig. 2, 1859, Puerto Cabello, Caribbean Sea.

Subgenus OPHICHTHUS Thunberg & Ahl.

641. **Ophichthus havannensis** (Bloch & Schneider).

West Indies; apparently not common.
Muræna havannensis Bloch & Schneider, Syst. Ichth., 491, 1801, Havana; after Parra.

642. **Ophichthus retropinnis** (Eigenmann).

Snapper Banks, off Pensacola, Florida.
Ophichthys retropinnis Eigenmann, Proc. U. S. Nat. Mus. 1887, 116, Snapper Banks, off Pensacola.

Subgenus MURÆNOPSIS Kaup.

Murænopsis Kaup, Apodes, 11, 1856 (*ocellatus*).

643. **Ophichthus guttifer** (Bean & Dresel).

Snapper Banks, off Pensacola, Florida.
Ophichthys guttifer Bean & Dresel, Proc. Biol. Soc. Wash., II, 1884, 100, Snapper Banks, off Pensacola, Florida.

644. **Ophichthus ocellatus** (LeSueur).

West Indies, south to Brazil and north to Pensacola.
Muræophis ocellatus LeSueur, Jour. Ac. Nat. Sci. Phila., V, 1825, 108, pl. 4, fig. 3, South America.

645. **Ophichthus triserialis** (Kaup).

Pacific Coast of Tropical America, rather common, from Lower California to the Galapagos.
Muræopsis triserialis Kaup, Apodes, 12, 1856, Pacific.

Subgenus SCYTALOPHIS Kaup.

Scytalophis Kaup, Apodes, 13, 1856 (*magniocuIis*).

646. **Ophichthus gomesii** (Castelnau). *Sea Serpent; Sea Eel; Whipsnake Eel.*

South Carolina to Rio Janeiro; generally common, especially about the Florida Keys and Cuba.
Ophisurus gomesii Castelnau, Anim. Am. Sud, 84, pl. 44, fig. 2, 1855, Rio Janeiro.

647. **Ophichthus zophochir** (Jordan & Gilbert).

Pacific Coast of Mexico, Guaymas to Acapulco.
Ophichthys zophochir Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 347, Mazatlan, Mexico.

648. Ophichthus magnioculis (Kaup).
West Indies to Brazil; Aspinwall.
Scytalophis magnioculis Kaup, Apodes, 13, fig. 7, 1856, St. Croix and Brazil.

649. Ophichthus parilis (Richardson).
Cuba to Brazil.
Ophisurus parilis Richardson, Voy. Erebus and Terror, 105, 1844, West Indies.

Genus 185. MYSTRIOPHIS Kaup.
Mystriophis Kaup, Apodes, 10, 1856 (*rostellatus*).

Subgenus ECHIOPSIS Kaup.
Echiopsis Kaup, Abhandl. Natur. Verein Hamburg, IV, 13, 1860 (*intertinctus*).

650. Mystriophis intertinctus (Richardson).
West Indies, north to Pensacola, Florida.
Ophisurus intertinctus Richardson, Voy. Erebus and Terror, Fishes, 102, 1844, West Indies.

Genus 186. SCYTALICHTHYS Jordan & Davis.
Scytalichthys Jordan & Davis, Apodal Fishes, 635, 1892 (*miurus*).

651. Scytalichthys miurus (Jordan & Gilbert).
Cape San Lucas, Lower California.
Ophichthys miurus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 357, Cape San Lucas, Lower California.

Genus 187. BRACHYSOMOPHIS Kaup.
Brachysomophis Kaup, Apodes, 9, 1856 (*horridus*).

652. Brachysomophis crocodilinus (Bennett).
East Indies; a specimen recorded by Günther from the Galapagos.
Ophisurus crocodilinus Bennett, Proc. Zool. Soc. Lond. 1833, 32, Mauritius.

Suborder COLOCEPHALI.

Family LIII. MURÆNIDÆ. The Morays.

Genus 188. ENCHELYCORE Kaup.
Enchelycore Kaup, Apodes, 72, 1856 (*eurýrhina*).

653. Enchelycore nigricans (Bonnaterre).
West Indies; rather common.
Muræna nigricans Bonnaterre, Encycl. Meth. Ichth., 34, 1788, South America; after Gronow.

Genus 189. PYTHONICHTHYS Poey.
Pythonichthys Poey, Repertorio, II, 265, 1867 (*sanguineus*).

654. Pythonichthys sanguineus Poey.
Coast of Cuba, in rather deep water.
Pythonichthys sanguineus Poey, Repertorio, II, 265, pl. 2, fig. 7, 1867, Cuba.

Genus 190. RABULA Jordan & Davis.
Rabula Jordan & Davis, Apodal Fishes, 589, 1892 (*aquædulcis*).

655. Rabula aquædulcis (Cope).
Two specimens known, one said to be from San Diego, the type from Rio Grande in Costa Rica.
Muræna aquæ-dulcis Cope, U. S. Geol. Surv. Mont., etc., 474, 1871 (1872), Rio Grande near San Jose, Costa Rica.

656. Rabula marmorea (Valenciennes).
Galapagos Islands.
Muræophis marmoreus Valenciennes, Voy. Vénus, Zool., 347, pl. 10, fig. 1, 1855, Galapagos Archipelago.

657. **Rabula panamensis** (Steindachner).
Pacific Coast of Central America.
Muræna panamensis Steindachner, Ichth. Beit., v, 19, 1876, Panama.

658. **Rabula longicauda** (Peters).
Tropical Atlantic, off the West Indies.
Muræna longicauda Peters, Berliner Monatsberichte 1876, 850, open Atlantic.

Genus 191. LYCODONTIS McClelland.
Lycodontis McClelland, Calcutta Jour. Nat. Hist., v, No. 18, 1844, 173 (*literata* = *tile*).

Subgenus LYCODONTIS McClelland.

659. **Lycodontis verrilli** (Jordan & Gilbert).
Panama; one specimen known.
Sidera verrilli Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 623, Panama.

660. **Lycodontis vicinus** (Castelnau).
Tropical Atlantic, Cuba to Africa and Brazil.
Muræophis vicina Castelnau, Anim. Amer. Sud, Poiss., 81, pl. 42, fig. 4, 1855, Bahia, Brazil.

661. **Lycodontis virescens** (Poey).
Cuba.
Gymnothorax virescens Poey, Enumeratio, 156, 1875, Cuba.

662. **Lycodontis polygonius** (Poey).
Cuba.
Gymnothorax polygonius Poey, Ann. N. Y. Lyc. Nat. Hist. 1870, 68, Havana.

663. **Lycodontis moringa** (Cuvier). *Common Spotted Moray; Hamlet; Eel.*
West Indies, Pensacola to Rio Janeiro and St. Helena.
Muræna moringa Cuvier, Règne Animal, ed. II, vol. 2, 352, 1829, Bahamas; after Catesby.

664. **Lycodontis mordax** (Ayres). *Conger Eel of California.*
Point Conception to Cerros Island; abundant about the Santa Barbara Islands.
Muræna mordax Ayres, Proc. Ac. Nat. Sci. Cal. 1859, 30, Cerros Island.

665. **Lycodontis funebris** (Ranzani). *Black Moray; Morena Verde.*
Tropical America on both coasts; common from Florida Keys to Rio Janeiro, and from Gulf of California to Panama.
Gymnothorax funebris Ranzani, Nov. Com. Ac. Sci. Inst. Bonon., IV, 76, 1840, Brazil.

666. **Lycodontis castaneus** (Jordan & Gilbert.)
Pacific coast from Gulf of California to Panama
Sidera castanea Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 647, Mazatlan.

667. **Lycodontis sanctæ-helenæ** (Günther).
Tropical Atlantic; recorded from St. Helena and the Bermudas.
Muræna sanctæ-helenæ Günther, Cat., VIII, 115, 1870, St. Helena.

668. **Lycodontis dovii** (Günther). *Morena Pintita.*
Gulf of California to the Galapagos Archipelago.
Muræna dovii Günther, Cat., VIII, 103, 1870, Panama.

669. **Lycodontis conspersus** (Poey).
Cuba to Rio Janeiro.
Gymnothorax conspersus Poey, Repertorio, II, 259, 1868, Cuba.

670. **Lycodontis miliaris** (Kaup).
West Indies.
Thrysoidea miliaris Kaup, Apodes, 90, 1856, Martinique.

671. Lycodontis elaboratus (Poey).
Cuba.
Muræna elaborata Poey, Memorias, II, 323, 1860, Cuba.

672. Lycodontis obscuratus (Poey).
Cuba.
Gymnothorax obscuratus Poey, Ann. Lyc. Nat. Hist. N. Y., IX, 1870, 320, Cuba.

673. Lycodontis chlevastes (Jordan & Gilbert).
Galapagos Islands.
Sidera chlevastes Jordan & Gilbert, Proc. U. S. Nat. Mus. 1883, 208, Galapagos Islands.

Subgenus **PRIODONOPHIS** Kaup.
Priodonophis Kaup, Aalenahnliche Fische Hamburg Museum, 22, 1859 (*ocellatus*).

674. Lycodontis ocellatus (Agassiz). *Spotted Moray; Moray Eel.*
Pensacola to Rio Janeiro.
Gymnothorax ocellatus Agassiz, Spix, Pisc. Brasil., 91, pl. 50*b*, 1828, Brazil.

674a. Lycodontis ocellatus saxicola (Jordan & Davis).
Snapper Banks off Pensacola and deep water off Cuba.
Gymnothorax ocellatus saxicola Jordan & Davis, Apodal Fishes, 606, 1892, Snapper Banks off Pensacola, Florida.

674b. Lycodontis ocellatus nigromarginatus (Girard).
Coasts of west Florida and Texas.
Neomuræna nigromarginata Girard, U. S. and Mex. Bound. Surv., 76, pl. 41, 1859, St. Joseph Island, Texas.

Genus 192. **MURÆNA** (Artedi) Linnæus. *Morays.*
Muræna Artedi, in Linnæus, Syst. Nat., ed. X, 244, 1758 (*helena*).

675. Muræna insularum Jordan & Davis.
Galapagos Islands.
Muræna insularum Jordan & Davis, Apodal Fishes, 609, 1892, Chatham Island, Galapagos Islands.

676. Muræna argus (Steindachner).
Altata, west coast of Mexico.
Gymnothorax (*Limamuræna*) *argus* Steindachner, Ichth. Notizen, X, 17, pl. IV, 1870, Altata, west coast of Mexico.

677. Muræna retifera Goode & Bean.
Coast of South Carolina, in rather deep water.
Muræna retifera Goode & Bean, Proc. U. S. Nat. Mus. 1882, 435, off Charleston.

678. Muræna melanotis (Kaup).
Tropical Atlantic, from Africa to South America.
Limamuræna melanotis Kaup, Aale Hamb. Mus., 27, pl. 4, fig. 3, 1860.

679. Muræna lentiginosa Jenyns. *Morena Pinta.*
Pacific Coast of America from Gulf of California to Galapagos.
Muræna lentiginosa Jenyns, Voy. Beagle, Zool., 143, 1842, Galapagos Islands.

Genus 193. **ECHIDNA** Forster.
Echidna Forster, Enchiridion, 31, 1778 (*variegata*).

680. Echidna nocturna (Cope).
Pacific Coast of Mexico, the two known specimens from Rio Grande, in Costa Rica, and from Cape San Lucas.
Pœcilophis nocturnus Cope, U. S. Geol. Surv. Mont., 474, 1871 (1872), Rio Grande at San Jose, Costa Rica.

681. Echidna catenata (Bloch).
West Indies, from Bermuda to Surinam; our specimens from San Lucia.
Gymnothorax catenatus Bloch, Ausl. Fische, XII, 74, pl. 415, fig. 1, 1795, Coromandel; an error.

Genus 194. **UROPTERYGIUS** Ruppell.

Uropterygius Ruppell, Neue Wirbelthiere, Fische, 83, 1838 (*concolor*).

Subgenus **SCUTICA** Jordan & Evermann.

Scutica Jordan & Evermann, Fishes North and Middle America, 404, 1896 (*necturus*).

682. **Uropterygius necturus** (Jordan & Gilbert).

Gulf of California.

Gymnomuræna nectura Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 356, Cape San Lucas.

Genus 195. **CHANNOMURÆNA** Richardson.

Channo-muræna Richardson, Voy. Erebus and Terror, 96, 1844 (*vittata*).

683. **Channomuræna vittata** (Richardson).

Coasts of Cuba.

Ichthyophis vittatus Richardson, Voy. Sulph., Fish., 114, pl. 53, figs. 7–9, 1844, locality uncertain.

Order R. LYOMERI. The Gulpers.

Family LIV. SACCOPHARYNGIDÆ. The Gulpers.

Genus 196. **SACCOPHARYNX** Mitchill.

Saccopharynx Mitchill, Ann. Lyc. Nat. Hist. N. Y. 1824, 82 (type afterwards called *S. flagellum*).

684. **Saccopharynx ampullaceus** (Harwood).

Atlantic.

Ophiognathus ampullaceus Harwood, Phil. Trans. 1827, 52, Atlantic.

Family LV. EURYPHARYNGIDÆ.

Genus 197. **GASTROSTOMUS** Gill & Ryder.

Gastrostomus Gill & Ryder, Proc. U. S. Nat. Mus. 1883, 271 (*bairdii*).

685. **Gastrostomus bairdii** Gill & Ryder.

Deep water off Newfoundland Banks and Davis Strait.

Gastrostomus bairdii Gill & Ryder, Proc. U. S. Nat. Mus. 1883, 271, off the Grand Banks.

Order S. ISOSPONDYLI. The Isospondylous Fishes.

Family LVI. ELOPIDÆ. The Tarpons.

Genus 198. **TARPON** Jordan & Evermann. *Grand Écaille.*

Tarpon Jordan & Evermann, Fishes North and Middle America, 409, 1896 (*atlanticus*).

686. **Tarpon atlanticus** (Cuvier & Valenciennes). *Tarpon; Tarpum; Grand Écaille.*

Long Island to Brazil.

Megalops atlanticus Cuvier & Valenciennes, Hist. Nat. Poiss., XIX, 398, 1846, Guadeloupe; San Domingo; Martinique; Porto Rico.

Genus 199. **ELOPS** Linnæus.

Elops Linnæus, Syst. Nat., ed. XII, 518, 1766 (*saurus*).

687. **Elops saurus** Linnæus. *Tenpounder; John-Mariggle; Bony-fish; Bone-fish; Big-eyed Herring; Matajuelo Real; Lisa Francesa.*

Tropical seas; common north to the Gulf of California and to Long Island on the Atlantic Coast.

Elops saurus Linnæus, Syst. Nat., ed. XII, 518, 1766, Carolina.

Family LVII. ALBULIDÆ. The Lady-Fishes.

Genus 200. ALBULA (Gronow) **Bloch & Schneider.**
Albula Gronow, Zoophyl., 102, 1763 (nonbinomial).

688. Albula vulpes (Linnæus). *Lady-fish; Bone-fish; Macabi; Banana-fish.*
Tropical seas, ranging northward to San Diego and Long Island.
Esox vulpes Linnæus, Syst. Nat., ed. x, 313, 1758, Bahamas, etc.; based on the bone-fish, *Vulpes bahamensis*, of Catesby.

Family LVIII. HIODONTIDÆ. The Moon-eyes.

Genus 201. HIODON LeSueur.
Hiodon LeSueur, Jour. Ac. Nat. Sci. Phila., I, 1818, 334 (*tergisus*).

Subgenus AMPHIODON Rafinesque.
Amphiodon Rafinesque, Jour. Physique 1819, 421 (*alosoides*).

689. Hiodon alosoides (Rafinesque). *La Quesche; Naccaysh.*
Ohio River and north to the Saskatchewan.
Amphiodon alosoides (misprinted *alveoides*) Rafinesque, Jour. Phys., Paris, 1819, 421, Ohio River.

Subgenus HIODON LeSueur.

690. Hiodon tergisus LeSueur. *Moon-eye; Toothed Herring.*
Great Lakes and Mississippi Valley, north to Assiniboine River.
Hiodon tergisus LeSueur, Jour. Ac. Nat. Sci. Phila., I, 1818, 364, Ohio River.

691. Hiodon selenops Jordan & Bean.
Tennessee, Cumberland, and Alabama rivers.
Hiodon selenops Jordan & Bean, Bull. U. S. Nat. Mus., x, 67, 1877, Chattanooga, Tennessee.

Family LIX. CHANIDÆ. The Milk-Fishes.

Genus 202. CHANOS Lacépède.
Chanos Lacépède, Hist. Nat. Poiss., v, 395, 1803 (*arabicus*).

692. Chanos chanos (Forskål). *Milkfish; Sabalo; Aua; Chani; Anged.*
Pacific and Indian oceans, north to Hawaiian Islands and Gulf of California.
Mugil chanos Forskål, Deser. Anim., 74, 1775, Red Sea at Djidda, Arabia.

Family LX. DOROSOMATIDÆ. The Gizzard Shads.

Genus 203. DOROSOMA Rafinesque. *Gizzard Shad.*
Dorosoma Rafinesque, Ichth. Ohiensis, 39, 1820 (*notata* = *cepedianum*).

693. Dorosoma cepedianum (LeSueur). *Gizzara Shad; Hickory Shad.*
Cape Cod to Mexico; from New Jersey and the Great Lakes to Nebraska and Texas.
Megalops cepediana LeSueur, Jour. Ac. Nat. Sci. Phila., I, 1818, 361, Delaware and Chesapeake bays.

693a. Dorosoma cepedianum exile Jordan & Gilbert.
Coastal region of Texas.
Dorosoma cepedianum exile Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 585, Galveston, Texas.

694. Dorosoma mexicanum (Günther).
East coast of Mexico.
Chatoëssus mexicanus Günther, Cat., VII, 409, 1868, Mexico.

695. Dorosoma petenense (Günther).
Lake Peten, Yucatan.
Chatoëssus petenensis Günther, Cat., VII, 408, 1868, Lake Peten, Yucatan.

Family LXI. CLUPEIDÆ. The Herrings.

Genus 204. JENKINSIA Jordan & Evermann.

Jenkinsia Jordan & Evermann, Fishes N. and M. Amer., 418, 1896 (*stolifera*).

696. **Jenkinsia acuminata** (Gilbert).

Gulf of California.

Etrumeus acuminatus Gilbert, Proc. U. S. Nat. Mus. 1890, 56, Gulf of California.

697. **Jenkinsia lamprotænia** (Gosse).

Jamaica.

Clupea lamprotænia Gosse, Nat. Sojourn Jam., 291, pl. 1, fig. 2, 1851, Jamaica.

698. **Jenkinsia stolifera** (Jordan & Gilbert).

Gulf of Mexico from Florida to Yucatan.

Dussumieria stolifera Jordan & Gilbert, Proc. U. S. N. M. 1884, 25, Key West.

Genus 205. ETRUMEUS Bleeker.

Etrumeus Bleeker, Verh. Bat. Gen. Japan, XXV, 58, 1853 (*micropus*, a Japanese species).

699. **Etrumeus sadina** (Mitchill). *Round Herring.*

Cape Cod to Gulf of Mexico.

Clupea sadina Mitchill, Trans. Lit. Phil. Soc. N. Y. 1815, 457, New York.

Genus 206. PERKINSIA Rosa Smith Eigenmann.

Perkinsia Rosa Smith Eigenmann, Am. Nat., February, 1891, 153 (*othonops*).

700. **Perkinsia othonops** Rosa Smith Eigenmann.

Point Loma, San Diego.

Perkinsia othonops Rosa Smith Eigenmann, Am. Nat., February, 1891, 153, San Diego, Cal.

Genus 207. CLUPEA (Artedi) Linnæus.

Clupea (Artedi) Linnæus, Syst. Nat., ed. X, 317, 1758 (*harengus*).

701. **Clupea harengus** Linnæus. *Common Herring.*

North Atlantic Ocean, south on our coast to Sandy Hook.

Clupea harengus Linnæus, Syst. Nat., ed. X, 317, 1758, seas of Europe.

702. **Clupea pallasii** Cuvier & Valenciennes. *California Herring*

Pacific Coast from Kamchatka to San Diego.

Clupea pallasii Cuvier & Valenciennes, Hist. Nat. Poiss., XX, 253, 1847, Kamchatka; based on Pallas's specimens.

Genus 208. CLUPANODON Lacépède.

Clupanodon Lacépède, Hist. Nat. Poiss., V, 468, 1803 (*pilchardus*, etc.).

703. **Clupanodon cæruleus** (Girard). *California Sardine.*

Pacific Coast, from Puget Sound to Magdalena Bay.

Maletta cærulea Girard, Proc. Ac. Nat. Sci. Phila. 1854, 138, San Francisco.

704. **Clupanodon pseudohispanicus** (Poey). *Sardina de España.*

Gulf of Mexico, Cuba, Pensacola, and Tampa; northward to Cape Cod.

Sardinia pseudohispanica Poey, Memorias, II, 311, 1860, Cuba.

Genus 209. POMOLOBUS Rafinesque.

Pomolobus Rafinesque, Ichth. Ohiensis, 38, 1820 (*chrysochloris*).

705. **Pomolobus chrysochloris** Rafinesque. *Skipjack; Blue Herring.*

Gulf of Mexico and Mississippi Valley; Lake Erie and Lake Michigan.

Pomolobus chrysochloris Rafinesque, Ichth. Ohiensis, 38, 1820, Ohio River.

706. **Pomolobus mediocris** (Mitchill). *Hickory Shad; Hickory Jack; Fall Herring; Tailor Herring; Mattowacca.*

Atlantic Coast of United States from Maine to Florida.

Clupea mediocris Mitchill, Trans. Lit. Phil. Soc. N. Y., I, 1815, 450, New York.

707. Pomolobus pseudoharengus (Wilson). *Alewife; Branch Herring; Gaspereau; Wall-eyed Herring; Big-eyed Herring; Ellwife; Bang.*

Atlantic Coast of United States; Lake Ontario.
Clupea pseudoharengus Wilson, Rees's Encycl., IX, about 1811, probably Delaware River near Philadelphia.

708. Pomolobus æstivalis (Mitchill). *Glut Herring; Blueback; Blackback; Summer Herring; Kyack; Saw-belly.*

Atlantic Coast.
Clupea æstivalis Mitchill, Trans. Lit. Phil. Soc. N. Y., I, 1815, 456, New York.

Genus 210. ALOSA Cuvier. *The Shad.*

Alosa Cuvier, Règne Animal, ed. 2, II, 319, 1829 (*alosa*).

709. Alosa alabamæ Jordan & Evermann. *Alabama Shad.*

Gulf Coast of United States.
Alosa alabamæ Jordan & Evermann, Rept. U. S. Fish Com. 1895 (1896), 203, Black Warrior River, Tuscaloosa, Alabama.

710. Alosa sapidissima (Wilson). *Common Shad; American Shad; North River Shad; Potomac Shad; Connecticut Shad; Delaware Shad.*

Atlantic Coast of United States from Miramachi River to Florida; from Monterey northward on the Pacific Coast, as an introduced species.
Clupea sapidissima Wilson, Rees's New Cyclopedia, IX, no pagination nor date, but prior to 1812, probably Philadelphia.

Genus 211. SARDINELLA Cuvier & Valenciennes. *Scaled Sardines.*

Sardinella Cuvier & Valenciennes, Hist. Nat. Poiss., XX, 261, 1847 (*aurita*).

Subgenus SARDINELLA Cuvier & Valenciennes.

711. Sardinella anchovia Cuvier & Valenciennes.

Martinique to Brazil.
Sardinella anchovia Cuvier & Valenciennes, Hist. Nat. Poiss., 269, 1847, Rio Janeiro; Martinique.

712. Sardinella clupeola (Cuvier & Valenciennes).

Guadeloupe.
Harengula clupeola Cuvier & Valenciennes, Hist. Nat. Poiss., XX, 289, 1847, Guadeloupe.

713. Sardinella apicalis (Müller & Troschel).

Barbados.
Alosa apicalis Müller & Troschel, in Schomburgk, Hist. Barbados, 675, 1848, Barbados.

714. Sardinella bischopi (Müller & Troschel).

Barbados.
Alosa bischopi Müller & Troschel, in Schomburgk, Hist. Barbados, 675, 1848, Barbados.

Subgenus HARENGULA Cuvier & Valenciennes.

Harengula Cuvier & Valenciennes, Hist. Nat. Poiss., XX, 280, 1847 (*latula*).

715. Sardinella sardina (Poey). *Sardina de Ley.*

West Indian fauna, north to Key West.
Harengula sardina Poey, Memorias, II, 310, 1860, Cuba.

716. Sardinella macrophthalma (Ranzani).

West Indies; Cuba to Brazil.
Clupea macrophthalma Ranzani, Nov. Com. Ac. Sci. Bonon., V, 320, 1842, Brazil.

717. Sardinella thrissina (Jordan & Gilbert).

Gulf of California.
Clupea thrissina Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 353, Cape San Lucas, Lower California.

718. **Sardinella humeralis** (Cuvier & Valenciennes). *Sardina Escamuda; Whitebill; Pincers.*

West Indies and Gulf of Mexico; Pensacola and Cedar Keys southward.
Harengula humeralis Cuvier & Valenciennes, Hist. Nat. Poiss., XX, 293, 1847, Rio Janeiro, Bahia, Guadeloupe, and San Domingo.

Subgenus LILE Jordan & Evermann.

Lile Jordan & Evermann, Fishes North and Middle America, 431, 1896 (*stolifera*).

719. **Sardinella stolifera** (Jordan & Gilbert).

Gulf of California to Panama.
Clupea stolifera Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 339, Mazatlan.

Genus 212. **OPISTHONEMA** Gill. *Thread Herring.*

Opisthonema Gill, Proc. Ac. Nat. Sci. Phila. 1861, 37 (*thrissa*=*oglinum*).

720. **Opisthonema oglinum** (LeSueur). *Thread Herring; Machuelo; Sprat; Cailleu-Tassart.*

West Indian fauna, ranging regularly north to Florida and Carolina; Longport, New Jersey; Newport, Rhode Island; Fortress Monroe.
Megalops oglina, LeSueur, Jour. Ac. Nat. Sci. Phila., I, 1817, 359, Newport, Rhode Island.

721. **Opisthonema libertatis** (Günther).

Pacific Coast of Mexico and Central America.
Meletta libertatis Günther, Proc. Zool. Soc. Lond. 1866, 603, Libertad, Central America.

Genus 213. **BREVOORTIA** Gill. *The Menhadens.*

Brevoortia Gill, Proc. Ac. Nat. Sci. Phila. 1861, 37 (*menhaden*=*tyrannus*).

722. **Brevoortia tyrannus** (Latrobe). *Menhaden; Mossbunker; Bony-fish; Whitefish; Bug-fish; Fatback; Yellow-tail; Pogy.*

Nova Scotia to Brazil.
Clupea tyrannus Latrobe, Trans. Amer. Phil. Soc. Phila., V, 1802, 77, pl. 1, Chesapeake Bay.

722a. **Brevoortia tyrannus aurea** (Agassiz).

Coast of Brazil.
Clupanodon aureus Agassiz, Spix, Pisc. Brasil., 52, 1828, Brazil.

722b. **Brevoortia tyrannus brevicaudata** Goode.

Noank, Connecticut, and south.
Brevoortia tyrannus brevicaudata Goode, Proc. U. S. Nat. Mus. 1878, 34, Noank, Connecticut.

722c. **Brevoortia tyrannus patronus** Goode. *Gulf Menhaden.*

Gulf of Mexico.
Brevoortia patronus Goode, Proc. U. S. Nat. Mus., I, 1878, 39, Brazos Santiago, Texas.

Genus 214. **CHIROCENTRODON** Günther.

Chirocentrodon Günther, Cat., VII, 463, 1868 (*tæniatus*).

723. **Chirocentrodon tæniatus** Günther.

Jamaica.
Chirocentrodon tæniatus Günther, Cat., VII, 463, 1868, Jamaica.

Genus 215. **ILISHA** Gray.

Ilisha Gray, in Richardson, Ichthyol. Chin., in Proc. Brit. Assoc. 1845 (1846), 306 (*abnormis*).

724. **Ilisha flavipinnis** (Valenciennes).

Coast of Surinam and Brazil.
Pristigaster flavipinnis Valenciennes, in D'Orbigny, Voy. Amer. Mér., Poiss., pl. 10, fig. 2, 1839, Buenos Ayres.

725. Ilisha bleekeriana (Poey).
Matanzas, Cuba.
Pellona bleekeriana Poey, Repertorio, II, 242, 1867, Matanzas, Cuba.

726. Ilisha furthii (Steindachner).
Panama.
Pellona fürthii Steindachner, Ichth. Beitr., I, 14, 1874, Panama.

Genus 216. OPISTHOPTERUS Gill.
Opisthopterus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 31 (*tartoor*).

727. Opisthopterus lutipinnis (Jordan & Gilbert).
Pacific Coast of Mexico.
Pristigaster lutipinnis Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 340, Mazatlan, Mexico.

728. Opisthopterus dovii (Günther).
Panama.
Pristigaster dovii Günther, Cat., VII, 461, 1868, Panama.

729. Opisthopterus macrops (Günther).
Panama.
Pristigaster macrops Günther, Proc. Zool. Soc. Lond. 1866, 603, and Cat., VII, 461, 1868, Panama.

Genus 217. ODONTOGNATHUS Lacépède.
Odontognathus Lacépède, Hist. Nat. Poiss., II, 221, 1790 (*mucronatus*).

730. Odontognathus mucronatum Lacèpéde.
Coast of Guiana.
Odontognathus mucronatus Lacépède, Hist. Nat. Poiss., 221, pl. 7, fig. 2, 1799, Cayenne.

731. Odontognathus panamense (Steindachner).
Panama.
Pristigaster (*Odontognathus*) *panamensis* Steindachner, Ichth. Beitr., V, 24, 1876, Panama.

Genus 218. PRISTIGASTER Cuvier.
Pristigaster Cuvier, Règne Anim., ed. I, 176, 1817 (*cayanus*).

732. Pristigaster cayanus Cuvier.
Coast of Guiana and northern Brazil.
Pristigaster cayanus Cuvier, Règne Anim., ed. I, pl. 10, fig. 3, 1817, Cayenne.

Family LXII. ENGRAULIDIDÆ. The Anchovies.

Genus 219. STOLEPHORUS Lacépède. *Silvery Anchovies.*
Stolephorus Lacépède, Hist. Nat. Poiss., V, 381, 1803 (*japonica*).

733. Stolephorus miarchus Jordan & Gilbert.
Pacific Coast of America from Mazatlan to Panama.
Stolephorus miarchus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881 344. Mazatlan, Mexico.

734. Stolephorus perfasciatus (Poey). *Grubber Broadhead.*
Florida Keys to Cuba and Jamaica.
Engraulis perfasciatus Poey, Memorias, II, 313, 1860, Cuba.

735. Stolephorus exiguus Jordan & Gilbert.
Pacific Coast of Mexico at Mazatlan.
Stolephorus exiguus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 342, Mazatlan.

736. Stolephorus cubanus (Poey).
Cuba and Porto Rico.
Engraulis cubanus Poey, Synopsis, 423, 1868, Cuba.

737. **Stolephorus perthecatus** Goode & Bean.

Pensacola, Florida.
Stolephorus perthecatus Goode & Bean, Proc. U. S. Nat. Mus. 1882, 434, Pensacola, Florida.

738. **Stolephorus ischanus** Jordan & Gilbert.

Pacific Coast of America from Mazatlan to Panama.
Stolephorus ischanus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 340, Mazatlan, Mexico.

739. **Stolephorus brownii** (Gmelin). *Striped Anchovy; Manjua; Anchovy Fry.*

Cape Cod to Brazil.
Atherina brownii Gmelin, Syst. Nat., 1397, 1788, Jamaica; after Brown.

740. **Stolephorus cultratus** Gilbert.

Santa Margarita Island, Lower California.
Stolephorus cultratus Gilbert, Proc. U. S. Nat. Mus. 1891, 544, Santa Margarita Island, Lower California.

741. **Stolephorus delicatissimus** (Girard).

San Diego Bay and southward on coast of Lower California.
Engraulis delicatissimus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 154, and Pac. R. R. Surv., x, 335, 1858, San Diego.

742. **Stolephorus chœrostomus** (Goode). *Hog-mouth Fry.*

Bermuda Islands; common in Hamilton Harbor.
Engraulis chœrostomus Goode, Am. Jour. Sci. Arts, August, 1874, 125, Bermudas.

743. **Stolephorus argyrophanus** (Cuvier & Valenciennes).

Gulf Stream; Woods Hole, Massachusetts.
Engraulis argyrophanus Cuvier & Valenciennes, Hist. Nat. Poiss., XXI, 49, 1848, equatorial Atlantic.

744. **Stolephorus curtus** Jordan & Gilbert.

Mazatlan, Mexico.
Stolephorus curtus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 343, Mazatlan, Mexico.

745. **Stolephorus astilbe** Jordan & Rutter.

West Indies.
Stolephorus astilbe Jordan & Rutter, Proc. Ac. Nat. Sci. Phila. 1896, Jamaica.

746. **Stolephorus poeyi** (Kner & Steindachner).

Rio Bayano, near Panama.
Engraulis poeyi Kner & Steindachner, Abh. Bayer Ak. Wiss., x, 1864, 23, with plate, Rio Bayano, near Panama.

747. **Stolephorus robertsi** Jordan & Rutter.

West Indies.
Stolephorus robertsi Jordan & Rutter, Proc. Ac. Nat. Sci. Phila. 1896, Jamaica.

748. **Stolephorus opercularis** Jordan & Gilbert.

Gulf of California to Panama.
Stolephorus opercularis Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 275, Punta San Felipe, Gulf of California.

749. **Stolephorus mitchilli** (Cuvier & Valenciennes).

Cape Cod to Texas.
Engraulis mitchilli Cuvier & Valenciennes, Hist. Nat. Poiss., XXI, 50, 1848, New York; Carolina; Lake Pontchartrain, Louisiana.

750. **Stolephorus lucidus** Jordan & Gilbert. *"Sardina."*

Mazatlan, Mexico.
Stolephorus lucidus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 341, Mazatlan, Mexico.

751. Stolephorus clupeoides (Swainson).
Coast of Guiana and southward.
Engraulis? clupeoides Swainson, Nat. Hist. Fishes, II, 388, 1839, Pernambuco, Dutch Guiana.

752. Stolephorus compressus (Girard).
Point Conception to Lower California.
Engraulis compressus Girard, U. S. Pac. R. R. Surv., X, 336, 1858, San Diego, Cal.

753. Stolephorus panamensis (Steindachner).
Panama.
Engraulis panamensis Steindachner, Ichth. Beitr., IV, 39, 1875, Panama.

754. Stolephorus spinifer (Cuvier & Valenciennes).
Coast of Guiana; recorded from Panama by Steindachner.
Engraulis spinifer Cuvier & Valenciennes, Hist. Nat. Poiss., XXI, 39, 1848, Cayenne, French Guiana.

Genus 220. ENGRAULIS Cuvier. *Anchovies.*
Engraulis Cuvier, Règne Animal, ed. I, 174, 1817 (*encrasicholus*).

755. Engraulis mordax Girard. *California Anchovy.*
Pacific Coast of America from Vancouver Island to Lower California.
Engraulis mordax Girard, Proc. Ac. Nat. Sci. Phila. 1854, 138, and in Pac. R. R. Surv., X, 334, 1858, Shoalwater (now Willapa) Bay, Washington.

Genus 221. ANCHOVIA Jordan & Evermann.
Anchovia Jordan & Evermann, Fishes North and Middle America, 449, 1896 (*macrolepidota*).

756. Anchovia producta (Poey). *Hechudo; Grubber Broadhead.*
Cuba and Jamaica.
Engraulis productus Poey, Repertorio, 380, 1866, Cuba.

757. Anchovia macrolepidota (Kner & Steindachner). *Sardina Bocona.*
Gulf of Mexico to Panama.
Engraulis macrolepidotus Kner & Steindachner, Abhandl. Bayer Akad. Wiss., X, 1864, 21, pl. 3, fig. 2, Rio Bayano, Panama.

Genus 222. CETENGRAULIS Günther.
Cetengraulis Günther, Cat., VII, 383, 1868 (*edentulus*).

758. Cetengraulis mysticetus (Günther).
Panama.
Engraulis mysticetus Günther, Proc. Zool. Soc. Lond. 1866, 604, Panama.

759. Cetengraulis edentulus (Cuvier). *Bocon; Tarpony Fry.*
West Indies to Brazil; common in Cuba.
Engraulis edentulus Cuvier, Règne Animal, ed. II, vol. 2, 323, 1829, Jamaica; after Sloane.

Genus 223. PTERENGRAULIS Günther.
Pterengraulis Günther, Cat., VII, 398, 1868 (*atherinoides*).

760. Pterengraulis atherinoides (Linnæus).
Coasts of Guiana and Brazil.
Clupea atherinoides Linnæus, Syst. Nat., ed. XII, 523, 1766, Surinam.

Genus 224. LYCENGRAULIS Günther.
Lycengraulis Günther, Cat., VII, 399, 1868 (*grossidens*).

761. Lycengraulis grossidens (Cuvier).
Coasts of Guiana and Brazil.
Engraulis grossidens Cuvier, in Agassiz, Spix, Pisc. Brasil., 50, 1828, Rio Janeiro.

Family LXIII. ALEPOCEPHALIDÆ.

Genus 225. ALEPOCEPHALUS Risso.

Alepocephalus Risso, Mem. Ac. Nat. Sci. Turin, XXV, 270, 1820 (*rostratus*).

762. **Alepocephalus productus** Gill.

Gulf Stream.

Alepocephalus productus Gill, Proc. U. S. Nat. Mus. 1883, 256, Gulf Stream, at Albatross Station 2035, in 1,362 fathoms.

763. **Alepocephalus agassizii** Goode & Bean.

Gulf Stream.

Alepocephalus agassizii Goode & Bean, Bull. Mus. Comp. Zool., No. 5, vol. x, 215, 1882, Gulf Stream, at latitude 30°, in 922 fathoms.

764. **Alepocephalus tenebrosus** Gilbert.

Santa Barbara Channel, California.

Alepocephalus tenebrosus Gilbert, Proc. U. S. Nat. Mus. 1891, 545, Santa Barbara Channel, California, at Albatross Stations 2839, 2923, and others, in 359 to 822 fathoms.

Genus 226. MITCHILLINA Jordan & Evermann.

Mitchillina Jordan & Evermann, Fishes North and Middle America, 453, 1896 (*bairdii*).

765. **Mitchillina bairdii** (Goode & Bean).

Grand Banks of Newfoundland.

Alepocephalus bairdii Goode & Bean, Proc. U. S. Nat. Mus. 1879, 55, Grand Banks of Newfoundland.

Genus 227. BATHYTROCTES Günther.

Bathytroctes Günther, Ann. Mag. Nat. Hist. 1878, 249 (*microlepis*).

766. **Bathytroctes stomias** Gilbert.

Coast of Oregon.

Bathytroctes stomias Gilbert, Proc. U. S. Nat. Mus. 1890, 53, coast of Oregon, at Albatross Station 3074, in 877 fathoms.

Genus 228. TALISMANIA Goode & Bean.

Talismania Goode & Bean, Oceanic Ichthyology, 41, 1896 (*homopterus*).

767. **Talismania antillarum** Goode & Bean.

Caribbean Sea.

Talismania antillarum Goode & Bean, Oceanic Ichthyology, 44, fig. 49, 1896, Albatross Station 2394, in Caribbean Sea, latitude 28° 38′ 30″ N., longitude 87° 2′ W., in 420 fathoms.

768. **Talismania æquatoris** Goode & Bean.

Coast of Ecuador.

Talismania æquatoris Goode & Bean, Oceanic Ichthyology, 44, fig. 50, 1896, Albatross Station 2793, latitude 1° 3′ N., longitude 80° 15′ W., off coast of Ecuador, in 741 fathoms.

Genus 229. CONOCARA Goode & Bean.

Conocara Goode & Bean, Oceanic Ichthyology, 39, 1896 (*macdonaldi*).

769. **Conocara macdonaldi** Goode & Bean.

Gulf of Mexico, 24° 36′ N., 84° 5′ W.; 24° 36′ N., 84° 5′ W.; 28° 47′ 30″ N., 87° 27′ W.

Conocara macdonaldi Goode & Bean, Oceanic Ichthyology, 39, fig. 48, 1896, Gulf of Mexico.

770. **Conocara macroptera** (Vaillant).

Morocco to Soudan, Banc d'Arguin, and the Canaries; latitude 16° 57′ N., longitude 63° 12′ W.

Alepocephalus macropterus Vaillant, Expéd. Sci. Travailleur et Talisman, Poissons, 150, pl. 11, figs. 2*a*, 2*b*, 2*c*, 1888, coast of Morocco, Soudan, and Canaries.

Genus 230. **PLATYTROCTES** Günther.

Platytroctes Günther, Ann. Mag. Nat. Hist., II, 1878, 249 (*apus*).

771. **Platytroctes apus** Günther.

Mid-Atlantic and the Arabian Sea.

Platytroctes apus Günther, Ann. Mag. Nat. Hist., II, 1878, 249, mid-Atlantic.

Genus 231. **ALEPOSOMUS** Gill.

Aleposomus Gill, Am. Nat., XVIII, 1884, 433 (*copei*).

772. **Aleposomus copei** Gill.

Gulf Stream.

Aleposomus copei Gill, Am. Nat., XVIII, 1884, 433, Gulf Stream, latitude 37° 12′ 20″ N., longitude 69° 39′ W.

Family LXIV. SALMONIDÆ. The Salmon Family.

Genus 232. **COREGONUS** (Artedi) Linnæus. *Whitefishes.*

Coregonus (Artedi) Linnæus, Syst. Nat., ed. X, 310, 1758 (*lavaretus*).

Subgenus **PROSOPIUM** Milner.

Prosopium Milner, in Jordan, Man. Vert., ed. 2, 361, 1878 (*quadrilateralis*).

773. **Coregonus coulterii** Eigenmann & Eigenmann.

Headwaters of Columbia River in British Columbia.

Coregonus coulterii Eigenmann & Eigenmann, Am. Nat., November, 1892, 961, Kicking Horse River, at Field, British Columbia.

774. **Coregonus williamsoni** Girard. *Rocky Mountain Whitefish; Williamson's Whitefish; "Mountain Herring."*

Rocky Mountains to the Pacific, especially in the Columbia Basin and the headwaters of the Colorado; Chief Mountain Lake at the head of the Saskatchewan in Montana.

Coregonus williamsoni Girard, Proc. Ac. Nat. Sci. Phila. 1856, 136, Des Chutes River, Oregon.

774a. **Coregonus williamsoni cismontanus** Jordan.

Madison and Yellowstone rivers and other tributaries of the upper Missouri.

Coregonus williamsoni cismontanus Jordan, Bull. U. S. Fish Com., IX, 1889, 49, pl. 9, figs. 8 and 9, Horsethief Creek, a tributary of Madison River, Montana.

775. **Coregonus kennicotti** Milner. *Broad Whitefish; Muksun of the Russians.*

Great Bear Lake; Mackenzie and Yukon rivers.

Coregonus kennicotti Milner, in Jordan & Gilbert, Synopsis, 298, 1883, Fort Good Hope, British America.

776. **Coregonus richardsonii** Günther.

Arctic North America.

Coregonus richardsonii Günther, Cat., VI, 185, 1866, Arctic North America; exact locality unknown.

777. **Coregonus quadrilateralis** Richardson. *Pilot-fish; Menominee Whitefish; Shadwaiter; Round Whitefish.*

Lakes of New Hampshire, upper Great Lakes, northwestward to Alaska, as far south as Yukon River.

Coregonus quadrilateralis Richardson, Franklin's Jour. 1823, 714, Fort Enterprise, British America.

Subgenus **COREGONUS** (Artedi) Linnæus.

778. **Coregonus clupeiformis** (Mitchill). *Common Whitefish.*

Great Lakes and neighboring waters

Salmo clupeiformis Mitchill, Am. Month. Mag., II, 1818, 321, Sault Ste. Marie.

779. **Coregonus nelsonii** Bean. *Humpback Whitefish.*

Alaska, from Bristol Bay northward.

Coregonus nelsonii Bean, Proc. U. S. Nat. Mus. 1884, 48, Nulato, Alaska.

780. **Coregonus labradoricus** Richardson. *Labrador Whitefish; Sault Whitefish; Shadwaiter; Musquaw River Whitefish; Whiting of Lake Winnipiscogee.*

Great Lakes region to the lakes of the Adirondacks and White Mountains, and northwest to Winnipeg.

Coregonus labradoricus Richardson, Fauna Bor.-Amer., III, 206, 1836, Musquaw River, Labrador.

Genus 233. **ARGYROSOMUS** Agassiz. *The Lake Herrings.*

Argyrosomus Agassiz, Lake Superior, 339, 1850 (*clupeiformis*=*artedi*).

Subgenus **ARGYROSOMUS** Agassiz.

781. **Argyrosomus osmeriformis** (H. M. Smith). *Smelt of the New York lakes.*

Lakes of central New York; known from Seneca and Skaneateles lakes.

Coregonus osmeriformis Hugh M. Smith, Bull. U. S. Fish Com., XIV, 1894, pl. 1, 2, Seneca Lake; Skaneateles Lake.

782. **Argyrosomus artedi** (LeSueur). *Cisco; Lake Herring; Michigan Herring.*

Great Lakes and neighboring waters, and northward into Labrador.

Coregonus artedi LeSueur, Jour. Ac. Nat. Sci. Phila., I, 1818, 231, Lake Erie; Niagara River.

782a. **Argyrosomus artedi cisco** Jordan.

Small lakes of Wisconsin and northern Indiana.

Argyrosomus cisco Jordan, Am. Nat. 1875, 136, Lake Tippecanoe, Warsaw, Ind.

783. **Argyrosomus hoyi** Gill. *Moon-eye Cisco; Cisco of Lake Michigan; Kieye of Lake Michigan.*

Deep waters of Lake Michigan.

Argyrosomus hoyi Gill, in Jordan, Am. Nat., March, 1875, 135, Lake Michigan, near Racine, Wisconsin.

784. **Argyrosomus pusillus** (Bean).

Yukon River to Bering Sea and northward.

Coregonus pusillus Bean, Proc. U. S. Nat. Mus. 1888, 526, Kuwuk River, Alaska.

785. **Argyrosomus lucidus** (Richardson). *Great Bear Lake Herring.*

Mackenzie River and tributaries; Great Bear Lake River.

Salmo (*Coregonus*) *lucidus* Richardson, Fauna Bor.-Amer., III, 207, 1836, with good figure, Great Bear Lake.

786. **Argyrosomus laurettæ** (Bean).

Alaska, from Yukon River northward to Point Barrow.

Coregonus laurettæ Bean, Proc. U. S. Nat. Mus. 1881, 156, Point Barrow, Alaska.

787. **Argyrosomus prognathus** (H. M. Smith). *Long-jaw; Bloater.*

Lake Ontario, Lake Michigan, Lake Superior, and doubtless the entire Great Lake basin.

Coregonus prognathus Hugh M. Smith, Bull. U. S. Fish Com., XIV, 1894, 4, pl. 1, fig. 3, Lake Ontario, at Wilson, N. Y.

788. **Argyrosomus nigripinnis** Gill. *Blue-fin; Black-fin.*

Deep waters of Lake Michigan and small lakes of Wisconsin and Minnesota.

Argyrosomus nigripinnis Gill, in Milner, Rept. U. S. Fish. Com. 1872–73 (1874), 87, Lake Michigan, off Racine, Wisconsin.

Subgenus **ALLOSOMUS** Jordan.

Allosomus Jordan, Man. Vert., ed. 2, 361, 1878 (*tullibee*).

789. **Argyrosomus tullibee** (Richardson). *Tullibee; Mongrel Whitefish.*

Great Lakes, Lake of the Woods, and northward.

Salmo (*Coregonus*) *tullibee* Richardson, Fauna Bor.-Amer., III, 201, 1836, Cumberland House, Pine Island Lake.

789a. **Argyrosomus tullibee bisselli** (Bollman).

Rawson Lake and Howard Lake, Michigan.

Coregonus tullibee bisselli Bollman, Rept. U. S. Fish Com., VIII, 1888, 223, Rawson and Howard lakes, Michigan.

Genus 234. STENODUS Richardson. *Inconnu.*

Stenodus Richardson, Back's Narrative Arctic Land Expedition, 521, 1836 (*mackenzii*).

790. Stenodus mackenzii (Richardson). *Inconnu.*

Delta of Mackenzie River.

Salmo mackenzii Richardson, Franklin's Jour. 1823, 707, Mackenzie River.

Genus 235. ONCORHYNCHUS Suckley. *The Pacific Salmons.*

Oncorhynchus Suckley, Ann. Lyc. Nat. Hist. N.Y. 1861, 312 (*scouleri=gorbuscha*).

Subgenus ONCORHYNCHUS Suckley.

791. Oncorhynchus gorbuscha (Walbaum). *Humpback Salmon; Haddo; Holia; Gorbuscha; Dog Salmon of Alaska.*

Pacific Coast and rivers of North America and Asia from Oregon northward.

Salmo gorbuscha Walbaum, Artedi Pisc., 69, 1792, Kamchatka; after the *Gorbuscha* of Pennant and Krascheninnikof.

792. Oncorhynchus keta (Walbaum). *Dog Salmon; Hay-ko; Le Kai Salmon.*

San Francisco to Kamchatka; abundant in Bering Straits.

Salmo keta vel *Kayko* Walbaum, Artedi Pisc., 72, 1792, rivers of Kamchatka; after the *Keta* or *Kayko* of Pennant and Krascheninnikof.

793. Oncorhynchus tschawytscha (Walbaum). *Quinnat Salmon; Chinook Salmon; Tschavitche; King Salmon; Columbia Salmon; Sacramento Salmon; Tyee Salmon; Saw-kwey; Chouicha* or *Tschawytscha.*

Alaska, Oregon, and California, southward to Ventura River and to northern China.

Salmo tschawytscha Walbaum, Artedi Pisc., 71, 1792, rivers of Kamchatka; after the *Tschawytscha* of Krascheninnikof, Hist. Kamchatka, 178, 1764, and the *Tschawytscha* of Pennant, 1792.

794. Oncorhynchus kisutch (Walbaum). *Silver Salmon; Kisutch; Skowitz; Hoopid Salmon; Coho Salmon; Bielaya Ryba; Quisutsch.*

From San Francisco northward, especially in Puget Sound and the Alaskan fjords; south on the Asiatic coast to Japan.

Salmo kisutch Walbaum, Artedi Pisc., 70, 1792, rivers and lakes of Kamchatka; after the *Kisutch* of Pennant.

Subgenus HYPSIFARIO Gill.

Hypsifario Gill, Proc. Ac. Nat. Sci. Phila. 1862, 330 (*kennerlyi = nerka*).

795. Oncorhynchus nerka (Walbaum). *Blueback Salmon; Redfish; Fraser River Salmon; Saw-qui, Sockeye,* or *Sauk-eye Salmon; Krasnaya Ryba.*

Klamath River and Rogue River to northern Alaska, Kamchatka, and Japan.

Salmo nerka Walbaum, Artedi, Pisc., 71, 1792, rivers and seas of Kamchatka; after the *Nerka* of Pennant, the *Narka* of Krascheninnikof.

Genus 236. SALMO (Artedi) Linnæus. *Salmons and Trouts.*

Salmo (Artedi, Gen. Piscium) Linnæus, Syst. Nat., ed. x, 308, 1758 (*salar*, etc.).

Subgenus SALMO (Artedi) Linnæus.

796. Salmo salar Linnæus. *Common Atlantic Salmon.*

North Atlantic, ascending all suitable rivers in northern Europe and region north of Cape Cod to Hudson Bay; formerly abundant in the Hudson and occasional in the Delaware, its northern limit in the Churchill, Albany, and Moose rivers, flowing into Hudson Bay.

Salmo salar Linnæus, Syst. Nat., ed. x, 308, 1758, seas of Europe.

796a. Salmo salar sebago Girard. *Landlocked Salmon.*

Lakes of Maine, New Hampshire, and New Brunswick.

Salmo sebago Girard, Proc. Ac. Nat. Sci. Phila. 1853, 380, Sebago Pond, N. H.

796b. Salmo salar ouananiche McCarthy. *Ouananiche; Wannanishe; Winninish.*

Lake St. John, Saguenay River, and northward.

Salmo salar ouananiche Eugene McCarthy, in Jordan & Evermann, Fishes North and Middle America, 487, 1896, Saguenay River, Canada.

Subgenus TRUTTA Linnæus.

Truttæ Linnæus, Syst. Nat., ed. x, 308, 1758 (*trutta*, etc.: "*Truttæ corpore variegato*").

797. **Salmo mykiss** Walbaum. *Cut-throat Trout; Mykiss.*

Lower Columbia to British America, Alaska, and Kamchatka.

Salmo mykiss Walbaum, Artedi Pisc., 59, 1792, Kamchatka; based on *Mykiss* of Pennant.

797a. **Salmo mykiss clarkii** (Richardson). *Columbia River Trout.*

Puget Sound to Elk River, Humboldt County, California.

Salmo clarkii Richardson, Fauna Bor.-Amer., III, 225, 1836, Cathlapootl River.

797b. **Salmo mykiss lewisi** (Girard). *Yellowstone Trout; Cut-throat Trout.*

Snake River basin above the Shoshone Falls, through Two-Ocean Pass to the headwaters of the Yellowstone and other affluents of the upper Missouri; Yellowstone Lake.

Salar lewisi Girard, Proc. Ac. Nat. Sci. Phila. 1856, 219, Falls of Missouri River.

797c. **Salmo mykiss gibbsii** (Suckley).

Middle Columbia River basin.

Salmo gibbsii Suckley, Ann. Lyc. Nat. Hist. N.Y., VII, 1858, 1, Fort Dalles, Oregon.

797d. **Salmo mykiss henshawi** (Gill & Jordan). *Lake Tahoe Trout; Silver Trout; Truckee Trout.*

Basin of the post-Tertiary Lake Lahontan; Lake Tahoe, Pyramid Lake, Webber Lake, Donner Lake, Independence Lake, Truckee River, Humboldt River, Carson River, and most streams of the eastern slope of the Sierra Nevada; also the headwaters of Feather River, west of the Sierra Nevada, probably introduced from Nevada.

Salmo henshawi Gill & Jordan, in Jordan, Man. Vert., ed. 2, 358, 1878, Lake Tahoe.

797e. **Salmo mykiss virginalis** (Girard). *Trout of Utah Lake.*

Lakes and streams west of the Wasatch range, especially in Bear, Provo, Jordan, and Sevier rivers, and in Utah Lake.

Salar virginalis Girard, Proc. Ac. Nat. Sci. Phila. 1856, 220, Utah Lake.

797f. **Salmo mykiss spilurus** (Cope). *Rio Grande Trout.*

Upper Rio Grande and southward into the mountains of Chihuahua.

Salmo spilurus Cope, Hayden's Geol. Surv. Mont. for 1871 (1872), 470, Sangre de Cristo Pass, Colorado.

797g. **Salmo mykiss pleuriticus** (Cope). *Colorado River Trout.*

Colorado River basin.

Salmo pleuriticus Cope, Hayden's Geol. Surv. Mont. for 1871 (1872), 471, headwaters of Green River, Wyoming.

797h. **Salmo mykiss bouvieri** (Bendire). *Waha Lake Trout.*

Waha Lake, Washington.

Salmo purpuratus bouvieri Bendire, in Jordan & Gilbert, Synopsis, 315, 1883, Waha Lake, Washington.

797i. **Salmo mykiss stomias** (Cope). *Greenback Trout.*

Headwaters of Arkansas and Platte rivers.

Salmo stomias Cope, Hayden's Geol. Surv. Wyo. for 1870 (1871), 433, South Platte River, locality unknown.

797j. **Salmo mykiss macdonaldi** Jordan & Evermann. *Yellow-fin Trout.*

Twin Lakes, tributary to the Arkansas River, near Leadville, Colorado.

Salmo mykiss macdonaldi Jordan & Evermann, Proc. U. S. Nat. Mus. 1889 (1890), 453, Twin Lakes, Colorado.

798. **Salmo gairdneri** Richardson. *Steelhead; Hardhead; "Salmon Trout."*

Coastwise streams from Santa Ynez Mountains, San ta Barbara County, northward to British Columbia, west of the Sierra Nevada and Cascade Range; especially abundant in the lower Columbia, ascending Snake River as far as Auger Falls and headwaters of Salmon River, Idaho.

Salmo gairdneri Richardson, Fauna Bor.-Amer., III, 221, 1836, Columbia River at Fort Vancouver, Washington.

798a. Salmo gairdneri kamloops (Jordan). *Kamloops Trout; Stit-tse.*

Kamloops Lake, Okanogan Lake, Kootenai Lake, and other lakes tributary to Fraser River or to the upper Columbia.

Oncorhynchus kamloops Jordan, Forest and Stream, XXXIX, No. 19, November 10, 1892, 405, Kamloops Lake, British Columbia.

798b. Salmo gairdneri crescentis Jordan & Beardslee. *Speckled Trout of Crescent Lake.*

Crescent Lake, Clallam County, Washington.

Salmo gairdneri crescentis Jordan & Beardslee, Proc. Cal. Ac. Sci. 1896, 207, pl. 22, Crescent Lake, Clallam County, Washington.

798c. Salmo gairdneri beardsleei Jordan & Seale. *Blueback Trout of Crescent Lake.*

Crescent Lake, Clallam County, Washington.

Salmo gairdneri beardsleei Jordan & Seale, Proc. Cal. Ac. Sci. 1896, 209, pl. 23, Crescent Lake, Clallam County, Washington.

799. Salmo irideus Gibbons. *Rainbow Trout; Coast Range Trout.*

Mountain streams from the coast of Washington southward to San Diego County, California.

Salmo irideus Gibbons, Proc. Cal. Ac. Nat. Sci. 1855, 36, San Leandro Creek, Alameda County, California.

799a. Salmo irideus masoni (Suckley). *Brook Trout of western Oregon.*

Puget Sound to southern Oregon, in streams of the Coast Range.

Salmo masoni Suckley, Pac. R. R. Surv., XII, part 2, 345, 1860, Cathlapootl River.

799b. Salmo irideus shasta (Jordan). *McCloud River Rainbow Trout.*

Streams of the Sierra Nevada from Mount Shasta southward; known from McCloud River, the limits of its range not well known. Introduced into the Truckee River and many eastern streams.

Salmo gairdneri shasta Jordan, 13th Bien. Rept. Fish Com. California, 1894, 142, with plate, McCloud River at Baird, Shasta County, California.

799c. Salmo irideus gilberti (Jordan). *Kern River Trout.*

Kern River, California.

Salmo gairdneri gilberti Jordan, 13th Bien. Rept. Fish Com. California, 1894, 143, with plate, South Fork of Kern River at Soda Springs, California.

799d. Salmo irideus stonei (Jordan). *Nissuee Trout; No-shee Trout.*

McCloud River and upper Sacramento River.

Salmo gairdneri stonei Jordan, 13th Bien. Rept. Fish Com. California, 1894, 142, with plate, McCloud River at Baird, California.

799e. Salmo irideus aqua-bonita (Jordan). *Golden Trout of Mount Whitney.*

Mountain streams on the west side of Mount Whitney, tributary to Kern River, Volcano Creek, and South Fork of Kern River; also Owens Lake.

Salmo mykiss aqua-bonita Jordan, Proc. U. S. Nat. Mus. 1892, 481, Volcano or Whitney Creek, California.

Genus 237. CRISTIVOMER Gill & Jordan. *Great Lakes Trout.*

Cristivomer Gill & Jordan, in Jordan, Man. Vert. E. U. S., ed. 2, 356, 1878 (*namaycush*).

800. Cristivomer namaycush (Walbaum). *Great Lakes Trout; Mackinaw Trout; Longe* (Vermont); *Togue* (Maine); *Namaycush; Masamacush.*

Great Lakes region and lakes of northern New York, New Hampshire, and Maine, headwaters of Columbia and Fraser rivers, streams of Vancouver Island, and north to the Arctic Circle.

Salmo namaycush Walbaum, Artedi Pisc., 68, 1792, Hudson Bay; based on the *Namaycush salmon* of Pennant.

800a. Cristivomer namaycush siscowet (Agassiz). *Siscowet.*

Lake Superior.

Salmo siscowet Agassiz, Lake Superior, 333, 1850, Lake Superior.

Genus 238. SALVELINUS (Nilsson). *Charrs.*

Salvelius Nilsson, Prodr. Scand., 7, 1832 (*alpinus*).

801. Salvelinus fontinalis (Mitchill). *Brook Trout; Speckled Trout.*

Maine to the Saskatchewan and northward to Labrador, southward in the Alleghanies to headwaters of the Savannah, Chattahoochee, Catawba, and French Broad rivers.

Salmo fontinalis Mitchill, Trans. Lit. Phil. Soc. N. Y., I, 1815, 435, near New York City.

801a. Salvelinus fontinalis agassizii (Garman). *Dublin Pond Trout.*

New Hampshire.

Salmo agassizii Garman, 19th Rept. Mass. Fish Com. 1885, 20, Dublin Pond (Lake Monadnock), Keene, N. H.; Center Pond, New Hampshire.

802. Salvelinus malma (Walbaum). *Dolly Varden Trout; Oregon Charr; Bull Trout; Red-spotted Trout; Malma; Golet.*

Streams west of the Cascade Range, from the upper Sacramento to Montana, Alaska, and Kamchatka; in the Columbia basin as far up as Montana and Idaho.

Salmo malma Walbaum, Artedi Pisc., 66, 1792, Bering Sea; based on *Malma* of Pennant.

803. Salvelinus alpinus (Linnæus). *European Charr; Sälbling; Saibling; Ombre Chevalier; Greenland Charr.*

Central and northern Europe and northeastern America.

Salmo alpinus Linnæus, Syst. Nat., ed. X, 309, 1758, Lapland, West Gothland, etc.

803a. Salvelinus alpinus alipes (Richardson). *Long-finned Charr.*

Lakes of Greenland and Boothia Felix.

Salmo alipes Richardson, Nat. Hist. App. Ross's Voy., LVII, and Fauna Bor.-Amer., III, 169, 1836, lakes about Regent Inlet; Boothia Felix.

803b. Salvelinus alpinus stagnalis (Fabricius). *Greenland Charr.*

Waters of Greenland, Boothia, and neighboring regions.

Salmo stagnalis Fabricius, Fauna Grœnlandica, 175, 1780, alpine ponds of Greenland; not migratory.

803c. Salvelinus alpinus arcturus (Günther).

Victoria Lake and Flœberg Beach, Arctic America, latitude 82° 34′.

Salmo arcturus Günther, Proc. Zool. Soc. Lond. 1877, 294, pl. 5, Victoria Lake and Flœberg Beach, Arctic America.

803d. Salvelinus alpinus aureolus (Bean). *Golden Trout of Sunapee Lake.*

Sunapee Lake, New Hampshire; Dan Hole Pond, Carroll County, New Hampshire, tributary to Saco River; and Floods Pond, Ellsworth, Maine, tributary to Union River.

Salvelinus aureolus Bean, Proc. U. S. Nat. Mus. 1887, 628, Sunapee Lake, New Hampshire.

804. Salvelinus oquassa (Girard). *Oquassa Trout; Blueback Trout; Quasky.*

Rangeley Lakes, western Maine.

Salmo oquassa Girard, Proc. Ac. Nat. Sci. Phila. 1854, 262, Oquassa Lake, Maine.

804a. Salvelinus oquassa naresi (Günther).

Lakes of Arctic America, Discovery Bay, and Cumberland Gulf.

Salmo naresi Günther, Proc. Zool. Soc. Lond. 1877, 476, plate, fresh-water lakes near Discovery Bay.

804b. Salvelinus oquassa marstoni (Garman). *Lac de Marbre Trout.*

Lac de Marbre, Ottawa County, Province of Quebec, Canada.

Salmo marstoni Garman, Science, July 14, 1893, 23, Lac de Marbre, Ottawa County, Quebec.

Family LXV. THYMALLIDÆ. The Graylings.

Genus 239. THYMALLUS Cuvier.

Thymallus Cuvier, Règne Anim., ed. 2, II, 306, 1829 (*thymallus*), (not *Thymalus* Latreille, 1802, a genus of *Coleoptera*).

805. Thymallus signifer (Richardson). *Arctic Grayling; Poisson Bleu.*

Mackenzie River to Alaska and the Arctic Ocean.

Coregonus signifer Richardson, Franklin's Jour. 1823, 711, Winter Lake near Fort Enterprise, British America.

806. Thymallus ontariensis Cuvier & Valenciennes. *Michigan Grayling.*

Streams of northern Michigan; formerly abundant in Au Sable River, Jordan River, and other streams in the southern peninsula; Otter Creek, near Keweenaw, in the northern peninsula.

Thymallus ontariensis Cuvier & Valenciennes, Hist. Nat. Poiss., XXI, 452, 1848, said to have been brought by Milbert from Lake Ontario.

806a. Thymallus ontariensis montanus Milner. *Montana Grayling.*

Madison and Gallatin rivers, Montana.

Thymallus montanus Milner, Rept. U. S. Fish Com. 1872-73 (1874), 741, tributary of Missouri River at Camp Baker, Montana.

Family LXVI. ARGENTINIDÆ. The Smelts.

Genus 240. MALLOTUS Cuvier. *Capelins.*

Mallotus Cuvier, Règne Anim., ed. 2, II, 305, 1829 (*villosa*).

807. Mallotus villosus (Müller). *Capelin; Lodde.*

Arctic America, south to Cape Cod and Alaska; Kamchatka.

Clupea villosa Müller, Prodr. Zool. Dan., 245, 1777, Greenland.

Genus 241. THALEICHTHYS Girard. *Eulachon.*

Thaleichthys Girard, U. S. Pac. R. R. Surv., Fishes, 325, 1858 (*stevensi*=*pacificus*).

808. Thaleichthys pacificus (Richardson). *Eulachon; Candle-fish; Oolachan.*

Oregon to Alaska.

Salmo (*Mallotus*) *pacificus* Richardson, Fauna Bor.-Amer., III, 226, 1836, Columbia River.

Genus 242. OSMERUS (Artedi) Linnæus.

Osmerus (Artedi) Linnæus, Syst. Nat., ed. X, 310, 1758 (*eperlanus*).

Subgenus SPIRINCHUS Jordan & Evermann.

Spirinchus Jordan & Evermann, Fishes North and Middle America, 522, 1896 (*thaleichthys*).

809. Osmerus thaleichthys Ayres.

Pacific Coast from San Francisco northward to Bristol Bay in Alaska.

Osmerus thaleichthys Ayres, Proc. Cal. Ac. Sci. 1860, 62, San Francisco.

810. Osmerus attenuatus Lockington.

California from San Francisco northward.

Osmerus attenuatus Lockington, Proc. U. S. Nat. Mus. 1880, 66, San Francisco.

Subgenus OSMERUS (Artedi) Linnæus.

811. Osmerus mordax (Mitchill). *American Smelt; Ice-fish.*

Atlantic Coast of United States from Virginia northward to Gulf of St. Lawrence; Lakes Champlain and Memphremagog.

Atherina mordax Mitchill, Trans. Lit. Phil. Soc. N. Y., I, 1815, 446, New York.

811a. Osmerus mordax spectrum (Cope). *Wilton Smelt.*

Landlocked in Wilton Pond, Kennebec County, Maine.

Osmerus spectrum Cope, Proc. Am. Phil. Soc. Phila. 1870, 490, Wilton Pond, Kennebec County, Maine.

811b. Osmerus mordax abbotti (Cope). *Cobessicontic Smelt.*
Landlocked in Cobessicontic Lake, Kennebec County, Maine.
Osmerus abbotti Cope, Proc. Am. Phil. Soc. Phila. 1870, 490, Cobessicontic Lake, Maine.

812. Osmerus dentex Steindachner. *Rainbow Herring.*
Coast of Alaska and south on the Pacific Coast to northern China.
Osmerus dentex Steindachner, Sitzungsb. Kais. Akad. Wiss. Wien, LXI, 1870, 429, northern China.

Genus 243. HYPOMESUS Gill. *Surf Smelts.*
Hypomesus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 168 (*pretiosa*).

813. Hypomesus pretiosus (Girard). *Surf Smelt.*
Coast of California and Oregon, from Monterey northward.
Argentina pretiosa Girard, Proc. Ac. Nat. Sci. Phila. 1854, 155, San Francisco.

814. Hypomesus olidus (Pallas). *Pond Smelt.*
Alaska and Kamchatka.
Salmo (*Osmerus*) *olidus* Pallas, Zoogr. Rosso-Asiat., III, 391, 1811, lakes and rivers of Kamchatka.

Genus 244. ARGENTINA (Artedi) **Linnæus.** *Argentines.*
Argentina (Artedi) Linnæus, Syst. Nat., ed. x, 315, 1758 (*sphyræna*).

815. Argentina silus Ascanius.
Northern Europe; occasionally taken on the Grand Banks and off the coast of Maine.
Argentina silus Ascanius, Icon. Rev. Nat., pl. 3, 3, 24, 1763, Norway.

816. Argentina sialis Gilbert.
Coast of California.
Argentina sialis Gilbert, Proc. U. S. Nat. Mus. 1890, 56, coast of California at Albatross Station 3017, in 58 fathoms.

817. Argentina striata Goode & Bean.
Gulf of Mexico.
Argentina striata Goode & Bean, Oceanic Ichthyology, 52, fig. 62, 1896, Gulf of Mexico, in latitude 28° 36′ N., longitude 85° 33′ 30″ W.

Genus 245. LEUROGLOSSUS Gilbert.
Leuroglossus Gilbert, Proc. U. S. Nat. Mus. 1890, 57 (*stilbius*).

818. Leuroglossus stilbius Gilbert.
Coast of California.
Leuroglossus stilbius Gilbert, Proc. U. S. Nat. Mus. 1890, 57, Coast of California at Albatross Stations 2997 and 2998, in 221 and 40 fathoms.

Family LXVII. MICROSTOMIDÆ.

Genus 246. NANSENIA Jordan & Evermann.
Nansenia Jordan & Evermann, Fishes North and Middle America, 528, 1896 (*grœnlandica*).

819. Nansenia grœnlandica (Reinhardt).
Greenland.
Microstomus grœnlandicus Reinhardt, Vidensk. Selsk. Naturv. Math. Afhandl., VIII, 1841, LXXIV, Greenland.

Genus 247. BATHYLAGUS Günther.
Bathylagus Günther, Ann. Mag. Nat. Hist., II, 1878, 248 (*atlanticus*).

820. Bathylagus benedicti Goode & Bean.
Gulf Stream.
Bathylagus benedicti Goode & Bean, Oceanic Ichthyology, 55, fig. 64, 1896, Gulf Stream, at Albatross Stations 2094, 2711, and 2572.

821. Bathylagus euryops Goode & Bean.

Gulf Stream.

Bathylagus euryops Goode & Bean, Oceanic Ichthyology, 55, fig. 63, 1896, Gulf Stream, in about latitude 40° N., and longitude 70° W.

822. Bathylagus pacificus Gilbert.

Coast of Washington, in deep water.

Bathylagus pacificus Gilbert, Proc. U. S. Nat. Mus. 1890, 55, off Washington, at Albatross Stations 3071 and 3074, in 685 and 877 fathoms.

823. Bathylagus borealis Gilbert.

Coast of Alaska, in deep water.

Bathylagus borealis Gilbert, Proc. Rept. U. S. Fish Com. 1893 (1896), 492, north of Aleutian Island at Albatross Station 3027, in 322 fathoms.

Order T. INIOMI. The Lantern-Fishes.

Family LXVIII. SYNODONTIDÆ. The Lizard-Fishes.

Genus 248. TRACHINOCEPHALUS Gill.

Trachinocephalus Gill, Cat. Fish. East Coast N. Amer., 53, 1861 (*myops*).

824. Trachinocephalus myops (Forster). *Ground Spearing; Lagarto.*

Tropical parts of the western Atlantic, West Indies, and Brazil, and ranging on our Atlantic Coast to South Carolina.

Salmo myops Forster, in Bloch & Schneider, Syst. Ichth., 421, 1801, St. Helena.

Genus 249. SYNODUS (Gronow) **Bloch & Schneider.** *Lizard-fishes.*

Synodus (Gronow) Bloch & Schneider, Syst. Ichth., 396, 1801 (*synodus*).

825. Synodus intermedius (Agassiz). *Sand-diver.*

Coast of southern Florida to Brazil.

Saurus intermedius Agassiz, Spix, Pisc. Brasil., 81, 1828, Brazil.

826. Synodus evermanni Jordan & Bollman.

Mazatlan to coast of Colombia.

Synodus evermanni Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 152, Pacific Ocean off coast of Colombia, at Albatross Stations 2795 and 2797, in 33 fathoms.

827 Synodus poeyi Jordan.

Cuba.

Synodus poeyi Jordan, Proc. U. S. Nat. Mus. 1886, 526, Havana, Cuba.

828. Synodus synodus (Linnæus).

Bahia, Brazil.

Esox synodus Linnæus, Syst. Nat., ed. XII, 516, 1766, America; based on *Synodus* of Gronow.

829. Synodus lacertinus Gilbert.

Acapulco, Mexico.

Synodus lacertinus Gilbert, Proc. U. S. Nat. Mus. 1890, 55, Acapulco, Mexico.

830. Synodus saurus (Linnæus). *Tira; Tannlola; Lacerto.*

Coast of southern Europe and neighboring islands; Bermudas.

Salmo saurus Linnæus, Syst. Nat., ed. XII, 511, 1766, Mediterranean; after Artedi.

831. Synodus scituliceps Jordan & Gilbert.

Pacific Coast of America from Cape San Lucas to Panama.

Synodus scituliceps Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 344, Mazatlan, Mexico.

832. Synodus jenkinsi Jordan & Bollman.

Gulf of California to Galapagos Islands.

Synodus jenkinsi Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 153, off coast of Colombia, Galapagos Islands, at Albatross Stations 2797 and 2802, in 33 and 16 fathoms.

833. Synodus fœtens (Linnæus). *Lizard-fish; Lagarto; Soap-fish.*

Cape Cod to Brazil; common from South Carolina southward.

Salmo fœtens Linnæus, Syst. Nat., ed. XII, 513, 1766, South Carolina.

834. Synodus lucioceps (Ayres).

Coast of California from San Francisco to Santa Barbara.

Saurus lucioceps Ayres, Proc. Cal. Ac. Sci. 1855, 66, San Francisco.

Genus 250. BATHYSAURUS Günther.

Bathysaurus Günther, Ann. Mag. Nat. Hist., August, 1878, 181 (*ferox*).

835. Bathysaurus ferox Günther.

Atlantic and South Pacific; known from off New Zealand, Morocco, and the Gulf Stream.

Bathysaurus ferox Günther, Ann. Mag. Nat. Hist. 1878, 182, east coast of New Zealand.

Genus 251. BATHYLACO Goode & Bean.

Bathylaco Goode & Bean, Oceanic Ichthyology, 57, 1896 (*nigricans*).

836. Bathylaco nigricans Goode & Bean.

Gulf of Mexico off Santa Cruz, in deep water.

Bathylaco nigricans Goode & Bean, Oceanic Ichthyology, 57, fig. 69, 1896, off Santa Cruz, Mexico, in 2,393 fathoms.

Family LXIX. AULOPIDÆ.

Genus 252. CHLOROPHTHALMUS Bonaparte.

Chlorophthalmus Bonaparte, Fauna Italica, fasci. XXVIII, Pesci, 1840 (*agassizii*).

837. Chlorophthalmus agassizii Bonaparte.

Atlantic and Mediterranean, rare about Naples and Sicily; eastern Atlantic, Azores, Sargasso Sea, and Cape Verde.

Chlorophthalmus agassizii Bonaparte, Fauna Italica, pl. 121, 1840, Italy.

838. Chlorophthalmus chalybeius (Goode).

Gulf Stream, in from 85 to 167 fathoms.

Hyphalonedrus chalybeius Goode, Proc. U. S. Nat. Mus., III, 1881, 484, Gulf Stream, off Rhode Island, at Fish Hawk Stations 876 and 878, in 120 and 142 fathoms.

839. Chlorophthalmus truculentus Goode & Bean.

Off Barbados.

Chlorophthalmus truculentus Goode & Bean, Oceanic Ichthyology, 61, fig. 72, 1896, off Barbados, in 158 fathoms.

Family LXX. BENTHOSAURIDÆ.

Genus 253. BENTHOSAURUS Goode & Bean.

Benthosaurus Goode & Bean, Bull. Mus. Comp. Zool., XII, No. 5, 165, 1886 (*grallator*).

840. Benthosaurus grallator Goode & Bean.

Gulf of Mexico and Gulf Stream, in latitude 24° 33′ N., longitude 84° 23′ W.; latitude 39° 3′ 15″ N., longitude 70° 50′ 45″ W.

Benthosaurus grallator Goode & Bean, Bull. Mus. Comp. Zool., XII, No. 5, 168, 1886, Gulf Stream.

Family LXXI. BATHYPTEROIDÆ.

Genus 254. BATHYPTEROIS Günther.

Bathypterois Günther, Ann. Mag. Nat. Hist., 5th series, II, 1878, 183 (*longifilis*).

Subgenus SYNAPTERETMUS Goode & Bean.

Synapteretmus Goode & Bean, Oceanic Ichthyology, 64, 1896 (*quadrifilis*).

841. Bathypterois quadrifilis Günther.

Brazil; St. Vincent.

Bathypterois quadrifilis Günther, Ann. Mag. Nat. Hist., II, 1878, 184, off coast of Brazil, in 500 to 770 fathoms.

842. Bathypterois longipes Günther.

East coast of South America.

Bathypterois longipes Günther, Ann. Mag. Nat. Hist., II, 1878, 184, east coast of South America, in 2,650 fathoms.

Family LXXII. IPNOPIDÆ.

Genus 255. IPNOPS Günther.

Ipnops Günther, Ann. Mag. Nat. Hist., II, 1878, 187 (*murrayi*).

843. Ipnops murrayi Günther.

Coast of Brazil, Tristan da Cunha, Celebes, and in tropical America (24° 36′ N., 84° W.), and off Bequia.

Ipnops murrayi Günther, Ann. Mag. Nat. Hist., II, 1878, 187, coast of Brazil, etc.

Family LXXIII. RONDELETIIDÆ.

Genus 256. RONDELETIA Goode & Bean.

Rondeletia Goode & Bean, Proc. U. S. Nat. Mus. 1894 (1895), 454 (*bicolor*), and in Oceanic Ichthyology, 68, 1896.

844. Rondeletia bicolor Goode & Bean.

Gulf Stream.

Rondeletia bicolor Goode & Bean, Proc. U. S. Nat. Mus. 1894 (1895), 454, pl. 17, fig. 7, and in Oceanic Ichthyology, 68, fig. 77, 1896, at Albatross Station 2724, in 1,641 fathoms.

Family LXXIV. CETOMIMIDÆ.

Genus 257. CETOMIMUS Goode & Bean.

Cetomimus Goode & Bean, Proc. U. S. Nat. Mus. 1894 (1895), 452 (*gillii*), and in Oceanic Ichthyology, 68, 1896.

845. Cetomimus gillii Goode & Bean.

Gulf Stream.

Cetomimus gillii Goode & Bean, Proc. U. S. Nat. Mus. 1894 (1895), 452, pl. 17, fig. 2, and in Oceanic Ichthyology, 69, fig. 78, 1896, Gulf Stream, in latitude 39° 35′ N., longitude 71° 24′ 30″ W.

846. Cetomimus storeri Goode & Bean.

Gulf Stream.

Cetomimus storeri Goode & Bean, Proc. U. S. Nat. Mus. 1894 (1895), 453, pl. 17, fig. 3, and in Oceanic Ichthyology, 69, fig. 79, 1896, Gulf Stream at Albatross Station 2222, in 1,535 fathoms.

Family LXXV. MYCTOPHIDÆ. The Lantern-Fishes.

Genus 258. MACROSTOMA Risso.

Macrostoma Risso, Europ. Mérid., III, 447, 1826 (*angustidens*); (not *Macrostomus* Wied, 1817, a genus of insects).

847. Macrostoma quercinum (Goode & Bean).

Western Atlantic and Mediterranean.

Notoscopelus quercinus Goode & Bean, Oceanic Ichthyology, 83, fig. 97, 1896, Grand Banks.

848. Macrostoma margaritiferum (Goode & Bean).
Grand Banks of Newfoundland.
Notoscopelus margaritiferus Goode & Bean, Oceanic Ichthyology, 84, fig. 98, 1896, off Banquero.

849. Macrostoma angustidens Risso. *Prick-fish; Maire d'Amplora.*
Atlantic and Indian oceans, Norway and Greenland.
Macrostoma angustidens Risso, Europ. Mérid., III, 448, 1826, Nice.

850. Macrostoma castaneum (Goode & Bean).
Grand Banks.
Notoscopelus castaneus Goode & Bean, Oceanic Ichthyology, 84, fig. 95, 1896, Grand Banks.

851. Macrostoma caudispinosum (Johnson).
Atlantic Ocean.
Scopelus caudispinosus Johnson, Proc. Zool. Soc. Lond. 1863, 42, Madeira.

Genus 259. CERATOSCOPELUS Günther.
Ceratoscopelus Günther, Cat., v, 405 and 412, 1864 (*madeirensis*).

852. Ceratoscopelus madeirensis (Lowe).
Atlantic and Mediterranean; west to the Grand Banks.
Scopelus madeirensis Lowe, Proc. Zool. Soc. Lond. 1839, 87, Madeira.

Genus 260. LAMPANYCTUS Bonaparte.
Lampanyctus Bonaparte, Fauna Italica, fasc. XXVII, 1840 (*crocodilus*).

853. Lampanyctus crocodilus (Risso).
Atlantic and Mediterranean; west to 40° W., 33° N.
Gasteropelecus crocodilus Risso, Ichth. Nice, 357, 1810, Nice.

854. Lampanyctus townsendi (Eigenmann & Eigenmann).
Cortez Banks, near San Diego.
Myctophum townsendi Eigenmann & Eigenmann, West Am. Sci. 1889, 125, Cortez Banks, off San Diego, California.

855. Lampanyctus alatus Goode & Bean.
Gulf of Mexico.
Lampanyctus alatus Goode & Bean, Oceanic Ichthyology, 79, fig. 92, 1896, Gulf of Mexico, in latitude 28° 43′ N., longitude 87° 14′ W.

856. Lampanyctus guntheri Goode & Bean.
Grand Banks.
Lampanyctus guntheri Goode & Bean, Oceanic Ichthyology, 79, fig. 90, 1896, Grand Banks.

857. Lampanyctus gemmifer Goode & Bean.
Gulf Stream.
Lampanyctus gemmifer Goode & Bean, Oceanic Ichthyology, 80, fig. 88, 1896, Grand Banks, in latitude 39° 40′ N., longitude 71° 35′ W., in 538 fathoms.

858. Lampanyctus lacerta Goode & Bean.
Gulf of Mexico.
Lampanyctus lacerta Goode & Bean, Oceanic Ichthyology, 81, fig. 89, 1896, Gulf of Mexico, in latitude 28° 38′ 30″ N., longitude 85° 52′ 30″ W.

Genus 261. LAMPADENA Goode & Bean.
Lampadena Goode & Bean, Oceanic Ichthyology, 85, 1896 (*speculigera*).

859. Lampadena speculigera Goode & Bean.
Gulf Stream.
Lampadena speculigera Goode & Bean, Oceanic Ichthyology, 85, fig. 99, 1896, Gulf Stream, in latitude 39° 48′ N., longitude 70° 36′ W., in 551 fathoms.

Genus 262. NANNOBRACHIUM Günther.

Nannobrachium Günther, Deep Sea Fishes, Challenger, 199, 1887 (*nigrum*).

860. Nannobrachium leucopsarum (Eigenmann & Eigenmann).

Pacific Coast of America from Alaska to San Diego.

Myctophum (*Stenobrachius*) *leucopsarum* Eigenmann & Eigenmann, Proc. Cal. Ac. Sci. 1890, 5, off Point Loma, California, in stomachs of *Sebastodes*.

861. Nannobrachium nannochir (Gilbert).

Alaska to Santa Barbara Islands, in deep water.

Myctophum nannochir Gilbert, Proc. U. S. Nat. Mus. 1890, 51, off Washington, at Albatross Stations 2925, 3072, and others, in 266 to 685 fathoms.

862. Nannobrachium mexicanum (Gilbert).

Coast of Lower California, in deep water.

Myctophum mexicanum Gilbert, Proc. U. S. Nat. Mus. 1890, 51, off Lower California, at Albatross Stations 3008 and 3009, in 306 and 857 fathoms.

863. Nannobrachium regale (Gilbert).

Santa Barbara Channel, in deep water.

Myctophum regale Gilbert, Proc. U. S. Nat. Mus. 1891, 544, Santa Barbara Channel, California, at Albatross Station 2923, in 822 fathoms.

864. Nannobrachium macdonaldi Goode & Bean.

Gulf Stream.

Nannobrachium macdonaldi Goode & Bean, Oceanic Ichthyology, 94, fig. 110, 1896, Gulf Stream.

Genus 263. DIAPHUS Eigenmann & Eigenmann.

Diaphus Eigenmann & Eigenmann, Proc. Cal. Ac. Sci., 2d series, III, 1890, 3 (*theta*).

865. Diaphus theta Eigenmann & Eigenmann.

Point Loma, near San Diego, to coast of Oregon.

Diaphus theta Eigenmann & Eigenmann, Proc. Cal. Ac. Sci., III, 1890, 4, Point Loma, near San Diego, California.

Genus 264. ÆTHOPRORA Goode & Bean.

Æthoprora Goode & Bean, Oceanic Ichthyology, 86, 1896 (*metopoclampum*).

866. Æthoprora lucida Goode & Bean.

Gulf Stream.

Æthoprora lucida Goode & Bean, Oceanic Ichthyology, 87, fig. 102, 1896, Gulf Stream, in latitude 19° 45′ N., longitude 75° 4′ W.

867. Æthoprora effulgens Goode & Bean.

Western Atlantic.

Æthoprora effulgens Goode & Bean, Oceanic Ichthyology, 87, fig. 103, 1896, Browns Bank and Albatross Station 2127, 19° 45′ N., 75° W.

Genus 265. COLLETTIA Goode & Bean.

Collettia Goode & Bean, Oceanic Ichthyology, 88, 1896 (*rafinesquei*).

868. Collettia rafinesquei (Cocco).

Mediterranean and Atlantic; Gulf Stream, off the New England coast.

Myctophus rafinesquei Cocco, Alcuni Salmon., etc., 20, 1820, Messina.

869. Collettia nocturna (Poey).

Coast of Cuba.

Myctophum nocturnum Poey, Memorias, II, 426, 1861, Cuba.

Genus 266. RHINOSCOPELUS Lütken.

Rhinoscopelus Lütken, Vid. Selsk. Natur. Kjöbenhavn, VII, 1892, 237 (*coccoi*).

870. Rhinoscopelus coccoi (Cocco).

Western Atlantic, Gulf Stream, Mediterranean, and ranging from Newfoundland to Africa.

Scopelus coccoi Cocco, Giorn. Sci. Litt. Art. Sicilia (No. 77), Palermo, 1829, 143 ("*Scopelo de Cocco*"), Palermo.

871. Rhinoscopelus andreæ (Lütken).
Open Atlantic and Indian Ocean; Gulf Stream.
Scopelus andreæ Lütken, Spolia Atlantica, Scopelini, 25, 1892, North Atlantic.

872. Rhinoscopelus rarus (Lütken).
Open Atlantic, west to 50° W., 33° N.
Scopelus rarus Lütken, Spolia Atlantica, Scopelini, 11, 26, 1892, North Atlantic

Genus 267. MYCTOPHUM Rafinesque.
Myctophum Rafinesque, Indice d'Ittiologia Siciliana, 56, 1810 (*punctatum*).

873. Myctophum punctatum Rafinesque.
Warmer parts of the Atlantic, Grand Banks, and from the Gulf Stream to the Mediterranean.
Myctophum punctatum Rafinesque, Indice d'Ittiologia Siciliana, 56, pl. 2, fig. 5, 1810, Palermo.

874. Myctophum affine (Lütken).
Open Atlantic, west to 63° W., 38° N.
Scopelus affinis Lütken, Spolia Atlantica, 11, 32, 1892, open Atlantic.

875. Myctophum opalinum Goode & Bean.
Western Atlantic.
Myctophum opalinum Goode & Bean, Oceanic Ichthyology, 72, fig. 81, 1896, Gulf Stream.

876. Myctophum humboldti (Risso).
Open seas, Mediterranean, and Atlantic on both shores.
Gasteropelecus humboldti Risso, Ichth. Nice, 358, 1810, Nice.

877. Myctophum californiense Eigenmann & Eigenmann.
Cortez Banks, near San Diego, California.
Myctophum californiense Eigenmann, West Am. Sci., November 9, 1889, 124, San Diego, California.

878. Myctophum gracile (Lütken).
Open Atlantic, west to 48° W., 23° N.
Scopelus gracilis Lütken, Spolia Atlantica, 11, 35, 1892, open Atlantic.

879. Myctophum benoiti (Cocco).
Mediterranean to Norway and Greenland.
Scopelus benoiti Cocco, Lett. su. Salmon., 12, pl. 2, fig. 4, 1838, Messina.

880. Myctophum hygomii (Lütken).
North Atlantic, occasional in our waters.
Scopelus hygomii Lütken, Spolia Atlantica, Scopelini, 256, 1892, North Atlantic.

Genus 268. BENTHOSEMA Goode & Bean.
Benthosema Goode & Bean, Oceanic Ichthyology, 75, 1896 (*mulleri*).

881. Benthosema mulleri (Gmelin).
North Atlantic, Norway to Greenland; South Carolina.
Salmo mulleri Gmelin, Syst. Nat., 1378, 1788, Norway; after Strom.

882. Benthosema arcticum (Lütken).
Davis Straits, Greenland.
Scopelus arcticum Lütken, Spolia Atlantica, Scopelini, 29, 1892, Davis Straits.

Genus 269. DASYSCOPELUS Günther.
Dasyscopelus Günther, Cat., v, 405, 1864 (*asper*).

883. Dasyscopelus spinosus (Steindachner).
Open seas; mid-Atlantic; Hawaiian Islands, etc.
Scopelus spinosus Steindachner, Sitzungsber. Ichth. Notiz., v, 11, 1867, China.

Genus 270. **TARLETONBEANIA** Eigenmann & Eigenmann.

Tarletonbeania Eigenmann & Eigenmann, Proc. Cal. Ac. Sci., IV, 1890, 7 (*tenua*).

884. Tarletonbeania crenularis (Jordan & Gilbert).

Santa Barbara Channel; coast of Washington.

Myctophum crenulare Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 274, Santa Barbara, California.

885. Tarletonbeania tenua Eigenmann & Eigenmann.

Coronado Islands, near San Diego.

Tarletonbeania tenua Eigenmann & Eigenmann, Proc. Cal. Ac. Sci., IV, 1890, 7, Coronado Islands, near San Diego, California.

Family LXXVI. MAUROLICIDÆ.

Genus 271. **MAUROLICUS** Cocco.

Maurolicus Cocco, Lett. su. Salmon., 32, 1838 (*amethystino* = *punctatus*).

886. Maurolicus pennanti (Walbaum).

Open seas, widely distributed; New England coast at Nahant, Provincetown, Woods Hole, etc.

Argentina pennanti Walbaum, Artedi Pisc., 47, 1792, England; after "*Sheppy argentine*" of Pennant.

Genus 272. **VINCIGUERRIA** Jordan & Evermann.

Vinciguerria Jordan & Evermann, Fishes North and Middle America, 577, 1896 (*attenuata*).

887. Vinciguerria attenuata (Cocco).

Open Atlantic, west to the Bahama region.

Maurolicus attenuatus Cocco, Lett. su. Salmon., 33, 1838, coast of Italy.

Genus 273. **VALENCIENNELLUS** Jordan & Evermann.

Valenciennellus Jordan & Evermann, Fishes North and Middle America, 577, 1896 (*tripunctulatus*).

888. Valenciennellus tripunctulatus (Esmark).

Madagascar; Denmark Straits, between Greenland and Iceland.

Maurolicus tripunctulatus Esmark, Christiania Vid. Selsk. Forh., 488, 1870, Madagascar.

Family LXXVII. CHAULIODONTIDÆ. The Viper-Fishes.

Genus 274. **GONOSTOMA** Rafinesque.

Gonostoma Rafinesque, Indice d'Ittiologia Siciliana, 64, 1810 (*denudatum*).

889. Gonostoma denudatum Rafinesque.

Gulf of Mexico at Albatross Station 2665; off Morocco and Cape Verdes; Mediterranean Sea.

Gonostoma denudata Rafinesque, Indice d'Ittiol. Sicil., 65, 1810, Palermo.

890. Gonostoma brevidens Kner & Steindachner.

Grenada; Bahama Channel; Bequia.

Gonostoma brevidens Kner & Steindachner, Sitzb. Akad. Wissensch., Wien, LXI, 1870, 443, Atlantic.

Genus 275. **BONAPARTIA** Goode & Bean.

Bonapartia Goode & Bean, Oceanic Ichthyology, 102, 1896 (*pedaliota*).

891. Bonapartia pedaliota Goode & Bean.

Gulf Stream.

Bonapartia pedaliota Goode & Bean, Oceanic Ichthyology, 102, fig. 120, 1896, Gulf Stream, at Albatross Station 2642.

Genus 276. CYCLOTHONE Goode & Bean.

Cyclothone Goode & Bean, Bull. Mus. Comp. Zool., x, No. 5, 221, 1882 (*lusca*).

Subgenus CYCLOTHONE Goode & Bean.

892. Cyclothone microdon (Günther).

Bermuda; Atlantic, Pacific, and Antarctic oceans; Pacific Coast from Oregon to Panama.

Gonostoma microdon Günther, Ann. Mag. Nat. Hist., II, 1878, 188, near Bermuda.

893. Cyclothone bathyphila (Vaillant).

Gulf of Gascony and off the Azores; western Atlantic.

Neostoma bathyphilum Vaillant, La Nature, 1884, 184, name and rough figure only.

Subgenus SIGMOPS Gill.

Sigmops Gill, Proc. U. S. Nat. Mus. 1883, 256 (*stigmaticus*).

894. Cyclothone elongata (Günther).

New Guinea; Banda; American coast; Gulf Stream; Indian Ocean.

Gonostoma elongatum Günther, Ann. Mag. Nat. Hist., II, 1878, 187, New Guinea; Banda.

Genus 277. YARRELLA Goode & Bean.

Yarrella Goode & Bean, Oceanic Ichthyology, 103, 1896 (*blackfordi*).

895. Yarrella blackfordi Goode & Bean.

Gulf Stream.

Yarrella blackfordi Goode & Bean, Oceanic Ichthyology, 103, fig. 121, 1896, Gulf Stream, at Albatross Station 2376, in 324 fathoms.

Genus 278. CHAULIODUS Bloch & Schneider.

Chauliodus Bloch & Schneider, Syst. Ichth., 430, 1801 (*sloanei*).

896. Chauliodus sloanei Bloch & Schneider.

Mediterranean and deep waters of the Atlantic; Georges Banks.

Chauliodus sloanei Bloch & Schneider, Syst. Ichth., 430, 1801, Atlantic; after *Vipera marina* of Catesby.

897. Chauliodus macouni Bean.

Coast of California to British Columbia and Queen Charlotte Islands.

Chauliodus macouni Bean, Proc. U. S. Nat. Mus. 1890, 44, off Queen Charlotte Islands.

Family LXXVIII. ASTRONESTHIDÆ.

Genus 279. ASTRONESTHES Richardson.

Astronesthes Richardson, Ichth. Voy. Sulph., 97, 1845 (*niger*).

898. Astronesthes niger Richardson.

Deep waters of all seas.

Astronesthes niger Richardson, Ichth. Voy. Sulph., 97, 1845, Atlantic.

899. Astronesthes gemmifer Goode & Bean.

Gulf Stream.

Astronesthes gemmifer Goode & Bean, Oceanic Ichthyology, 105, fig. 124, 1896, Grand Banks, latitude 44° 25′ N., longitude 53° 12′ W., in 300 fathoms.

900. Astronesthes richardsoni (Poey).

Deep waters of West Indies; Indian and Pacific oceans.

Chauliodus richardsoni Poey, Memorias, I, 176, 1855, Cuba.

Family LXXIX. STOMIATIDÆ.

Genus 280. STOMIAS Cuvier.

Stomias Cuvier, Règne Anim., ed. 1, 184, 1817 (*boa*).

901. Stomias ferox Reinhardt.

Greenland and southward; Gulf Stream from Bahama Channel to the Grand Banks.

Stomias ferox Reinhardt, Vidensk. Selsk. Naturv., etc., x, 77, 1842, Greenland.

902. Stomias affinis Günther.

Sombrero Island.

Stomias affinis Günther, Deep Sea Fishes, Challenger, XXII, 205, pl. 54, fig. A, 1887, off Sombrero Island.

Genus 281. ECHIOSTOMA Lowe.

Echiostoma Lowe, Proc. Zool. Soc. Lond. 1843, 87 (*barbatum*).

903. Echiostoma barbatum Lowe.

Madeira; Gloucester, Mass., and southward in the Gulf Stream to the old Bahama Channel.

Echiostoma barbatum Lowe, Proc. Zool. Soc. Lond. 1843, 88, Madeira.

904. Echiostoma margarita Goode & Bean.

Middle of the Gulf of Mexico.

Echiostoma margarita Goode & Bean, Oceanic Ichthyology, 109, fig. 131, 1896, Gulf of Mexico.

[illegible] 282. GRAMMATOSTOMIAS Goode & Bean.

Grammatostomias Goode & Bean, Oceanic Ichthyology, 110, 1896 (*dentatus*).

905. Grammatostomias dentatus Goode & Bean.

Gulf Stream.

Grammatostomias dentatus Goode & Bean, Oceanic Ichthyology, 110, fig. 133, 1896, Gulf Stream, in latitude 38° 19′ 20″ N., longitude 69° 2′ 30″ W.

Genus 283. PHOTONECTES Günther.

Photonectes Günther, Challenger Report, XXII, 212, 1887 (*albipinnis*).

906. Photonectes gracilis Goode & Bean.

Martinique.

Photonectes gracilis Goode & Bean, Oceanic Ichthyology, 112, 1896, off Martinique.

Family LXXX. MALACOSTEIDÆ.

Genus 284. MALACOSTEUS Ayres.

Malacosteus Ayres, Jour. Bost. Soc. Nat. Hist. 1849, 53 (*niger*).

907. Malacosteus niger Ayres.

Open sea; Gulf Stream and southward to Barbados.

Malacosteus niger Ayres, Jour. Bost. Soc. Nat. Hist. 1849, 53, Gulf Stream, 42° N., 60° W.

Family LXXXI. ALEPISAURIDÆ. The Lancet-Fishes.

Genus 285. ALEPISAURUS Lowe. *Lancet-fishes.*

Alepisaurus Lowe, Proc. Zool. Soc. Lond. 1833, 104 (*ferox*).

Subgenus ALEPISAURUS Lowe.

908. Alepisaurus ferox Lowe.

Deep waters of the Atlantic; coasts of Nova Scotia and Massachusetts, and the Grand Banks.

Alepisaurus ferox Lowe, Trans. Zool. Soc. Lond., I, 1833, 395, Madeira.

909. Alepisaurus æsculapius (Beau). *Sabatka; Wolf-fish.*
Coast of Alaska to California; Unalaska and elsewhere.
Alepidosaurus æsculapius Beau, Proc. U. S. Nat. Mus. 1882, 661. Unalaska.

Subgenus **CAULOPUS** Gill.
Caulopus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 128 (*altivelis*).

910. Alepisaurus altivelis Poey. *Conejo.*
Cuba.
Alepisaurus altivelis Poey, Memorias, II, 302, 1860, Cuba.

911. Alepisaurus borealis (Gill). *Handsaw-fish.*
Pacific Coast of America from Alaska to Puget Sound.
Alepidosaurus (*Caulopus*) *borealis* Gill, Proc. Ac. Nat. Sci. Phila. 1862, 128, Puget Sound.

912. Alepisaurus serra (Gill). *Serra.*
Monterey, California.
Alepidosaurus (*Caulopus*) *serra* Gill, Proc. Ac. Nat. Sci. Phila. 1862, 129, Monterey, California.

Family LXXXII. ODONTOSTOMIDÆ.

Genus 286. OMOSUDIS Günther.
Omosudis Günther, Challenger Report, XXII, 201, 1887 (*lowii*).

913. Omosudis lowii Günther.
Open sea; Gulf Stream, at Albatross Station 2392.
Omosudis lowii Günther, Challenger Report, XXII, 201, pl. 52, figs. *c*, *c'*, 1887, Philippine Islands; Magdalena.

Family LXXXIII. PARALEPIDIDÆ.

Genus 287. SUDIS Rafinesque.
Sudis Rafinesque, Caratteri di Alcuni Nuovi Generi, etc., 60, 1810 (*hyalina*).

914. Sudis intermedius (Poey).
Matanzas, Cuba.
Paralepis intermedius Poey, Repertorio, II, 416, 1867, Matanzas.

915. Sudis ringens Jordan & Gilbert.
Santa Barbara Channel, California.
Sudis ringens Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 273, Santa Barbara.

Genus 288. ARCTOZENUS Gill.
Arctozenus Gill, Proc. Ac. Nat. Sci. Phila. 1864, 188 (*borealis*).

916. Arctozenus borealis (Reinhardt).
Greenland and southward to Cape Ann.
Paralepis borealis Reinhardt, Naturv. Math. Afhandl., VII, 115, 1832, Greenland.

917. Arctozenus coruscans (Jordan & Gilbert).
Puget Sound.
Paralepis coruscans Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 411, harbor of Port Townsend, Washington.

Genus 289. PARALEPIS Risso.
Paralepis Risso, Hist. Nat. Eur. Mérid., III, 472, 1826 (*coregonoides*).

918. Paralepis coregonoides Risso.
Mediterranean; Gulf Stream at Albatross Station 2393.
Paralepis coregonoides Risso, Hist. Nat. Eur. Mérid., III, 472, pl. 7, fig. 15, 1826, Nice.

Family LXXXIV. STERNOPTYCHIDÆ.

Genus 290. STERNOPTYX Hermann.

Sternoptyx Hermann, Naturforscher, XVI, 8, 1771 (*diaphana*).

919. Sternoptyx diaphana Hermann.

Atlantic; Gulf Stream, from Santa Cruz Island to the Grand Banks.
Sternoptyx diaphana Hermann, Naturforscher, XVI, 8, 1771, Jamaica.

Genus 291. ARGYROPELECUS Cocco.

Argyropelecus Cocco, Giorn. Sci. Sicil., fasc. 77, 146, 1829 (*hemigymnus*).

920. Argyropelecus hemigymnus Cocco.

Atlantic and Mediterranean; Gulf Stream off southern New England.
Argyropelecus hemigymnus Cocco, Giorn. Sci. Sicil., fasc. 77, 146, 1829, coast of Italy.

921. Argyropelecus olfersi (Cuvier).

Open Atlantic; coast of Norway to Brazil and Cape of Good Hope, Grand Banks southward in the Gulf Stream.
Sternoptyx olfersi Cuvier, Règne Anim., ed. 2, II, 316, 1829, near Cape of Good Hope.

Family LXXXV. IDIACANTHIDÆ.

Genus 292. IDIACANTHUS Peters.

Idiacanthus Peters, Monatsber. Akad. Wiss. Berlin 1876, 846 (*fasciola*).

922. Idiacanthus ferox (Günther).

North Atlantic.
Bathyophis ferox Günther, Ann. Mag. Nat. Hist., II, 1878, 181, North Atlantic.

923. Idiacanthus antrostomus Gilbert.

Coast of southern California, in deep water.
Idiacanthus antrostomus Gilbert, Proc. U. S. Nat. Mus. 1890, 54, off southern California, at Albatross Station 2980, in 603 fathoms.

Order U. LYOPOMI.

Family LXXXVI. HALOSAURIDÆ.

Genus 293. HALOSAURUS Johnson.

Halosaurus Johnson, Proc. Zool. Soc. Lond. 1863, 406 (*oweni*).

924. Halosaurus oweni Johnson.

Madeira; Gulf Stream, at Albatross Station 2181; Guadeloupe and Santa Lucia.
Halosaurus oweni Johnson, Proc. Zool. Soc. Lond. 1863, 406, pl. 36, fig. 2, Madeira.

925. Halosaurus guntheri Goode & Bean.

Gulf Stream.
Halosaurus guntheri Goode & Bean, Oceanic Ichthyology, 131, 1896, Gulf Stream, in latitude 39° 13′ N., longitude 72° W., Albatross Station 2722.

Genus 294. ALDROVANDIA Goode & Bean.

Aldrovandia Goode & Bean, Oceanic Ichthyology, 132, 1896 (*rostratus*).

926. Aldrovandia rostrata (Günther).

Mid-Atlantic.
Halosaurus rostratus Günther, Ann. Mag. Nat. Hist., II, 1878, 252, mid-Atlantic.

927. Aldrovandia macrochir (Günther).

Marion Island; Blake Stations 308 and 325.
Halosaurus macrochir Günther, Ann. Mag. Nat. Hist., II, 1878, 251, between Cape of Good Hope and Kerguelen Island.

928. **Aldrovandia goodei** (Gill).

Gulf Stream, at Albatross Stations 2037 in 1,731 fathoms, 2051 in 1,106 fathom 2035 in 1,362 fathoms, and 2052 in 1,098 fathoms.

Halosaurus goodei Gill, Proc. U. S. Nat. Mus. 1883, 257, Gulf Stream, at Albatross Stations 2035, 2037, 2051, and 2052, off South Carolina.

929. **Aldrovandia gracilis** Goode & Bean.

Gulf Stream and Gulf of Mexico.

Aldrovandia gracilis Goode & Bean, Oceanic Ichthyology, 134, fig. 157, 1896, off Guadeloupe, and in Gulf Stream at Albatross Station 2380, latitude 28° 2′ 30″ N., longitude 87° 43′ 45″ W.; also Albatross Station 2381, latitude 28° 5′ N., longitude 87° 56′ 15″ W.

930. **Aldrovandia pallida** Goode & Bean.

Gulf Stream, at Albatross Station 173 in 955 fathoms in Gulf Stream.

Aldrovandia pallida Goode & Bean, Oceanic Ichthyology, 135, fig. 158, 1896, Gulf of Mexico.

Order V. HETEROMI. The Spiny Eels.

Family LXXXVII. NOTACANTHIDÆ.

Genus 295. NOTACANTHUS Bloch.

Notacanthus Bloch, Abhandl. Böhmischen Gesellsch. der Wissenschaft, I, 278, 1787 (*chemnitzii*) (*nasus*).

931. **Notacanthus chemnitzii** Bloch.

Greenland; West Indies; Iceland; Scandinavia; South Greenland.

Notacanthus chemnitzii Bloch, Abhandl. Böhmischen Gesellsch. der Wissenschaft, I, 278, 1787, Northern Sea.

932. **Notacanthus analis** Gill.

Gulf Stream.

Notacanthus analis Gill, Proc. U. S. Nat. Mus. 1883, 255, latitude 40° N., longitude 69° W., at Albatross Stations 2677 in 478 fathoms, and 2676 in 407 fathoms.

933. **Notacanthus phasganorus** Goode.

Grand Banks, Newfoundland.

Notacanthus phasganorus Goode, Proc. U. S. Nat. Mus., III, 1880, 535, Grand Banks of Newfoundland.

Genus 296. MACDONALDIA Goode & Bean.

Macdonaldia Goode & Bean, Proc. U. S. Nat. Mus. 1894 (1895), 467 (*rostrata*).

934. **Macdonaldia rostrata** (Collett).

Gulf Stream.

Notacanthus rostratus Collett, Bull. Soc. Zool. France, 1889, 307, off Newfoundland, at Albatross Stations 2216 in 963 fathoms, and 2553 in 551 fathoms.

935. **Macdonaldia challengeri** (Vaillant).

North Pacific and Bering Sea.

Notacanthus challengeri Vaillant, Expédition Travailleur et Talisman, 1888, south of Yeddo.

Family LXXXVIII. LIPOGENYIDÆ.

Genus 297. LIPOGENYS Goode & Bean.

Lipogenys Goode & Bean, Proc. U. S. Nat. Mus. 1894 (1895), 469 (*gillii*).

936. **Lipogenys gillii** Goode & Bean.

Gulf Stream.

Lipogenys gillii Goode & Bean, Proc. U. S. Nat. Mus. 1894 (1895), 469, pl. 18, fig. 3, and in Oceanic Ichthyology, 173, 1896, Station 2742, Gulf Stream.

Order W. XENOMI.

Family LXXXIX. DALLIIDÆ. The Alaska Blackfishes

Genus 298. DALLIA Bean.

Dallia Bean, Proc. U. S. Nat. Mus. 1879, 358 (*pectoralis*).

937. Dallia pectoralis Bean. *Alaska Blackfish; Charnia Ryba.*

Northern Alaska and Siberia.

Dallia pectoralis Bean, Proc. U. S. Nat. Mus. 1879, 358, St. Michaels, Alaska.

Order X. HAPLOMI. The Pike-like Fishes.

Family XC. UMBRIDÆ. The Mud Minnows.

Genus 299. UMBRA (Krämer) Müller.

Umbra Krämer, Anim. Austr. Infer. 1756; Müller, Abhandl. Akad. Wiss. Wien, Berlin, 188, 1842 (*crameri*).

Subgenus MELANURA Agassiz.

Melanura Agassiz, Am. Jour. Sci. Arts 1854, 135 (*annulata*, etc., =*pygmæa*).

938. Umbra limi (Kirtland). *Mud Minnow; Dogfish.*

Quebec to Minnesota and southward to the Ohio River.

Hydrargyra limi Kirtland, Bost. Jour. Nat. Hist., III, 1840, 277, streams in northern Ohio.

939. Umbra pygmæa (DeKay). *Eastern Mud Minnow.*

Lowland streams and coastwise swamps from Long Island to Neuse River.

Leuciscus pygmæus DeKay, New York Fauna: Fishes, 214, 1842, Tappan, Rockland County, New York.

Family XCI. LUCIIDÆ. The Pikes.

Genus 300. LUCIUS Rafinesque.

Lucius Rafinesque, Caratteri di Alcuni Nuovi Generi, 59, 1810 (*lucius*).

Subgenus KENOZA Jordan & Evermann.

Kenoza Jordan & Evermann, Fishes North and Middle America, 625, 1896 (*americanus*).

940. Lucius americanus (Gmelin). *Banded Pickerel.*

Massachusetts to Florida, east of Alleghany Mountains; Escambia River at Flomaton, Alabama.

Esox lucius (*B. americanus*) Gmelin, Syst. Nat., 1390, 1788, Long Island, New York; after Schöpf.

941. Lucius vermiculatus (LeSueur). *Little Pickerel.*

Mississippi Valley, tributaries of Lake Erie and Lake Michigan, south to Mississippi and Arkansas.

Esox vermiculatus LeSueur, in Cuvier & Valenciennes, Hist. Nat. Poiss., XVIII, 333, 1846, Wabash River, New Harmony, Indiana.

942. Lucius reticulatus (LeSueur). *Common Eastern Pickerel; Green Pike; Jack.*

Maine to Florida, Louisiana, Arkansas, and Tennessee.

Esox reticulatus LeSueur, Jour. Ac. Nat. Sci. Phila., I, 1818, 414, Connecticut River, Adams, Massachusetts; Philadelphia.

Subgenus LUCIUS Rafinesque.

943. Lucius lucius (Linnæus). *Common Pike; Pickerel.*

Fresh waters of the northern parts of Europe, Asia, and North America, north to Alaska and Siberia; in the eastern United States south to New York and the Ohio River; in Europe south to Italy and Greece.

Esox lucius Linnæus, Syst. Nat., ed. X, 314, 1758, Europe.

Subgenus MASCALONGUS Jordan.

Mascalongus Jordan, Klippart's Report Ohio Fish Com., 92, 1878 (*nobilior*).

944. Lucius masquinongy (Mitchill). *Muskallunge; Maskinongy; Muscalonge.*

Great Lakes region; Upper Mississippi Valley and northward.

Esox masquinongy Mitchill, Mirror, 1824, 297.

944a. Lucius masquinongy ohiensis (Kirtland). *Ohio Muscalonge.*

Ohio River and its tributaries.

Esox ohiensis Kirtland, Proc. Cleveland Ac. Nat. Sci., February 7, 1854, 85, Mahoning River, Ohio.

944b. Lucius masquinongy immaculatus (Garrard). *Great Northern Pike.*

Lakes of Wisconsin and Minnesota; also in Chautauqua Lake and Conneaut Lake.

Esox immaculatus Garrard MS., noticed in different fishing journals; Jordan, Manual, ed. 5, 89, 1888, Eagle Lake, northern Wisconsin.

Family XCII. PŒCILIIDÆ. The Killifishes.

Genus 301. **FUNDULUS** Lacépède. *Killifishes.*

Fundulus Lacépède, Hist. Nat. Poiss., v, 37, 1803 (*mudfish*).

Subgenus FUNDULUS Lacépède.

945. Fundulus punctatus Günther.

Chiapas.

Fundulus punctatus Günther, Cat., VI, 320, 1866, Chiapas.

946. Fundulus vinctus Jordan & Gilbert.

Coast of Lower California.

Fundulus vinctus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 355, Cape San Lucas.

947. Fundulus pallidus Evermann.

Galveston Bay and Swan Lake, Texas.

Fundulus pallidus Evermann, Bull. U. S. Fish Com. 1891 (1892), 84, Swan Lake, near Galveston Bay, Galveston, Texas.

948. Fundulus similis (Baird & Girard). *Sac-a-Lait.*

Coast of the Gulf States.

Hydrargyra similis Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1853, 389, Indianola, Texas.

949. Fundulus majalis (Walbaum). *Killifish; Mayfish; Rockfish.*

Cape Cod to Florida.

Cobitis majalis Walbaum, Artedi Pisc., 12, 1792, Long Island.

950. Fundulus parvipinnis Girard.

Coast of California from Point Conception southward to Lower California.

Fundulus parvipinnis Girard, Proc. Ac. Nat. Sci. Phila. 1854, 154, San Diego.

951. Fundulus lima Vaillant.

Lower California.

Fundulus lima Vaillant, Bull. Soc. Philom. 1894, 71, San Ignatio de Caracamande, Lower California.

952. Fundulus heteroclitus (Linnæus). *Common Killifish; Mudfish; Mud Dabbler; Mummichog; Cobbler.*

Coast of Maine to the Rio Grande; Gulf Coast.

Cobitis heteroclita Linnæus, Syst. Nat., ed. XII, 500, 1766, Charleston; after the *Mudfish* of Dr. Garden.

952a. Fundulus heteroclitus grandis (Baird & Girard).

Gulf Coast of United States.

Fundulus grandis Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1853, 389, Indianola, Texas.

953. Fundulus ocellaris Jordan & Gilbert.

Gulf Coast of Florida to Louisiana.

Fundulus ocellaris Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 255, Pensacola, Florida, in salt water.

954. Fundulus fonticola Cuvier & Valenciennes.

Mountain springs in Porto Rico.

Fundulus fonticola Cuvier & Valenciennes, Hist. Nat. Poiss., XVIII, 198, 1846, Porto Rico.

955. Fundulus bermudæ Günther. *Mangrove Minnow.*

Bermudas.

Fundulus bermudæ Günther, Ann. Mag. Nat. Hist. 1874, 4, reprint, Bermudas.

956. Fundulus robustus Bean.

Streams of Guanajuato.

Fundulus robustus Bean, Proc. U. S. Nat. Mus. 1892, 285, Guanajuato.

957. Fundulus labialis Günther.

River of Guatemala.

Fundulus labialis Günther, Cat., VI, 319, 1866, Rio San Geronimo; Yzabal.

Subgenus FONTINUS Jordan & Evermann.

Fontinus Jordan & Evermann, Fishes North and Middle America, 645, 1896 (*seminolis*).

958. Fundulus adinia Jordan & Gilbert.

Rio Grande Basin.

Fundulus adinia Jordan & Gilbert, Synopsis, 335, 1883, Rio Grande at Brownsville, Texas.

959. Fundulus diaphanus (LeSueur).

Maine to Cape Hatteras in river mouths; New York to northern Illinois in lakes.

Hydrargyra diaphana LeSueur, Jour. Ac. Nat. Sci. Phila., I, 1817, 130, Saratoga Lake, New York.

959a. Fundulus diaphanus menona (Jordan & Copeland).

Ohio westward to the Mississippi River; Lake Menona, near Madison, Wis.

Fundulus menona Jordan & Copeland, Proc. Ac. Nat. Sci. Phila. 1877, 68, lakes about Madison, Wisconsin.

960. Fundulus extensus Jordan & Gilbert.

Coast of Lower California.

Fundulus extensus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 355, Cape San Lucas.

961. Fundulus seminolis Girard.

Florida.

Fundulus seminolis Girard, Proc. Ac. Nat. Sci. Phila. 1859, 59, Palatka, eastern Florida.

Subgenus PLANCTERUS Garman.

Plancterus Garman, Cyprinodonts, 96, 1895 (*kansæ=zebrinus*).

962. Fundulus zebrinus Jordan & Gilbert.

Kansas to Texas and New Mexico, in upper tributaries of Arkansas and Red rivers.

Fundulus zebrinus Jordan & Gilbert, Synopsis, 891, 1883 (substitute for *zebra* Girard, preoccupied), streams between Fort Defiance and Fort Union, New Mexico; doubtless headwaters of Canadian River, near Fort Union.

Subgenus XENISMA Jordan.

Xenisma Jordan, Bull. Buffalo Soc. Nat. Hist. 1876, 142 (*stellifera*).

963. Fundulus catenatus (Storer). *Studfish.*

Tennessee and Cumberland rivers and clear streams of the Ozark Mountains.

Pœcilia catenata Storer, Synopsis, 430, 1846, Tennessee River, Florence, Alabama.

964. Fundulus stellifer (Jordan). *Studfish.*

Alabama River and tributaries.

Xenisma stellifera Jordan, Ann. Lyc. Nat. Hist. N. Y. 1876, 322, Etowah and Oostanaula rivers, Rome, Georgia.

Subgenus GAMBUSINUS Jordan & Evermann.

Gambusinus Jordan & Evermann, Fishes North and Middle America, 649, 1896 (*rathbuni*).

965. Fundulus lineatus (Garman).

Northeastern Wyoming.

Zygonectes lineatus Garman, Bull. Mus. Zool., VIII, No. 3, 88, 1881, northeastern Wyoming.

966. Fundulus rathbuni Jordan & Meek.

Eastern North Carolina.

Fundulus rathbuni Jordan & Meek, Proc. U. S. Nat. Mus. 1888, 356, Reedy Fork, Allemance Creek, Buffalo Creek, and other tributaries of Cape Fear River about Greensboro, North Carolina; Jumping Run, tributary of Yadkin River, Salisbury, North Carolina.

967. Fundulus albolineatus Gilbert.

Tennessee Basin in Alabama.

Fundulus albolineatus Gilbert, Bull. U. S. Fish Com. 1889, 149, Spring Creek, Huntsville, Alabama.

968. Fundulus confluentus Goode & Bean.

Eastern Florida.

Fundulus confluentus Goode & Bean, Proc. U. S. Nat. Mus. 1879, 118, Lake Monroe, Florida.

969. Fundulus funduloides (Evermann).

Coast of Texas.

Zygonectes funduloides Evermann, Bull. U. S. Fish. Com. 1891 (1892), 85, Dickinson Bayou, Dickinson, Texas, on Galveston Bay.

Subgenus ZYGONECTES Agassiz.

Zygonectes Agassiz, Am. Jour. Sci. Arts 1854, 135 (*olivacea* = *notatus*).

970. Fundulus macdonaldi (Meek).

Tributaries of Gasconade and Neosho rivers, southern Missouri.

Zygonectes macdonaldi Meek, Bull. U. S. Fish Com. 1889, 122, Jones Creek, Dixon, Mo.; Osage Fork of Gasconade River, at Mansfield; Neosho River.

971. Fundulus floripinnis (Cope).

Platte River and Arkansas River, in Colorado; Cherry Creek, a tributary of the Arkansas.

Haplochilus floripinnis Cope, Zool. Lieut. Wheeler's Expl. W. 100th Mer., v, 695, 1876, Platte River, at Denver, Colorado.

972. Fundulus jenkinsi (Evermann).

Coast of Texas.

Zygonectes jenkinsi Evermann, Bull. U. S. Fish Com. 1891 (1892), 86, Dickinson Bayou, Galveston Bay.

973. Fundulus pulvereus (Evermann).

Coast of Texas.

Zygonectes pulvereus Evermann, Bull. U. S. Fish Com. 1891 (1892), 85, Dickinson Bayou; Buffalo Bayou at Houston; Oso Creek at Corpus Christi, Texas.

974. Fundulus arlingtonius (Goode & Bean).

Arlington River, a tributary of St. Johns River, Florida.

Gambusia arlingtonia Goode & Bean, Proc. U. S. Nat. Mus. 1879, 118, Arlington River, Florida.

975. Fundulus henshalli (Jordan).

Southern Florida.

Zygonectes henshalli Jordan, Proc. U. S. Nat. Mus. 1879, 237, San Sebastian River, Florida.

976. Fundulus rubrifrons (Jordan).

Eastern Florida.

Zygonectes rubrifrons Jordan, Proc. U. S. Nat. Mus. 1879, 237, San Sebastian River, Florida.

977. Fundulus scartes Meek.

Eastern Arkansas.

Fundulus scartes Meek, Bull. U. S. Fish Com. 1895 (1896), 347, St. Francis River, Big Bay, Arkansas.

978. Fundulus sciadicus Cope.

Middle Missouri River basin.

Fundulus sciadicus Cope, Proc. Ac. Nat. Sci. Phila. 1865, 78, Platte River, Nebraska.

979. Fundulus luciæ (Baird & Girard).

Atlantic Coast from Long Island to Virginia.

Hydragyra luciæ Baird, Ninth Smithson. Rept. 1855, 344, Beesley Point, New Jersey.

980. Fundulus goodei (Jordan).

Everglades region; Alligator, Arlington, Peace, and Withlacoochee rivers.

Lucania goodei Jordan, Proc. U. S. Nat. Mus. 1879, 240, Arlington River, Florida, a tributary of the St. Johns.

981. Fundulus chrysotus Holbrook.

South Carolina to Florida.

Fundulus chrysotus Holbrook MS., 1860, Charleston, South Carolina.

982. Fundulus cingulatus Cuvier & Valenciennes.

South Carolina to Florida; Escambia River at Flomaton, Alabama.

Fundulus cingulatus Cuvier & Valenciennes, Hist. Nat. Poiss., XVIII, 197, 1846, "United States."

983. Fundulus nottii (Agassiz). *Star-headed Minnow.*

Florida and neighboring States.

Zygonectes nottii Agassiz, Am. Jour. Sci. Arts 1854, 353, Mobile, Alabama.

984. Fundulus guttatus (Agassiz).

Florida to Texas.

Zygonectes guttatus Agassiz, Am. Jour. Sci. Arts 1854, 353, Mobile, Alabama.

985. Fundulus dispar (Agassiz).

Northern Ohio to Illinois, south to Mississippi; Maumee, Wabash, Big Black, and Pearl rivers.

Zygonectes dispar Agassiz, Am. Jour. Sci. Arts 1854, 353, creeks opposite St. Louis; Beardstown, Illinois.

986. Fundulus notatus (Rafinesque). *Top Minnow.*

Michigan to Alabama, Mississippi, and Texas.

Semotilus notatus Rafinesque, Ichth. Ohiensis, 86, 1820, tributaries of Ohio River in Kentucky.

Genus 302. APLOCHEILUS McClelland.

Aplocheilus McClelland, Ind. Cypr. As. Res., XIX, 301, 1839 (*chrysostigmus*=*panchax*).

987. Aplocheilus dovii (Günther).

Coast of Costa Rica.

Haplochilus dovii Günther, Cat., VI, 316, 1866, Punta Arenas, Costa Rica.

Genus 303. ADINIA Girard.

Adinia Girard, Proc. Ac. Nat. Sci. Phila. 1859, 117 (*multifasciata*).

988. Adinia guatemalensis (Günther).

Guatemala, south to western Ecuador.

Fundulus guatemalensis Günther, Cat., VI, 321, 1866, Lake of Duenas, Lake Amatitlan, Rio Guacalate, and western Ecuador.

989. Adinia pachycephala (Günther).

Guatemala.

Fundulus pachycephalus Günther, Cat., VI, 321, 1866, Lake Atitlan, Guatemala.

990. Adinia dugesii (Bean).

Guanajuato, Mexico.

Fundulus dugesii Bean, Proc. U. S. Nat. Mus. 1887, 373, Guanajuato.

991. Adinia multifasciata Girard.

Gulf Coast, western Florida to Texas.

Adinia multifasciata Girard, Proc. Ac. Nat. Sci. Phila. 1859, 11, Galveston, St. Joseph Island, and Indianola, Texas.

Genus 304. RIVULUS Poey.

Rivulus Poey, Memorias de Cuba, II, 307, 1860 (*cylindraceus*).

992. Rivulus cylindraceus Poey.

Havana, Cuba.

Rivulus cylindraceus Poey, Memorias, II, 308, 1860, stream at Mordazo, near Havana, Cuba.

993. Rivulus marmoratus Poey.

Cuba.

Rivulus marmoratus Poey, Anales de Hist. Nat. España, IX, 1880, 248, Cuba.

994. Rivulus isthmensis Garman.

Costa Rica.

Rivulus isthmensis Garman, Cyprinodonts, 140, 1895, Rio San Jose, Costa Rica.

Genus 305. LUCANIA Girard.

Lucania Girard, Proc. Ac. Nat. Sci. Phila. 1859, 118 (*venusta*); not *Lucanus*, a genus of beetles.

995. Lucania ommata (Jordan).

Florida; Indian River; Santa Fe River, Florida, and its tributaries.

Heterandria ommata Jordan, Proc. U. S. Nat. Mus. 1881, 323, Indian River, Florida.

996. Lucania venusta (Girard).

Gulf of Mexico; Pensacola; mouth of the Rio Grande.

Limia venusta Girard, U. S. Mex. Bound. Surv., Ichth., 71, 1859, Indianola, Tex.

997. Lucania parva (Baird & Girard). *Rainwater-fish.*

Atlantic Coast from Connecticut to Key West.

Cyprinodon parvus Baird & Girard, Ninth Smithson. Rept. 1855, 345, Long Island.

Genus 306. GIRARDINICHTHYS Bleeker.

Girardinichthys Bleeker, Cyprin., 481, 1860 (*innominatus*).

998. Girardinichthys innominatus Bleeker.

City of Mexico.

Girardinichthys innominatus Bleeker, Cyprin., 484, 1860; after Girard.

Genus 307. **EMPETRICHTHYS** Gilbert.

Empetrichthys Gilbert, Death Valley Exped., Fishes, 233, 1893 (*merriami*).

999. Empetrichthys merriami Gilbert.

Death Valley in eastern California.

Empetrichthys merriami Gilbert, Fishes of Death Valley Expedition, in North American Fauna No. 7, 234, May 31, 1893, Ash Meadows, Amargosa Desert, on boundary between California and Nevada.

Genus 308. **CHARACODON** Günther.

Characodon Günther, Cat., VI, 308, 1866 (*lateralis*).

1000. Characodon lateralis Günther.

Central America.

Characodon lateralis Günther, Cat., VI, 308, 1866, Central America.

1001. Characodon bilineatus Bean.

Rio Lerma, Guanajuato.

Characodon bilineatus Bean, Proc. U. S. Nat. Mus. 1887, 371, Guanajuato.

1002. Characodon variatus Bean.

Tributaries of Rio Lerma, about Guanajuato and Mexico.

Characodon variatus Bean, Proc. U. S. Nat. Mus. 1887, 370, Guanajuato.

1003. Characodon luitpoldi Steindachner.

Lake Pátzcuaro, Mexico.

Characodon luitpoldi Steindachner, Anzeiger der kais. Akad. Wissench. 1894, 147, Lake Pátzcuaro, Mexico.

1004. Characodon furcidens Jordan & Gilbert.

Cape San Lucas southward to Colima, Mexico.

Characodon furcidens Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 354, Cape San Lucas, Lower California.

1005. Characodon eiseni Rutter.

Tepic, Mexico.

Characodon eiseni Rutter, Proc. Cal. Ac. Sci. 1896, 265, Tepic, Jalisco, Mexico.

Genus 309. **CYPRINODON** Lacépède.

Cyprinodon Lacépède, Hist. Nat. Poiss., V, 486, 1803 (*variegatus*).

1006. Cyprinodon variegatus Lacépède. *Sheepshead Minnow.*

Cape Cod to the Rio Grande.

Cyprinodon variegatus Lacépède, Hist. Nat. Poiss., V, 486, 1803, South Carolina.

1006a. Cyprinodon variegatus riverendi (Poey).

Cuba and Florida Keys; Key West.

Trifarcius riverendi Poey, Memorias, II, 306, 1860, Havana.

1007. Cyprinodon eximius Girard.

Chihuahua, Mexico.

Cyprinodon eximius Girard, Proc. Ac. Nat. Sci. Phila. 1859, 158, Chihuahua River, Mexico.

1008. Cyprinodon bovinus Baird & Girard.

Leon Springs, Texas.

Cyprinodon bovinus Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1853, 389, Leon Springs, Texas.

1009. Cyprinodon macularius Baird & Girard.

Southern Nevada to Sonora; Ash Meadows, Nevada; Medbury Springs, Amargosa Desert, California; Saratoga Spring, Death Valley.

Cyprinodon macularius Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1853, 389, Rio San Pedro.

1010. Cyprinodon baileyi (Gilbert).
Pahranagat Valley, Nevada.
Cyprinodon macularius baileyi Gilbert, Death Valley Exped., 233, 1893, Pahranagat Valley, Nevada.

1011. Cyprinodon elegans Baird & Girard.
Rio Grande; Rio de los Conchos, Chihuahua.
Cyprinodon elegans Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1853, 389, Comanche Spring, Texas.

1012. Cyprinodon martæ Steindachner.
Santa Marta, coast of Colombia, South America.
Cyprinodon martæ Steindachner, Ichth. Beitr., IV, 61, 1875, Santa Marta, Caribbean Sea.

1013. Cyprinodon carpio Günther.
Coasts of Florida.
Cyprinodon carpio Günther, Cat., VI, 306, 1866, America, locality unknown.

1014. Cyprinodon felicianus (Poey).
Cuba.
Trifarcius felicianus Poey, Synopsis, 412, 1867, Havana.

1015. Cyprinodon latifasciatus Garman.
Parras, Coahuila, Mexico.
Cyprinodon latifasciatus Garman, Bull. Mus. Comp. Zool., VIII, No. 3, 92, 1881, Parras, Mexico.

Genus 310. JORDANELLA Goode & Bean.
Jordanella Goode & Bean, Proc. U. S. Nat. Mus., II, 1879, 177 (*floridæ*).

1016. Jordanella floridæ Goode & Bean.
Florida, in San Sebastian, St. Johns, Alligator, Withlacoochee, Hillsboro, Pease, and Myakka rivers; also in Lakes Monroe, Jessup, and Tohopekaliga, Florida.
Jordanella floridæ Goode & Bean, Proc. U. S. Nat. Mus., II, 1879, 117, Lake Monroe, Florida.

Genus 311. PSEUDOXIPHOPHORUS Bleeker.
Pseudoxiphophorus Bleeker, Ichthyol. Ind. Prodr. Cypr., 483, 1860 (*bimaculatus*).

1017. Pseudoxiphophorus bimaculatus (Heckel).
Central Mexico; Rio Blanco, Orizaba.
Xiphophorus bimaculatus Heckel, Sitzungsber. Akad. Wiss. Wien 1848, 169, Mexico.

Genus 312. GAMBUSIA Poey.
Gambusia Poey, Memorias de Cuba, I, 382, 1855 (*punctata*).

1018. Gambusia punctata Poey. *Guajacon.*
Cuba; Rio Almendares.
Gambusia punctata Poey, Memorias, I, 384, 1855, Cuba.

1019. Gambusia puncticulata Poey.
Cuba.
Gambusia puncticulata Poey, Memorias, I, 386, 1855, Cuba.

1020. Gambusia infans Woolman.
Rio Lerma, Salamanca, Mexico.
Gambusia infans Woolman, Bull. U. S. Fish Com. 1894, 62, Rio Lerma, Salamanca, Mexico.

1021. Gambusia affinis (Baird & Girard). *Top Minnow.*
South Atlantic and Gulf coasts, Delaware to Mexico, and northward to southern Illinois.
Heterandria affinis Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1853, 390, Rio Medina and Rio Salado, Texas.

1022. Gambusia nobilis (Baird & Girard).
Southern Illinois to the Rio Grande region; Chihuahua River.
Heterandria nobilis Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1853, 390, Leona and Comanche Springs, Texas; Rio Grande del Norte.

1023. Gambusia nicaraguensis Günther.
Lakes of Nicaragua.
Gambusia nicaraguensis Günther, Cat., VI, 336, 1866, lakes of Nicaragua.

1024. Gambusia gracilis (Heckel).
Orizaba, Mexico.
Xiphophorus gracilis Heckel, Sitzungsber. Akad. Wiss. Wien, I, 1848, 300, Orizaba, Mexico.

1025. Gambusia episcopi Steindachner.
Isthmus of Panama at Obispo Station
Gambusia episcopi Steindachner, Ichth. Beitr., VI, 9, 1878, Obispo, near Panama.

1026. Gambusia melapleura (Gosse).
Streams of Jamaica.
Pœcilia melapleura Gosse, Sojourn Jamaica, 84, pl. 1, fig. 3, 1851, Jamaica.

1027. Gambusia tridentiger Garman.
Isthmus of Panama in fresh water.
Gambusia tridentiger Garman, Cyprinodonts, 89, pl. 4, fig. 10, 1895, Panama.

Genus 313. BELONESOX Kner.
Belonesox Kner, Sitzungsber. Akad. Wiss. Wien 1860, XL, 419 (*belizanus*).

1028. Belonesox belizanus Kner.
Southern Mexico, Honduras, and Guatemala.
Belonesox belizanus Kner, Sitzungsber. Akad. Wiss. Wien 1860, 419, with figure, Balize.

Genus 314. ANABLEPS (Artedi) Bloch.
Anableps (Artedi) Bloch, Ichthyologia, VIII, 7, 1795 (*tetrophthalmus=anableps*).

1029. Anableps dovii Gill.
Central America, from Chiapas to the Isthmus of Panama.
Anableps dovii Gill, Proc. Ac. Nat. Sci. Phila. 1861, 4, Panama.

Genus 315. GOODEA Jordan.
Goodea Jordan, Proc. U. S. Nat. Mus. 1879, 299 (*atripinnis*).

1030. Goodea atripinnis Jordan.
Guanajuato, Mexico.
Goodea atripinnis Jordan, Proc. U. S. Nat. Mus. 1879, 299, Leon in Guanajuato.

Genus 316. PLATYPŒCILUS Günther.
Platypœcilus Günther, Cat., VI, 350, 1866 (*maculatus*).

1031. Platypœcilus maculatus Günther.
Mexico.
Platypœcilus maculatus Günther, Cat., VI, 350, Mexico.

1032. Platypœcilus mentalis Gill.
Atlantic side of Isthmus of Panama.
Platypœcilus mentalis Gill, Proc. Ac. Nat. Sci. Phila. 1876, 335, Isthmus of Panama.

Genus 317. GLARIDICHTHYS Garman.

Glaridichthys Garman, American Naturalist, March, 1896, 232 (*uninotatus*); substitute for *Glaridodon*, preoccupied.

1033. Glaridichthys uninotatus (Poey).

Cuba.
Girardinus uninotatus Poey, Memorias, II, 309, 1860, Rio Tacotaco, Cuba.

1034. Glaridichthys latidens (Garman).

Chihuahua, Mexico.
Glaridodon latidens Garman, Cyprinodonts, 42, pl. 5, fig. 11, 1895, Chihuahua, Mexico.

Genus 318. GIRARDINUS Poey.

Girardinus Poey, Memorias, I, 383, 1855 (*metallicus*).

1035. Girardinus metallicus Poey.

Cuba.
Girardinus metallicus Poey, Mem. Cuba, I, 387, lam. 31, fig. 8–11, 1855, Cuba.

1036. Girardinus denticulatus Garman.

Streams of Cuba.
Girardinus denticulatus Garman, Cyprinodonts, 47, 1895, Remedios, Cuba.

1037. Girardinus creolus Garman.

Cuba.
Girardinus creolus Garman, Cyprinodonts, 47, pl. 5, fig. 9 (teeth), 1895, Cuba.

1038. Girardinus pleurospilus Günther.

Guatemala.
Girardinus pleurospilus Günther, Cat., VI, 353, 1866, Lake of Duenas.

Genus 319. PŒCILIA Bloch & Schneider.

Pœcilia Bloch & Schneider, Syst. Ichthyologia, 452, 1801 (*vivipara*).

1039. Pœcilia versicolor (Günther).

San Domingo.
Girardinus versicolor Günther, Cat., VI, 352, 1866, San Domingo.

1040. Pœcilia occidentalis (Baird & Girard).

Gila Basin, Arizona; Yaqui River, Sonora; Tucson, Arizona.
Heterandria occidentalis Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1853, 390, Rio Santa Cruz, near Tucson, Arizona.

1041. Pœcilia pœciloides (De Filippi).

Barbados.
Lebistes pœciloides De Filippi, Arch. Zool. Anat., I, 1862, 69, Barbados.

1042. Pœcilia vivipara Bloch & Schneider.

Brazil; Guiana; Martinique.
Pœcilia vivipara Bloch & Schneider, Syst. Ichthyol., 452, 1801, tab. 86, fig. 2, Surinam.

1043. Pœcilia butleri Jordan.

Rio Presidio, near Mazatlan, Mexico.
Pœcilia butleri Jordan, Proc. U. S. Nat. Mus. 1888, 330, Rio Presidio, Mazatlan.

1044. Pœcilia gillii (Kner & Steindachner).

Rio Chagres, Panama.
Xiphophorus gillii Kner & Steindachner, Abh. Bayer. Akad. 1864, 28, 1866, Rio Chagres, Panama.

1045. Pœcilia vittata Guichenot. *Fanguito; Guajica.*

Cuba.
Pœcilia vittata Guichenot, in Ramon de la Sagra, Hist. Nat. Cuba, Poiss., 146, 1850, Cuba.

1046. Pœcilia mexicana Steindachner.

Southern Mexico and Central America; Chiapas; Duenas, and Vera Paz.
Pœcilia mexicana Steindachner, Sitzungsber. Akad. Wiss. Wien 1863, 178, southern Mexico.

1047. Pœcilia thermalis Steindachner.

Warm Springs, etc., in Central America.
Pœcilia thermalis Steindachner, Sitzungsber. Akad. Wiss. Wien 1863, 181, Warm Springs, in Central America.

1048. Pœcilia chisoyensis Günther.

Rio Chisoy, Vera Paz.
Pœcilia chisoyensis Günther, Cat., VI, 342, Rio Chisoy.

1049. Pœcilia petenensis Günther.

Lake Peten, Yucatan.
Pœcilia petenensis Günther, Cat., VI, 342, 1866, Lake Peten, Yucatan.

1050. Pœcilia sphenops Cuvier & Valenciennes.

Vera Cruz, Mexico.
Pœcilia sphenops Cuvier & Valenciennes, Hist. Nat. Poiss., XVIII, 130, 1846, Vera Cruz, Mexico.

1051. Pœcilia dovii Günther.

Mexico and Guatemala.
Pœcilia dovii Günther, Cat., VI, 344, 1866, Lake Nicaragua; Lake Amatitlan.

1052. Pœcilia couchiana (Girard).

Rio San Juan at Cadereita and Monterey, and Nuevo Leon, Mexico.
Limia couchiana Girard, Proc. Ac. Nat. Sci. Phila. 1859, 116, Rio San Juan, Mexico.

1053. Pœcilia boucardi Steindachner.

Colon.
Pœcilia boucardi Steindachner, Ichth. Beitr., VI, 8, 1878, Colon or Aspinwall.

1054. Pœcilia reticulata Peters.

Brooks on the island of Curaçao, Caribbean Sea and adjacent coast.
Pœcilia reticulata Peters, Berliner Monatsber. for 1859 (1860), 412, Rio Guayra, Caracas.

1055. Pœcilia dominicensis Cuvier & Valenciennes.

San Domingo and Barbados.
Pœcilia dominicensis Cuvier & Valenciennes, Hist. Nat. Poiss., XVIII, 131, pl. 525, 1846, San Domingo.

1056. Pœcilia spilurus Günther.

Central America.
Pœcilia spilurus Günther, Cat., VI, 345, 1866, Central America.

1057. Pœcilia elongata Günther.

Panama.
Pœcilia elongata Günther, Cat., VI, 342, 1866, Panama.

1058. Pœcilia presidionis Jordan & Culver.

Rio Presidio, Sinaloa, Mexico.
Pœcilia presidio Jordan & Culver, in Jordan, Fishes of Sinaloa, 413, pl. 29, 1895, Rio Presidio, Sinaloa, Mexico.

Genus 320. MOLLIENISIA Le Sueur.

Mollienisia Le Sueur, Jour. Ac. Nat. Sci. Phila., II, 1821, 3 (*latipinna*).

1059. Mollienisia jonesi Günther.

Lake Alcohuaca, Huamantla, Mexico.
Mollienesia jonesi Günther, Ann. Mag. Nat. Hist., XIV, 1874, 370, Huamantla.

1060. Mollienisia formosa (Girard).

Palo Alto, Mexico.
Limia formosa Girard, Proc. Ac. Nat. Sci. Phila. 1859, 115, Palo Alto, Mexico

1061. Mollienisia latipinna LeSueur.

South Carolina to northern Mexico.
Mollienisia latipinna LeSueur, Jour. Ac. Nat. Sci. Phila., II, 1821, 3, New Orleans.

1062. Mollienisia petenensis Günther.

Lake Peten, Guatemala.
Mollienesia petenensis Günther, Cat., VI, 348, 1866, Lake Peten, Guatemala.

Genus 321. XIPHOPHORUS Heckel.

Xiphophorus Heckel, Sitzb. Akad. Wiss. Wien 1848, I, pl. 3, 163 (*helleri*).

1063. Xiphophorus helleri Heckel.

Rivers of southern Mexico and Central America.
Xiphophorus helleri Heckel, Sitzb. Akad. Wiss. Wien I, 1848, 163, Rio Chisoy.

1064. Xiphophorus guntheri Jordan & Evermann.

Rio Chisoy, basin of Rio Usumacinta, Guatemala.
Xiphophorus guntheri Jordan & Evermann, Fishes North and Middle America, 702, 1896, Rio Chisoy, Guatemala.

Family XCIII. AMBLYOPSIDÆ. The Blind Fishes.

Genus 322. CHOLOGASTER Agassiz.

Chologaster Agassiz, Am. Jour. Sci. Arts, XVI, 1853, 135 (*cornutus*).

1065. Chologaster cornutus Agassiz. *Fish of the Dismal Swamp.*

Southern States; from the Dismal Swamp to the Okefinokee Swamp.
Chologaster cornutus Agassiz, Am. Jour. Sci. Arts 1853, 135, ditch in a rice field at Waccamaw, South Carolina.

1066. Chologaster agassizii Putnam.

Tennessee and Kentucky.
Chologaster agassizii Putnam, Am. Nat. 1872, 30, fig., from a well at Lebanon, Tennessee.

1067. Chologaster papilliferus Forbes.

Cave spring, Union County, Illinois.
Chologaster papilliferus Forbes, Am. Nat., January, 1882, 1, cave spring in Union County, southern Illinois.

Genus 323. TYPHLICHTHYS Girard.

Typhlichthys Girard, Proc. Ac. Nat. Sci. Phila. 1859, 62 (*subterraneus*).

1068. Typhlichthys subterraneus Girard. *Small Blindfish.*

Subterranean streams in limestone regions of Kentucky, Tennessee, Missouri, and Alabama.
Typhlichthys subterraneus Girard, Proc. Ac. Nat. Sci. Phila. 1859, 62, well at Bowling Green, Kentucky.

Genus 324. AMBLYOPSIS DeKay.

Amblyopsis DeKay, New York Fauna: Fishes, 187, 1842 (*spelæus*).

1069. Amblyopsis spelæus DeKay. *Mammoth Cave Blindfish.*

Subterranean streams of the limestone regions of Kentucky and Indiana; River Styx, Mammoth Cave.
Amblyopsis spelæus DeKay, New York Fauna: Fishes, 187, 1842, Mammoth Cave, Kentucky.

Order Y. SYNENTOGNATHI. The Synentognathous Fishes.

Family XCIV. ESOCIDÆ. The Needle-Fishes.

Genus 325. TYLOSURUS Cocco.

Tylosurus Cocco, "Lettere in Giornale Sci. Sicilia, XVII," 18, 1829 (*cantraini* = *imperialis* = *acus*).

1070. Tylosurus notatus (Poey). *Needle-fish; Long-jaws.*

West Indies, north to Pensacola, common about Key West.
Belone notata Poey, Memorias, II, 293, 1860, Havana.

1071. Tylosurus scapularis Jordan & Gilbert.
Panama.
Tylosurus scapularis Jordan & Gilbert, Bull. U. S. Fish Com. 1881, 307, Panama.

1072. Tylosurus timucu (Walbaum). *Timucu; Peixe Agulka.*
Florida Keys to Brazil.
Esox timucu Walbaum, Artedi Pisc., III, 88, 1792, Brazil; after *Timucu* of Maregrave.

1073. Tylosurus euryops Bean & Dresel. *Long-jaw.*
Cuba and Jamaica.
Tylosurus euryops Bean & Dresel, Proc. U. S. Nat. Mus. 1884, 168, Jamaica.

1074. Tylosurus diplotænia (Cope).
St. Martins Island, West Indies.
Belone diplotænia Cope, Trans. Am. Philos. Soc. 1871, 481, St. Martins.

1075. Tylosurus microps (Günther).
Coast of Guiana.
Belone microps Günther, Cat., VI, 237, 1866, Surinam, British Guiana.

1076. Tylosurus angusticeps (Günther).
Coast of Ecuador.
Belone angusticeps Günther, Cat., VI, 238, 1866, Ecuador.

1077. Tylosurus ardeola (Cuvier & Valenciennes)
West Indies.
Belone ardeola Cuvier & Valenciennes, Hist. Nat. Poiss., 425, 1846, Martinique.

1078. Tylosurus stolzmanni (Steindachner).
Pacific Coast of America from Guaymas and Mazatlan to Peru.
Belone stolzmanni Steindachner, Ichth. Beitr., VII, 21, 1878, Tumbez, Peru.

1079. Tylosurus exilis (Girard). *Needle-fish.*
Coast of southern California, from Point Conception southward to Cerros Island.
Belone exilis Girard, Proc. Ac. Nat. Sci. Phila. 1854, 149, San Diego.

1080. Tylosurus marinus (Walbaum). *Garfish; Billfish; Needle-fish; Agujon.*
Coast of Maine to Texas; Atlantic and Gulf coasts.
Esox marinus Walbaum, Artedi Piscium, III, 88, 1792; after Schöpf.

1081. Tylosurus almeida (Quoy & Gaimard). *Timucu.*
Surinam to Rio Janeiro and northward in the West Indies.
Belone almeida Quoy & Gaimard, Voyage de l'Uranie, Zool., 226, 1824, Brazil.

1082. Tylosurus fodiator Jordan & Gilbert. *Agujon.*
Pacific Coast of Mexico.
Tylosurus fodiator Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 459, Mazatlan.

1083. Tylosurus raphidoma (Ranzani). *Houndfish; Aguja de Casta; Guardfish.*
West Indies, Florida Keys to Brazil; Ocean City, New Jersey.
Belone raphidoma Ranzani, Nov. Com. Ac. Nat. Sci. Inst. Bonon., V, 1842, 359, pl. 37, fig. 1, Brazil.

1084. Tylosurus galeatus (Cuvier & Valenciennes).
Cayenne, French Guiana.
Belone galeata Cuvier & Valenciennes, Hist. Nat. Poiss., XVIII, 429, 1846, Cayenne, French Guiana.

1085. Tylosurus pacificus (Steindachner).
Acapulco to Panama.
Belone pacifica Steindachner, Ichth. Beitr., III, 65, 1875, Panama.

1086. Tylosurus acus (Lacépède). *Houndfish; Agujon.*
West Indies and occasionally northward.
Sphyræna acus Lacépède, Hist. Nat. Poiss., V, 6, pl. 1, fig. 3, 1803, Martinique.

1087. Tylosurus caribbæus (LeSueur).
West Indies.
Belone caribbæa LeSueur, Jour. Ac. Nat. Sci. Phila., II, 1821, 127, Caribbean Sea.

Genus 326. ATHLENNES Jordan & Fordice.
Athlennes Jordan & Fordice, Proc. U. S. Nat. Mus. 1886, 342 (*hians*).

1088. Athlennes hians (Cuvier & Valenciennes).
West Indies, from Florida to Brazil; Acapulco.
Belone hians Cuvier & Valenciennes, Hist. Nat. Poiss., XVIII, 432, 1846, Havana; Bahia.

Family XCV. HEMIRAMPHIDÆ. The Balaos.

Genus 327. CHRIODORUS Goode & Bean. *Hardheads.*
Chriodorus Goode & Bean, Proc. U. S. Nat. Mus. 1882, 432 (*atherinoides*).

1089. Chriodorus atherinoides Goode & Bean. *Hardhead.*
Florida Keys.
Chriodorus atherinoides Goode & Bean, Proc. U. S. Nat. Mus. 1882, 432, Key West, Florida.

Genus 328. HYPORHAMPHUS Gill. *Halfbeaks.*
Hyporhamphus Gill, Proc. Ac. Nat. Sci. Phila. 1859, 131 (*tricuspidatus* = *unifasciatus*.)

1090. Hyporhamphus unifasciatus (Ranzani). *Escribano.*
Key West to Rio Janeiro; Panama; East Indies or Africa.
Hemiramphus unifasciatus Ranzani, Nov. Comn. Ac. Sci. Bonon., V, 1842, 326, Brazil.

1091. Hyporhamphus roberti (Cuvier & Valenciennes). *Common Halfbeak; Pajarito.*
Coasts of America; Newport, Rhode Island; Longport and Beesley Point, New Jersey; Fortress Monroe, Virginia; Beaufort, North Carolina; Charleston; Pensacola; San Sebastian River; Cedar Keys; New Orleans; Mazatlan; Guaymas; Cape San Lucas; La Paz; Panama; Chatham and Indefatigable Islands of the Galapagos.
Hemirhamphus roberti Cuvier & Valenciennes, Hist. Nat. Poiss., XIX, 24, 1846, Cayenne.

1092. Hyporhamphus rosæ (Jordan & Gilbert).
Southern California and southward.
Hemiramphus rosæ Jordan & Gilbert, Proc. U.S. Nat. Mus. 1880, 335, San Diego, California.

Genus 329. HEMIRAMPHUS Cuvier.
Hemiramphus Cuvier, Règne Animal, ed. I, II, 1817 (*brasiliensis*).

1093. Hemiramphus brasiliensis (Linnæus). *Balao; Escribano.*
West Indies; Key West southward to Bahia.
Esox brasiliensis Linnæus, Syst. Nat., ed. X, 314, 1758, Jamaica; after Browne; the *Timucu* of Marcgrave wrongly included in the synonymy; Bloch, Ichth., 391, 1801, corrected synonymy and description.

1094. Hemiramphus balao LeSueur. *Balao; Piper.*
Cuba; also known from Panama.
Hemirhamphus balao LeSueur, Jour. Ac. Nat. Sci. Phila., II, 1823, 136, Lesser Antilles.

Genus 330. EULEPTORHAMPHUS Gill.
Euleptorhamphus Gill, Proc. Ac. Nat. Sci. Phila. 1859, 131 (*brevoorti*).

1095. Euleptorhamphus velox Poey.
West Indies northward in the Gulf Stream to Massachusetts.
Euleptorhamphus velox Poey, Synopsis, 383, 1867, Cuba.

Family XCVI. SCOMBERESOCIDÆ. The Sauries.

Genus 331. SCOMBERESOX Lacépède. *Sauries.*

Scomberesox Lacépède, Hist. Nat. Poiss., v, 344, 1803 (*camperii*).

1096. Scomberesox saurus (Walbaum). *Saury; Skipper; Billfish.*

Atlantic Ocean, north of Cape Cod and France.

Esox saurus Walbaum, Artedi Pisc., III, 93, 1792, Cornwall; after the *Saury Pike* of Pennant.

Genus 332. COLOLABIS Gill.

Cololabis Gill, Proc. U. S. Nat. Mus. 1896, 176 (*brevirostris*).

1097. Cololabis brevirostris (Peters).

Coast of California; Tomales Bay and San Francisco.

Scombresox brevirostris Peters, Monatsberichte Akad. Wiss. Berl., July, 1866, 521, Tomales Bay, California.

Family XCVII. EXOCŒTIDÆ. The Flying-Fishes.

Genus 333. FODIATOR Jordan & Meek.

Fodiator Jordan & Meek, Proc. U. S. Nat. Mus. 1885, 45 (*acutus*).

1098. Fodiator acutus (Cuvier & Valenciennes). *Sharp-nosed Flying-fish.*

Both shores of Tropical America; Gulf of California; San Luis Gonzales; Panama; Nice.

Exocœtus acutus Cuvier & Valenciennes, Hist. Nat. Poiss., 125, 1849, Surinam; Nice.

Genus 334. PAREXOCŒTUS Bleeker.

Parexocœtus Bleeker, Nederl. Tydskr. Dierk., III, 105, 1865 (*mento*).

1099. Parexocœtus mesogaster (Bloch).

Tropical seas; East Indies and West Indies; Hawaiian Islands; Newport, Rhode Island; Carolina coast.

Exocœtus mesogaster Bloch, Ichth., pl. 399, 1795, Martinique; on a drawing by Plumier, in which the pectorals and ventrals are much too long.

Genus 335. EXOCŒTUS (Artedi) Linnæus. *Flying-fishes.*

Exocœtus Artedi (Genera Piscium, 6, 1738), Linnæus, Syst. Nat., ed. x, 316, 1758 (*volitans*).

1100. Exocœtus volitans Linnæus.

Warm seas; Newfoundland; England; Hawaiian Islands.

Exocœtus volitans Linnæus, Syst. Nat., ed. x, 316, 1758.

Genus 336. EXONAUTES Jordan & Evermann.

Exonautes, new genus (*exsiliens*).

1101. Exonautes exsiliens (P. L. S. Müller).

Open seas.

Exocœtus exsiliens Philip Ludwig Statius Müller, Nuremberg ed. Linnæus Syst. Nat., 209, 1776, Carolina.

1102. Exonautes rondeletii (Cuvier & Valenciennes).

Tropical seas; Florida; France; Acapulco; West Indies; southern Europe.

Exocœtus rondeletii Cuvier & Valenciennes, Hist. Nat. Poiss., XIX, 115, 1846, Naples; Sicily; Canaries.

1103. Exonautes vinciguerræ (Jordan & Meek).

Open Atlantic; southern Europe; Newfoundland; St. Martins; Gulf of Mexico.

Exocœtus vinciguerræ Jordan & Meek, Proc. U. S. Nat. Mus. 1885, 56, open sea off Newfoundland, 46° N., 61° W.

1104. Exonautes speculiger (Cuvier & Valenciennes).
Open seas; Atlantic Coast; Grand Banks; southern Europe; Hawaiian Islands.
Exocœtus speculiger Cuvier & Valenciennes, Hist. Nat. Poiss., IX, 93, 1846, Friendly Islands, etc.

1105. Exonautes rufipinnis (Cuvier & Valenciennes).
Tropical America; Payta; Panama; Tobasco; Barbados.
Exocœtus rufipinnis Cuvier & Valenciennes, Hist. Nat. Poiss., XIX, 99, 1846, Payta, Peru.

Genus 337. **CYPSILURUS Swainson.**
Cypsilurus Swainson, Class. Fishes, etc., II, 296, 1839 (*nuttalli*).

1106. Cypsilurus heterurus (Rafinesque).
Atlantic Ocean; Newfoundland; England.
Exocœtus heterurus Rafinesque, Caratteri di Alcuni Nuovi Generi, etc., 58, 1810, Palermo.

1107. Cypsilurus lutkeni (Jordan & Evermann).
Cape San Antonio.
Exocœtus lutkeni Jordan & Evermann, Fishes North and Middle America, 736, 1896, Cape San Antonio.

1108. Cypsilurus furcatus (Mitchill).
Warm seas; north to Cape Cod and to the Mediterranean.
Exocœtus furcatus Mitchill, Trans. Lit. Phil. Soc. N. Y., I, 1815, 149, New York.

1109. Cypsilurus nigricans (Bennett).
Tropical seas; north to Cuba, Central America, and France.
Exocœtus nigricans Bennett, Whaling Voyage, II, 287, 1840, taken in both the Atlantic and Pacific oceans, in latitude 5° N.

1110. Cypsilurus xenopterus (Gilbert).
Clarion Island, one of the Revillagigedo Islands.
Exocœtus xenopterus Gilbert, Proc. U. S. Nat. Mus. 1890, 58, Clarion Island.

1111. Cypsilurus lineatus (Cuvier & Valenciennes).
Tropical Atlantic; Korea; the Canaries; Madeira and Bermuda.
Exocœtus lineatus Cuvier & Valenciennes, Hist. Nat. Poiss., XIX, 92, 1836, Korea; Canaries.

1112. Cypsilurus cyanopterus (Cuvier & Valenciennes).
Coasts of Brazil and Caribbean Sea.
Exocœtus cyanopterus Cuvier & Valenciennes, Hist. Nat. Poiss., XIX, 98, 1846, Bahia; Rio de Janeiro.

1113. Cypsilurus bahiensis (Ranzani).
Tropical seas; north to Cuba and the Galapagos Islands.
Exocœtus bahiensis Ranzani, Nov. Com. Ac. Sci. Inst. Bonon., V, 1842, 362, pl. 38, Bahia.

1114. Cypsilurus californicus (Cooper). *Great Flying-fish; Volador.*
Southern California; Point Conception to Cape San Lucas; Santa Barbara Islands.
Exocœtus californicus Cooper, Proc. Cal. Ac. Sci., III, 1864, 93, fig. 20, Santa Catalina Island.

1115. Cypsilurus callopterus (Günther).
Panama.
Exocœtus callopterus Günther, Cat., VI, 292, 1866, Panama.

1116. Cypsilurus gibbifrons (Cuvier & Valenciennes).
Atlantic Ocean; Newport, Rhode Island.
Exocœtus gibbifrons Cuvier & Valenciennes, Hist. Nat. Poiss., XIX, 118, 1846, Atlantic.

Order Z. HEMIBRANCHII. The Hemibranchs.

Family XCVIII. GASTEROSTEIDÆ. The Sticklebacks.

Genus 338. EUCALIA Jordan.

Eucalia Jordan, Man. Vert., ed. I, 248, 1876 (*inconstans*).

1117. Eucalia inconstans (Kirtland). *Brook Stickleback.*

New York to Kansas and northward to the Saskatchewan; Great Lakes region; central Ohio and Illinois.

Gasterosteus inconstans Kirtland, Bost. Jour. Nat. Hist., III, 1841, 273, Trumbull County, Ohio.

1117a. Eucalia inconstans cayuga Jordan.

Ithaca and Syracuse, New York.

Eucalia inconstans cayuga Jordan, Man. Vert., ed. I, 249, 1876, Cayuga Lake, Ithaca, New York.

1117b. Eucalia inconstans pygmæa (Agassiz).

Lake Superior.

Gasterosteus pygmæus Agassiz, Lake Superior, 314, 1850, Lake Superior.

Genus 339. PYGOSTEUS Brevoort.

Pygosteus Brevoort, in Gill, Cat. Fish. East Coast N. A., 39, 1861, name only.

1118. Pygosteus pungitius (Linnæus). *Nine-spined Stickleback.*

Northern Europe; Atlantic coasts of America; Long Island to the Arctic Sea; tributaries of the Great Lakes.

Gasterosteus pungitius Linnæus, Syst. Nat., ed. X, 1758, 296; after *Gasterosteus aculeis decem* Artedi.

1118a. Pygosteus pungitius brachypoda (Bean).

Mountain lakes and streams about Baffin Bay.

Gasterosteus pungitius brachypoda Bean, Bull. U. S. Nat. Mus., XV, 1879, 129, Oosooadlin, Baffin Bay.

Genus 340. GASTEROSTEUS (Artedi) Linnæus. *Sticklebacks.*

Gasterosteus (Artedi) Linnæus, Syst. Nat., X, 489, 1758 (*aculeatus*).

1119. Gasterosteus aculeatus Linnæus. *European Stickleback; Burnstickle.*

Coasts and streams of northern Europe; Greenland.

Gasterosteus aculeatus Linnæus, Syst. Nat., ed. X, I, 489, 1758, Europe.

1120. Gasterosteus bispinosus Walbaum. *Common Eastern Stickleback.*

Labrador to New Jersey; New England.

Gasterosteus bispinosus Walbaum, Artedi, Pisc., 450, 1792, after Pennant; said to be "New York," but more likely Hudson Bay.

1120a. Gasterosteus bispinosus atkinsi Bean.

Quebec; Maine.

Gasterosteus atkinsi Bean, Proc. U. S. Nat. Mus. 1879, 67, Schoodic Lakes, Maine.

1120b. Gasterosteus bispinosus cuvieri Girard.

East coast of North America from Labrador to Massachusetts.

Gasterosteus cuvieri Girard, in Storer's Fishes of Nova Scotia and Labrador, 254, pl. 7, fig. 1, 1849, Bras d'Or, Red Bay, Labrador.

1121. Gasterosteus gladiunculus Kendall.

Off coast of Maine, in floating fucus and other seaweed.

Gasterosteus gladiunculus Kendall, Proc. U. S. Nat. Mus., XVIII, 1896, 623, off coast of Maine, near Seguin Island.

1122. Gasterosteus cataphractus (Pallas). *Alaska Stickleback; Salmon-killer.*

San Francisco to Alaska and Kamchatka.

Gasteracanthus cataphractus Pallas, Mém. Acad. Petersb., III, 325, 1811, Kamchatka.

1123. Gasterosteus williamsoni Girard.

Streams of southern California from Ventura County to Santa Ana River; Williamson Pass near Saugus, Ventura County; San Bernardino; and Santa Ana River at Colton.

Gasterosteus williamsoni Girard, Proc. Ac. Nat. Sci. Phila. 1854, 133, Williamson Pass, California.

1123a. Gasterosteus williamsoni microcephalus (Girard). *California Sticklebaek.*

Pacific Coast of the United States in streams and brackish water; Alaska to Todos Santos, Lower California.

Gasterosteus microcephalus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 133, Four Creeks (Kaweah River), tributary to Tule Lake (Tulare Lake), San Joaquin Valley, California.

Genus 341. APELTES DeKay.

Apeltes DeKay, New York Fauna: Fishes, 67, 1842 (*quadracus*).

1124. Apeltes quadracus (Mitchill).

Maine to New Jersey in salt water.

Gasterosteus quadracus Mitchill, Trans. Lit. and Phil. Soc., I, 1815, 430, New York.

Family XCIX. AULORHYNCHIDÆ.

Genus 342. AULORHYNCHUS Gill.

Aulorhynchus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 169 (*flavidus*).

1125. Aulorhynchus flavidus Gill.

Coast of California from San Nicolas Island and Monterey northward to Sitka, Alaska.

Aulorhynchus flavidus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 169, coast of Washington.

Family C.* AULOSTOMIDÆ. The Trumpet-Fishes.

Genus 343. AULOSTOMUS Lacépède.

Aulostomus Lacépède, Hist. Nat. Poiss., v, 357, 1803 (*chinensis*).

1126. Aulostomus maculatus Valenciennes. *Trompetero.*

Caribbean Sea, north to southern Florida.

Aulostoma maculatum Valenciennes, in Cuvier, Illust. Poiss., pl. 92, fig. 2, about 1845.

1127. Aulostomus cinereus Poey

Cuba.

Aulostoma cinereum Poey, Synopsis, 386, 1867, Cuba.

Family CI. FISTULARIIDÆ. The Cornet-Fishes.

Genus 344. FISTULARIA Linnæus.

Fistularia Linnæus, Syst. Nat., ed. x, 312, 1758 (*tabacaria*).

1128. Fistularia tabacaria Linnæus. *Trumpet-fish; Trompetero.*

West Indies and neighboring seas; northward to Carolina and Florida, and occasionally to Long Island.

Fistularia tabacaria Linnæus, Syst. Nat., ed. x, 312, 1758, Tropical America.

1129. Fistularia depressa Günther. *Corneta.*

East Indies, Australia, China, Panama, and Lower California.

Fistularia depressa Günther, Report on the Shore Fishes, Challenger Report, 69, pl. 32, Fig. D, 1880.

1130. Fistularia petimba Lacépède.

Western Pacific; Bermudas; Cuba.

Fistularia petimba Lacépède, Hist. Nat. Poiss., v, 349, 1803, New Britain, Isle of Reunion, equatorial Pacific.

Family CII. MACRORHAMPHOSIDÆ. The Snipe-Fishes.

Genus 345. MACRORHAMPHOSUS Lacépède. *Snipe-fishes.*

Macrorhamphosus Lacépède, Hist. Nat. Poiss., v, 136, 1803 (*cornutus* = *scolopax*).

1131. Macrorhamphosus scolopax (Linnæus). *Snipe-fish; Trumpet-fish; Bellows-fish.*

Mediterranean Sea; northward to southern England; accidental on our North Atlantic Coast.

Balistes scolopax Linnæus, Syst. Nat., ed. x, 329, 1758, Mediterranean.

Order AA. LOPHOBRANCHII. The Lophobranchs.

Suborder SYNGNATHI.

Family CIII. SYNGNATHIDÆ. The Pipefishes.

Genus 346. SIPHOSTOMA Rafinesque.

Siphostoma Rafinesque, Caratteri Nuovi Generi, 18, 1810 (*pelagicus*).

Subgenus DERMATOSTETHUS Gill.

Dermatostethus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 283 (*punctipinnis*).

1132. Siphostoma punctipinne (Gill).

San Diego, California.

Dermatostethus punctipinnis Gill, Proc. Ac. Nat. Sci. Phila. 1862, 283, San Diego, California.

Subgenus SIPHOSTOMA Rafinesque.

1133. Siphostoma carinatum Gilbert.

Gulf of California.

Siphostoma carinatum Gilbert, Proc. U. S. Nat. Mus. 1891, 547, Gulf of California, 31° 31′ N., 114° 19′ W., at Albatross Stations 3027 and 3028.

1134. Siphostoma californiense (Storer).

Santa Barbara and Monterey; from Santa Barbara northward.

Syngnathus californiensis Storer, Proc. Bost. Soc. Nat. Hist., II, 1845, 73, California.

1135. Siphostoma griseolineatum (Ayres).

Pacific Coast of the United States, from Puget Sound to Monterey.

Syngnathus griseolineatus Ayres, Proc. Cal. Ac. Sci. 1854, 14, San Francisco Bay.

1136. Siphostoma leptorhynchum (Girard).

West coast of America from San Francisco to San Diego.

Syngnathus leptorhynchus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 156, San Diego, California.

1137. Siphostoma fistulatum (Peters).

Puerto Cabello, near Aspinwall.

Syngnathus fistulatus Peters, Monatsber. Ak. Wiss. Berk., 456, 1868, Puerto Cabello, near Aspinwall.

1138. Siphostoma barbaræ Swain.

California coast, at Santa Barbara.

Siphostoma barbaræ Swain, Proc. U. S. Nat. Mus. 1884, 238, Santa Barbara, California.

1139. Siphostoma mackayi Swain & Meek.

Key West, Florida, and south to Yucatan.

Siphostoma mackayi Swain & Meek, Proc. U. S. Nat. Mus. 1884, 239, Key West, Florida.

1140. Siphostoma floridæ Jordan & Gilbert.
Beaufort, North Carolina, to Corpus Christi, Texas.
Siphostoma floridæ Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 263, Pensacola, Florida.

1141. Siphostoma poeyi Jordan & Evermann.
Havana.
Siphostoma poeyi Jordan & Evermann, Fishes North and Middle America, 766, 1896, Havana, Cuba.

1142. Siphostoma auliscus Swain.
Southern California.
Siphostoma auliscus Swain, Proc. U. S. Nat. Mus. 1882, 310, Santa Barbara and San Diego, California.

1143. Siphostoma pelagicum (Osbeck).
Tropical parts of the Atlantic; north to the West Indies and the Mediterranean.
Syngnathus pelagicus Osbeck, Dagbök Resa Ostind., 305, 1757, open sea in floating seaweed.

1144. Siphostoma rousseau (Kaup).
West Indies; known from Jamaica, St. Lucia, and Martinique.
Syngnathus rousseau Kaup, Lophobranchii, 40, 1856, Martinique.

1145. Siphostoma elucens (Poey).
Cuba.
Syngnathus elucens Poey, Synopsis, 443, 1867, Havana, Cuba.

1146. Siphostoma jonesi (Günther).
Bermuda Islands.
Syngnathus jonesi Günther, Ann. and Mag. Nat. Hist., series 4, XIV, 1874, 8, Bermudas.

1147. Siphostoma robertsi Jordan & Rutter.
Known only from Jamaica.
Siphostoma robertsi Jordan & Rutter, Fishes of Jamaica, in Proc. Ac. Nat. Sci. Phila. 1896, Jamaica.

1148. Siphostoma brachycephalum (Poey).
Cuba.
Syngnathus brachycephalus Poey, Synopsis, 444, 1867, Havana, Cuba.

1149. Siphostoma affine (Günther).
Gulf of Mexico, on coast of Louisiana.
Syngnathus affinis Günther, Cat., VIII, 163, 1870, Louisiana.

1150. Siphostoma scovelli Evermann & Kendall.
Coast of Texas and both coasts of Florida.
Siphostoma scovelli Evermann & Kendall, Proc. U. S. Nat. Mus., XVIII, 1895 (1896), 109, Corpus Christi, Texas.

1151. Siphostoma bairdianum (Duméril).
West coast of Mexico, near California.
Syngnathus bairdianus Duméril, Hist. Nat. Poiss., II, 574, 1870, "Coast of Mexico, near California."

1152. Siphostoma louisianæ (Günther).
Atlantic and Gulf coasts of the United States, North Carolina to Texas and south to Key West.
Syngnathus louisianæ Günther, Cat., VIII, 160, 1870, New Orleans, Louisiana.

1153. Siphostoma fuscum (Storer). *Common Pipefish.*
Atlantic Coast of United States from Maine to Virginia.
Syngnathus fuscus Storer, Rept. Fish. Mass., 162, 1839, Nahant, Massachusetts.

1154. Siphostoma starksii Jordan & Culver.

Rio Presidio, Sinaloa, Mexico.
Siphostoma starksii Jordan & Culver, in Jordan, Fishes of Sinaloa, 416, 1895, Rio Presidio, Mazatlan, Mexico.

1155. Siphostoma arctum Jenkins & Evermann.

Gulf of California; Guaymas.
Siphostoma arctum Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 137, Bay of Guaymas, Sonora, Mexico.

1156. Siphostoma sinaloæ Jordan & Starks.

Pacific coast of Mexico.
Siphostoma sinaloæ Jordan & Starks, Proc. Cal. Ac. Sci. 1896, Mazatlan, Mexico.

1157. Siphostoma crinigerum Bean & Dresel.

Pensacola and Key West, to Abrolhos Reef, Brazil.
Siphostoma crinigerum Bean & Dresel, Proc. Biological Soc. Washington, II, 1884, 99, Pensacola, Florida.

Subgenus CORYTHROICHTHYS Kaup.

Corythroichthys Kaup, Lophobranchii, 25, 1856 (*albirostris*); not of Linnæus as restricted by Rafinesque.

1158. Siphostoma albirostre (Heckel).

West Indies; north to Pensacola and Key West; south to Bahia.
Corythroichthys albirostris Heckel, in Kaup, Lophobranchii, 25, 1856, Mexico; Bahia.

1159. Siphostoma cayennense (Sauvage).

Cayenne.
Syngnathus cayennensis Sauvage, Bull. Soc. Philom. Paris, 1882, 176, Cayenne.

Genus 347. DORYRHAMPHUS Kaup.

Doryrhamphus Kaup, Lophobranchii, 54, 1856 (*excisus*).

Subgenus DORYICHTHYS Kaup.

Doryichthys Kaup, Lophobranchii, 56, 1856 (*bilineatus*).

1160. Doryrhamphus lineatus (Valenciennes).

Tropical parts of Atlantic from Cuba to Africa.
Doryichthys lineatus Valenciennes, in Kaup, Lophobranchii, 59, 1856, Bahia, Mexico, and Guadeloupe.

Subgenus DORYRHAMPHUS Kaup.

1161. Doryrhamphus californiensis Gill.

Gulf of California.
Doryrhamphus californiensis Gill, Proc. Ac. Nat. Sci. Phila. 1862, 284, Cape San Lucas.

Genus 348. SYNGNATHUS Linnæus.

Syngnathus Linnæus, Artedi Genera Piscium, 1738 (*acus, typhle,* etc)

Subgenus SYNGNATHUS Linnæus.

1162. Syngnathus æquoreum Linnæus. *Ocean Pipefish.*

Northern and western coasts of Europe; open Atlantic; Gulf of Mexico.
Syngnathus æquoreus Linnæus, Syst. Nat., ed. X, 417, 1758, open sea.

Genus 349. OSPHYOLAX Cope.

Osphyolax Cope, Proc. Ac. Nat. Sci. Phila. 1875, 450 (*pellucidus*).

1163. Osphyolax pellucidus Cope.

Osphyolax pellucidus Cope, Proc. Ac. Nat. Sci. Phila. 1875, 450, pl. 25, figs. 1 to 4, open Atlantic Ocean.

Family CIV. HIPPOCAMPIDÆ. The Sea-Horses.

Genus 350. HIPPOCAMPUS Rafinesque.

Hippocampus Rafinesque, Indice d'Ittiologia Siciliana, 37, 1810 (*hippocampus*).

1164. Hippocampus ingens Girard. *Caballito del Mar.*

Pacific Coast from San Diego to Mazatlan.

Hippocampus ingens Girard, Pac. R. R. Surv., Fishes, 342, 1858, San Diego, Cal.

1165. Hippocampus hudsonius DeKay. *Common American Sea-horse.*

West Coast of northern Mexico, Mazatlan to San Diego, California.

Atlantic Coast of United States, from Cape Cod southward to Charleston.

Hippocampus hudsonius DeKay, N. Y. Fauna: Fishes, 322, pl. 53, fig. 171, 1842, New York.

1166. Hippocampus punctulatus Guichenot. *Caballito del Mar; Sea-horse.*

Tropical parts of the Atlantic; common in the West Indies, Brazil, and western Africa; Gulf Stream; Beaufort, North Carolina.

Hippocampus punctulatus Guichenot, in Sagra, Cuba, Poiss., 174, pl. 5, fig. 2, 1850, Cuba.

1167. Hippocampus stylifer Jordan & Gilbert.

Coasts of Florida; "Snapper Banks" off Pensacola and Tampa; Gulf Stream.

Hippocampus stylifer Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 265, "Snapper Banks," Gulf of Mexico.

1168. Hippocampus zosteræ Jordan & Gilbert.

Pensacola Bay, Florida.

Hippocampus zosteræ Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 265, Grand Lagoon, Pensacola, Florida.

Order BB. ACANTHOPTERI. The Spiny-rayed Fishes.

Suborder SALMOPERCÆ. The Trout Perches.

Family CV. PERCOPSIDÆ. The Sand-Rollers.

Genus 351. PERCOPSIS Agassiz.

Percopsis Agassiz, Lake Superior, 284, 1850 (*guttatus*).

1169. Percopsis guttatus Agassiz. *Sand-Roller; Trout Perch.*

Lake Champlain and Delaware River to Ohio River, Kansas, and northward; Great Lakes; Hudson Bay; Red River of the North; Saskatchewan River.

Percopsis guttatus Agassiz, Lake Superior, 286, 1850, Lake Superior.

Genus 352. COLUMBIA Eigenmann & Eigenmann.

Columbia Eigenmann & Eigenmann, Science, October 21, 1892, 233 (*transmontana*).

1170. Columbia transmontana Eigenmann & Eigenmann.

Columbia River basin; Umatilla and Wallula rivers.

Columbia transmontana Eigenmann & Eigenmann, Science, 1892, 233, mouth of Umatilla River, Oregon.

Suborder XENARCHI.

Family CVI. APHREDODERIDÆ. The Pirate Perches.

Genus 353. APHREDODERUS LeSueur. *Pirate Perches.*

Aphredoderus LeSueur, in Cuvier & Valenciennes, Hist. Nat. Poiss., IX, 445, 1833 (*gibbosus* = *sayanus*).

1171. Aphredoderus sayanus (Gilliams). *Pirate Perch.*

From New York in coastwise streams to Texas; also in the Mississippi Basin north to Michigan.

Scolopsis sayanus Gilliams, Jour. Ac. Nat. Sci. Phila., IV, 1824, 81, near Philadelphia.

Suborder PERCESOCES.

Family CVII. ATHERINIDÆ. *The Silversides.*

Genus 354. ATHERINA (Artedi) Linnæus.

Atherina Artedi, in Linnæus, Syst. Nat., ed. x, 315, 1758 (*hepsetus*).

1172. Atherina stipes Müller & Troschel.

Barbados.

Atherina stipes Müller & Troschel, in Schomburgk, Hist. Barbados, 671, 1848, Barbados.

1173. Atherina laticeps Poey. *Cabezote*; *Bristle Herring.*

Caribbean Sea, north to western Florida; Key West, Havana, Jamaica, and Cozumel.

Atherina laticeps Poey, Memorias, II, 265, 1861, Havana.

1174. Atherina aræa Jordan & Gilbert.

Gulf of Mexico, at Key West and Cozumel.

Atherina aræa Jordan & Gilbert, Proc. U. S. Nat. Mus. 1884, 27, Key West, Florida.

1175. Atherina harringtonensis Goode.

Bermudas.

Atherina harringtonensis Goode, Am. Jour. Sci. and Arts, 3d series, XIV, No. 82, 1877, 297, Bermuda Islands.

1176. Atherina carolina Cuvier & Valenciennes.

South Carolina.

Atherina carolina Cuvier & Valenciennes, Nat. Hist. Poiss., x, 445, 1835, South Carolina.

1177. Atherina microps Poey.

Havana.

Atherina microps Poey, Memorias, II, 266, 1861, Havana, Cuba.

Genus 355. CHIROSTOMA Swainson.

Chirostoma Swainson, Class. Fishes, etc., 243, 1839 (*humboldtianum*).

1178. Chirostoma estor Jordan. *Pescado Blanco de Chapala.*

Lake Chapala, Guanajuato.

Chirostoma estor Jordan, Proc. U. S. Nat. Mus. 1879, 298, Lake Chapala, Mexico.

1179. Chirostoma humboldtianum (Cuvier & Valenciennes).

Lake near the City of Mexico.

Atherina humboldtiana Cuvier & Valenciennes, Hist. Nat. Poiss., x, 479, 1835, lake at City of Mexico.

1180. Chirostoma grandocule (Steindachner). *Guerepo.*

Lake Pátzcuaro, Mexico.

Atherinichthys grandoculis Steindachner, Anzeiger der kais. Akad. d. Wissensch. Wien, 1894, 149, Lake Pátzcuaro, near the City of Mexico.

Genus 356. ESLOPSARUM Jordan & Evermann.

Eslopsarum, new genus (*jordani*).

1181. Eslopsarum jordani (Woolman).

City of Mexico; tributaries of Rio de Lerma, Mexico.

Chirostoma jordani Woolman, Bull. U. S. Fish. Com. 1894, 62, pl. 2, canals in City of Mexico; Rio de Lerma at Salamanca, Mexico.

1182. Eslopsarum bartoni (Jordan & Evermann).

Tributary of the Rio Lerma, near Guanajuato, Mexico.

Chirostoma bartoni Jordan & Evermann, Fishes North and Middle America, 793, 1896, tributary of the Rio Lerma, near Guanajuato, Mexico.

Genus 357. **KIRTLANDIA** Jordan & Evermann.

Kirtlandia Jordan & Evermann, Fishes North and Middle America, 794, 1896 (*vagrans*).

1183. Kirtlandia vagrans (Goode & Bean).

Coast of Gulf of Mexico, Florida to Texas.
Chirostoma vagrans Goode & Bean, Proc. U. S. Nat. Mus. 1879, 148, Pensacola, Florida.

1184. Kirtlandia martinica (Cuvier & Valenciennes).

Martinique.
Atherina martinica Cuvier & Valenciennes, Hist. Nat. Poiss., x, 459, 1835, Martinique.

1185. Kirtlandia laciniata (Swain). *Silver-fish.*

Lower Chesapeake to South Carolina.
Menidia vagrans laciniata Swain, in Jordan & Gilbert, Synopsis, 908, 1883, Beaufort, North Carolina.

Genus 358. **MENIDIA** Bonaparte.

Menidia Bonaparte, Fauna Italica, about 1836 (no type indicated, *menidia* doubtless intended).

1186. Menidia peninsulæ (Goode & Bean).

Florida and Gulf Coast.
Chirostoma peninsulæ Goode & Bean, Proc. U. S. Nat. Mus. 1879, 148, Pensacola and Lake Monroe, Florida.

1187. Menidia gracilis (Günther).

Atlantic Coast, from Massachusetts to Albemarle Sound.
Atherinichthys gracilis Günther, Cat., III, 405, 1861, no locality.

1187a. Menidia gracilis beryllina (Cope).

Potomac River, in fresh water.
Chirostoma beryllinum Cope, Trans. Am. Philos. Soc. 1866, 403, Potomac River near Washington.

1188. Menidia audens Hay.

Mississippi River, in Mississippi and Tennessee.
Menidia audens Hay, Bull. U. S. Fish Com. 1882, 64, Memphis, Tenn., and Vicksburg, Miss.

1189. Menidia gilberti Jordan & Bollman.

Panama.
Menidia gilberti Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 155, Panama.

1190. Menidia sardina (Jenkins & Evermann). *Pez del Rey.*

Gulf of California.
Atherina sardina Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 137, Guaymas, Sonora.

1191. Menidia notata (Mitchill). *Silverside.*

Atlantic Coast of United States, south to North Carolina.
Atherina notata Mitchill, Trans. Lit. and Phil. Soc. N. Y. 1815, 446, New York.

1192. Menidia menidia (Linnæus).

Atlantic Coast, Cape Hatteras to Florida.
Atherina menidia Linnæus, Syst. Nat., ed. XII, 519, 1766, Charleston, S. C.

1193. Menidia clara Evermann & Jenkins.

Gulf of California.
Menidia clara Evermann & Jenkins, Proc. U. S. Nat. Mus. 1891, 136, Guaymas, Sonora.

Genus 359. LEURESTHES Jordan & Gilbert.

Leuresthes Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 29 (*tenuis*).

1194. Leuresthes crameri Jordan & Evermann.

Ballenas Bay, Lower California.

Leuresthes crameri Jordan & Evermann, Fishes North and Middle America, 802, 1896, Ballenas Bay, Lower California.

1195. Leuresthes tenuis (Ayres).

Coast of California, from San Francisco to San Diego.

Atherinopsis tenuis Ayres, Proc. Cal. Ac. Sci. 1860, 76, San Francisco.

Genus 360. EURYSTOLE Jordan & Evermann.

Eurystole Jordan & Evermann, Fishes North and Middle America, 802, 1896 (*eriarcha*).

1196. Eurystole eriarcha (Jordan & Gilbert).

West coast of Mexico; Mazatlan.

Atherinella eriarcha Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 348, Mazatlan, Mexico.

Genus 361. THYRINA Jordan & Culver.

Thyrina Jordan & Culver, in Jordan, Fishes Sinaloa, 419, 1895 (*evermanni*).

1197. Thyrina evermanni Jordan & Culver.

West coast of Mexico; Mazatlan.

Thyrina evermanni Jordan & Culver, in Jordan, Fishes Sinaloa, 419, 1895, Mazatlan, Mexico.

1198. Thyrina crystallina Jordan & Culver.

Rio Presidio, near Mazatlan, Sinaloa.

Thyrina crystallina Jordan & Culver, in Jordan, Fishes Sinaloa, 420, 1895, Rio Presidio, below Presidio, Sinaloa.

1199. Thyrina guatemalensis (Günther).

Lakes of Guatemala.

Atherinichthys guatemalensis Günther, Proc. Zool. Soc. Lond. 1864, 151, lakes of Huamuchal, Guatemala.

1200. Thyrina pachylepis (Günther).

Panama.

Atherinichthys pachylepis Günther, Proc. Zool. Soc. Lond. 1864, 25, Panama.

Genus 362. ATHERINELLA Steindachner.

Atherinella Steindachner, Ichth. Beitr., II, 35, 1875 (*panamensis*).

1201. Atherinella panamensis Steindachner.

Panama.

Atherinella panamensis Steindachner, Ichth. Beitr., II, 35, 1875, Panama.

Genus 363. LABIDESTHES Cope.

Labidesthes Cope, Proc. Amer. Phil. Soc. Phila. 1870, 455 (*sicculum*).

1202. Labidesthes sicculus (Cope). *Brook Silverside; Skipjack.*

Lake Ontario and southern Michigan to Iowa, Florida, and Texas.

Chirostoma sicculum Cope, Proc. Ac. Nat. Sci. Phila. 1865, 81, Grosse Isle, Detroit River, Michigan.

Genus 364. ATHERINOPSIS Girard. *Pescado del Rey.*

Atherinopsis Girard, Proc. Ac. Nat. Sci. Phila. 1854, 134 (*californiensis*).

1203. Atherinopsis californiensis Girard. *California Smelt; Pescado del Rey; Peixe Rey; Pesce-Rey.*

Coast of California, from Cape Mendocino to San Diego.

Atherinopsis californiensis Girard, Proc. Ac. Nat. Sci. Phila. 1854, 134, San Francisco, Cal.

Genus 365. ATHERINOPS Steindachner. *Pescadillos del Rey.*
Atherinops Steindachner, Ichth. Beitr., III, 61, 1875 (*affinis*).

1204. Atherinops insularum (Gilbert).
San Clemente and San Nicolas islands of the Santa Barbara group; Guadalupe Island.
Atherina insularum Gilbert, Proc. U. S. Nat. Mus. 1891, 549, San Clemente, San Nicolas, and Guadalupe islands.

1205. Atherinops affinis (Ayres). *Little "Smelt"; Pescadillo del Rey.*
Coast of California.
Atherinopsis affinis Ayres, Proc. Cal. Ac. Sci. 1860, 73, San Francisco.

1206. Atherinops regis Jenkins & Evermann. *Pez del Rey.*
Gulf of California.
Atherinops regis Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 138, Bay of Guaymas, Sonora.

Family CVIII. MUGILIDÆ. The Mullets.

Genus 366. MUGIL (Artedi) Linnæus. *Mullets.*
Mugil Artedi, in Linnæus, Syst. Nat., ed. X, 316, 1758 (*cephalus*).

1207. Mugil brasiliensis Agassiz. *Lisa; Lebrancho; Queriman.*
Cuba to Patagonia; West Indies; Brazil; Havana.
Mugil brasiliensis Agassiz, Spix, Pisc. Brasil., 234, pl. 72, 1829, Atlantic Ocean, off Brazil.

1208. Mugil cephalus Linnæus. *Common Mullet; Striped Mullet; Cefalo; Macho; Machuto; Liza Cabezuda.*
Coasts of southern Europe and northern Africa; Atlantic Coast of America, from Cape Cod to Brazil; Pacific Coast, from Monterey to Chile.
Mugil cephalus Linnæus, Syst. Nat., ed. X, 316, 1758, Europe; based on Artedi.

1209. Mugil incilis Hancock. *Trench Mullet.*
Waters of Central America; Rio Chagres to Pará and Bahia.
Mugil incilis Hancock, Quart. Jour. Sci. 1830, 127, Guiana.

1210. Mugil thoburni Jordan & Starks.
Pacific Coast of Tropical America, from Guatemala to Galapagos.
Mugil thoburni Jordan & Starks, in Jordan & Evermann, Fishes North and Middle America, 812, 1896, Galapagos.

1211. Mugil curema Cuvier & Valenciennes. *White Mullet; Blueback Mullet; Liza; Liza Blanca; Red-and-black-eyed Mullet.*
Both coasts of America; Cape Cod to Brazil; Magdalena Bay to Chile.
Mugil curema Cuvier & Valenciennes, Hist. Nat. Poiss., XI, 87, 1836, Brazil; Martinique; Cuba.

1212. Mugil hospes Jordan & Culver. *Lizita.*
West coast of Mexico.
Mugil hospes Jordan & Culver, in Jordan, Fishes Sinaloa, 422, pl. 31, 1895, Mazatlan, Mexico.

1213. Mugil gaimardianus Desmarest. *Red-eye Mullet; Liza Ojo de Perdriz.*
Florida Keys to Cuba; Key West.
Mugil gaimardianus Desmarest, Dict. Class., pl. 109. 1831, Cuba.

1214 Mugil setosus Gilbert.
Clarion Island of the Revillagigedo group.
Mugil setosus Gilbert, Proc. U. S. Nat. Mus. 1891, 549, Clarion Island.

1215. Mugil trichodon Poey. *Fan-tail Mullet.*
Florida Keys to Brazil; Key West.
Mugil trichodon Poey, Ann. Lyc. Nat. Hist. N. Y., XI, 1875, 66, pl. 8, figs. 4–8, Cuba.

Genus 367. CHÆNOMUGIL Gill.

Chænomugil Gill, Proc. Ac. Nat. Sci. Phila. 1863, 169 (*proboscideus*).

1216. Chænomugil proboscideus (Günther).

Pacific Coast of Tropical America; Mazatlan; Cordova; Panama.
Mugil proboscideus Günther, Cat., III, 459, 1861, island of Cordova (Cardon), west coast of Central America.

Genus 368. QUERIMANA Jordan & Gilbert.

Querimana Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 588 (*harengus*).

1217. Querimana harengus (Günther). *El Verde.*

Pacific Coast of tropical America, from Mazatlan to Peru.
Myxus harengus Günther, Cat., III, 467, 1861, Pacific Coast of Central America.

1218. Querimana gyrans Jordan & Gilbert. *Whirligig Mullet.*

South Atlantic Coast of North America, Woods Hole to Key West, and both coasts of Florida.
Querimana gyrans Jordan & Gilbert, Proc. U. S. Nat. Mus. 1884, 26, Key West.

Genus 369. AGONOSTOMUS Bennett.

Agonostomus Bennett, Proc. Com. Zool. Soc. 1830, 166 (*telfairii*).

Subgenus DAJAUS Cuvier & Valenciennes.

Dajaus Cuvier & Valenciennes, Hist. Nat. Poiss., XI, 164, 1836 (*monticola*).

1219. Agonostomus percoides Günther.

San Domingo.
Agonostoma percoides Günther, Cat., III, 464, 1861, San Domingo.

1220. Agonostomus monticola (Bancroft).

West Indies; eastern Mexico; Vera Cruz.
Mugil monticola Bancroft, in Griffith's edition of Cuvier's Animal Kingdom, Fishes, 367, pl. 36, 1836, Jamaica.

1221. Agonostomus nasutus Günther. *Trucha.*

Rivers of Central America, and north to Lower California.
Agonostoma nasutum Günther, Cat., III, 463, 1861, Rio Geronimo.

1222. Agonostomus microps Günther.

West Indies and Central America.
Agonostoma microps Günther, Cat., III, 462, 1861, probably West Indies.

Genus 370. JOTURUS Poey.

Joturus Poey, Memorias, II, 263, 1861 (*pichardi*).

1223. Joturus pichardi Poey. *Joturo; Bobo.*

Panama; Costa Rica; Cuba; Vera Cruz; Rio Almendares, near Havana.
Joturus pichardi Poey, Memorias, II, 263, 1861, cascades throughout Cuba.

Family CIX. SPHYRÆNIDÆ. The Barracudas.

Genus 371. SPHYRÆNA (Artedi) Bloch & Schneider.

Sphyræna Artedi, in Bloch & Schneider, Syst. Ichth., 109, 1801 (*sphyræna*).

1224. Sphyræna barracuda (Walbaum). *Great Barracuda; Picuda; Becuna; Short Barracuda.*

West Indies and Brazil, north to Pensacola, Charleston, and the Bermudas.
Esox barracuda Walbaum, Artedi Piscium, III, 94, 1792; after Catesby.

1225. Sphyræna ensis Jordan & Gilbert. *Picuda.*

Gulf of California to Panama.
Sphyræna ensis Jordan & Gilbert, Bull. U. S. Fish Com. 1882, 106, Mazatlan.

1226. Sphyræna guaguanche Cuvier & Valenciennes. *Guaguanche; Guaguanche Pelon; Long Barracuda.*

West Indies north to Pensacola; Gulf Stream to Woods Hole.
Sphyræna guachancho Cuvier & Valenciennes, Hist. Nat. Poiss., III, 342, 1829 (*lapsus* for *guaguanche*), Havana.

1227. Sphyræna picudilla Poey. *Picudilla.*

West Indies on the coasts of Cuba; Bahia.
Sphyræna picudilla Poey, Memorias, II, 162, 1860, Havana.

1228. Sphyræna borealis DeKay. *Northern Barracuda.*

Atlantic Coast of the United States, from Cape Cod to North Carolina.
Sphyræna borealis DeKay, N. Y. Fauna: Fishes, 37, pl. 60, fig. 196, 1842, New York.

1229. Sphyræna argentea Girard. *California Barracuda; Barracouta.*

Pacific Coast, from San Francisco southward to Cape San Lucas.
Sphyræna argentea Girard, Proc. Ac. Nat. Sci. Phila. 1854, 144, San Diego, Cal.

1230. Sphyræna sphyræna (Linnæus) *European Barracuda; Spet; Sennet.*

Coasts of southern Europe and neighboring islands, west to the Bermudas.
Esox sphyræna Linnæus, Syst. Nat., ed. x, 313, 1758, Mediterranean Sea.

Suborder RHEGNOPTERI.

Family CX. POLYNEMIDÆ. The Threadfins.

Genus 372. POLYNEMUS (Gronow) Linnæus.

Polynemus (Gronow) Linnæus, Syst. Nat., ed. x, 317, 1758 (in part; *quinquarius; virginicus; paradiseus*).

1231. Polynemus quinquarius Linnæus.

Atlantic Ocean, West Indies to coast of Africa.
Polynemus quinquarius Linnæus, Syst. Nat., ed. x, 317, 1758, America; after Gronow.

Genus 373. POLYDACTYLUS Lacépède. *Barbudos.*

Polydactylus Lacépède, Hist. Nat. Poiss., v, 419, 1832 (*plumieri* = *virginicus*).

1232. Polydactylus approximans (Lay & Bennett). *Raton.*

Pacific Coast of tropical America, from Guaymas to Panama.
Polynemus approximans Lay & Bennett, Beechey's Voyage, Zool., Fish., 57, 1849, Mazatlan.

1233. Polydactylus virginicus (Linnæus). *"Catfish."*

West Indies, north to the Florida Keys.
Polynemus virginicus Linnæus, Syst. Nat., ed. x, 317, 1758, America.

1234. Polydactylus octonemus (Girard).

New York to the Rio Grande.
Polynemus octonemus Girard, Proc. Ac. Nat. Sci. Phila. 1858, 167, Brazos Santiago; Galveston.

1235. Polydactylus opercularis (Gill).

Pacific Coast of tropical America, from Cape San Lucas to Panama.
Trichidion opercularis Gill, Proc. Ac. Nat. Sci. Phila. 1863, 168, Cape San Lucas.

Group AMMODYTOIDEI.

Family CXI. AMMODYTIDÆ. The Sand Launces.

Genus 374. AMMODYTES (Artedi) Linnæus. *Sand Launces.*

Ammodytes Artedi, in Linnæus, Syst. Nat., ed. x, 247, 1758 (*tobianus*).

1236. Ammodytes dubius Reinhardt.

Greenland to Cape Cod.
Ammodytes dubius Reinhardt, Dansk. Vidensk. Selsk. Afhandl., 132, 1838, Greenland.

1237. Ammodytes alascanus Cope.
North Pacific Coast of North America, Sitka to Aleutian Islands.
Ammodytes alascanus Cope, Proc. Am. Philos. Soc. 1873, 7, Sitka.

1238. Ammodytes americanus DeKay. *Sand Launce; Sand Eel; Lant.*
Newfoundland to Cape Hatteras.
Ammodytes americanus DeKay, N. Y. Fauna: Fishes, 317, 1842, Stratford, Conn.

1239. Ammodytes personatus Girard. *Sand Launce.*
Alaska to Monterey, California.
Ammodytes personatus Girard, Proc. Ac. Nat. Sci. Phila. 1856, 137, Cape Flattery, Washington.

Group BERYCOIDEI. The Berycoid Fishes.

Family CXII. BATHYCLUPEIDÆ.

Genus 375. BATHYCLUPEA Alcock.
Bathyclupea Alcock, Ann. and Mag. Nat. Hist., VIII, 1891, 130 (*hoskynii*).

1240. Bathyclupea argentea Goode & Bean.
Nevis Island, West Indies, in deep water.
Bathyclupea argentea Goode & Bean, Oceanic Ichthyology, 190, 1896, off Nevis Island, West Indies, at Blake Station 37, in 365 fathoms.

Family CXIII. STEPHANOBERYCIDÆ.

Genus 376 STEPHANOBERYX Gill.
Stephanoberyx Gill, Proc. U. S. Nat. Mus. 1883, 258 (*monæ*).

1241. Stephanoberyx monæ Gill.
Gulf Stream.
Stephanoberyx monæ Gill, Proc. U. S. Nat. Mus. 1883, 258, Gulf Stream, at Albatross Station 2077, in 1,255 fathoms.

1242. Stephanoberyx gillii Goode & Bean.
Gulf Stream.
Stephanoberyx gillii Goode & Bean, Oceanic Ichthyology, 187, fig. 206, 1896, Gulf Stream at Albatross Station 2099, in 2,949 fathoms.

Family CXIV. TRACHICHTHYIDÆ.

Genus 377. HOPLOSTETHUS Cuvier & Valenciennes.
Hoplostethus Cuv. & Val., Hist. Nat. Poiss., IV, 469, 1829 (*mediterraneus*).

1243. Hoplostethus mediterraneus Cuvier & Valenciennes.
Coasts of southern Europe; Gulf Stream.
Hoplostethus mediterraneus Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 469, 1829, Mediterranean Sea.

Family CXV. BERYCIDÆ. The Berycoids.

Genus 378. CAULOLEPIS Gill.
Caulolepis Gill, Forest and Stream, XXI, August 30, 1883, and in Proc. U. S. Nat. Mus., VI, 1884, 258 (*longidens*).

1244. Caulolepis longidens Gill.
Gulf Stream, in deep water.
Caulolepis longidens Gill, Proc. U. S. Nat. Mus. 1883, 258, Atlantic Ocean, latitude 39° 27′ N., longitude 69° 56′ 20″ W., in 1,346 fathoms.

Genus 379. ANOPLOGASTER Günther.
Anoplogaster Günther, Cat., I, 12, 1859 (*cornutus*).

1245. Anoplogaster cornutus (Cuvier & Valenciennes).
North Atlantic, in deep water.
Hoplostethus cornutus Cuvier & Valenciennes, Hist. Nat. Poiss., IX, 270, 1833, from stomach of an albicore, taken at 31° N., 40° W.

Genus 380. POROMITRA Goode & Bean.

Poromitra Goode & Bean, Bull. Mus. Comp. Zool., x, No. 5, 214, 1882 (*capito*).

1246. Poromitra capito Goode & Bean.

Gulf Stream, in latitude 34°.
Poromitra capito Goode & Bean, Bull. M. C. Z., x, No. 5, 215, 1882, Gulf Stream.

Genus 381. PLECTROMUS Gill.

Plectromus Gill, Proc. U. S. Nat. Mus. 1883, 257 (*suborbitalis*).

1247. Plectromus suborbitalis Gill.

Gulf Stream, in deep water.
Plectromus suborbitalis Gill, Proc. U. S. N. M., VI, 1883, 258, 38° 52′ N., 69° 24′ W., at Albatross Stations 2036, 2190, and 2535, in 1,149 to 1,800 fathoms.

1248. Plectromus lugubris (Gilbert).

Coast of California.
Melamphaës lugubris Gilbert, Proc. U. S. N. M. 1890 (1891), 59, coast of California, south of Point Conception, at Albatross Station 2923, in 822 fathoms.

1249. Plectromus beanii (Günther).

Gulf Stream.
Melamphaës beanii Günther, Deep Sea Fishes, Challenger, XXII, 29, 1887, Gulf Stream, in about latitude 40°.

1250. Plectromus crassiceps (Günther).

Mid-Atlantic; Pernambuco.
Scopelus crassiceps Günther, Ann. Mag. Nat. Hist., II, 1878, 185, deep water in mid-Atlantic and off Pernambuco.

1251. Plectromus cristiceps (Gilbert).

Coast of Washington and Oregon.
Melamphaës cristiceps Gilbert, Proc. U. S. Nat. Mus. 1890 (1891), 60, coast of Oregon and Washington at Albatross Station 3075, in 859 fathoms.

Genus 382. BERYX Cuvier.

Beryx Cuvier, Règne Animal, ed. 2, II, 151, 1829 (*decadactylus*).

1252. Beryx decadactylus Cuvier & Valenciennes. *Alfonsin a Casta Larga.*

Portugal, Madeira, Japan, and Cuba.
Beryx decadactylus Cuvier & Valenciennes, Hist. Nat. Poiss., III, 222, 1829, Madeira or Portugal.

1253. Beryx splendens Lowe. *Alfonsin a Casta Cumprida.*

Madeira, Japan, and Gulf Stream at 35° 49′ 30″ N., 74° 34′ 45″ W., in 424 fathoms.
Beryx splendens Lowe, Proc. Zool. Soc. Lond. 1833, 142, Madeira.

Family CXVI. HOLOCENTRIDÆ. The Squirrel-Fishes.

Genus 383. MYRIPRISTIS Cuvier.

Myripristis Cuvier, Règne Animal, ed. 2, II, 150, 1829 (*jacobus*).

Subgenus OSTICHTHYS Langsdorf.

Ostichthys Langsdorf, in Cuvier & Valenciennes, Hist. Nat. Poiss., III, 174, 1829, name only, passing reference.

1254. Myripristis trachypoma Günther.

West Indies, Cuba.
Myripristis trachypoma Günther, Cat., I, 25, 1859, Cuba.

Subgenus MYRIPRISTIS Cuvier.

1255. Myripristis jacobus Cuvier & Valenciennes. *Frère Jacques; Candil.*

West Indies to Brazil.
Myripristis jacobus Cuvier & Valenciennes, Hist. Nat. Poiss., III, 162, 1829, Martinique.

1256. Myripristis occidentalis Gill.
West coast of America, from Cape San Lucas to Panama.
Myriopristis occidentalis Gill, Proc. Ac. Nat. Sci. Phila. 1863, 87, Cape San Lucas.

1257. Myripristis pœcilopus (Gill).
West coast of America, from Cape San Lucas to Panama.
Rhamphoberyx pœcilopus Gill, Proc. Ac. Nat. Sci. Phila. 1863, 87, Cape San Lucas.

Genus 384. HOLOCENTRUS Gronow. *Squirrel-fishes.*
Holocentrus Gronow, Zoophyl., 65, 1763 (*rostratus*).

1258. Holocentrus ascensionis (Osbeck). *Matejuelo; Squirrel-fish; Welshman; Soldado.*
Florida to St. Helena; Cuba.
Perca ascensionis Osbeck, Iter Chin., 388, 1771, Ascension Island.

1258a. Holocentrus ascensionis rufus (Walbaum).
Bahia; Cuba.
Perca rufa Walbaum, Artedi Pisc., 351, 1792, Bahamas; after *perca marina rubra* of Catesby.

1259. Holocentrus siccifer Cope.
Bahamas.
Holocentrum siccifer um Cope, Trans. Amer. Philos. Soc., xxx, 1866, 465, New Providence, Bahamas.

1260. Holocentrus suborbitalis Gill. *Mojarra Cardinal.*
Mazatlan to Panama.
Holocentrum suborbitale Gill, Proc. Ac. Nat. Sci. Phila. 1863, 86, Cape San Lucas.

1261. Holocentrus coruscus Poey.
West Indies; Cuba and the Bahamas.
Holocentrum coruscum Poey, Memorias, II, 158, 1860, Cuba.

1262. Holocentrus brachypterus Poey.
Cuba.
Holocentrus brachypterus Poey, Repertorio, 184, 1866, Cuba.

1263. Holocentrus marianus Cuvier & Valenciennes. *Marian.*
West Indies: Cuba, Jamaica, and Martinique.
Holoncentrum marianum Cuvier & Valenciennes, Hist. Nat. Poiss., III, 219, 1829, Martinique.

1264. Holocentrus vexillarius Poey.
Cuba.
Holocentrum vexillarium Poey, Memorias, II, 158, 1860, Cuba.

1265. Holocentrus osculus Poey.
Cuba.
Holocentrum osculum Poey, Memorias, II, 156, 1860, Cuba.

1266. Holocentrus sancti-pauli Günther.
St. Paul Rocks, mid-Atlantic.
Holocentrum sancti-pauli Günther, Shore Fishes, 4, 1880, St. Paul Rocks.

Genus 385. PLECTRYPOPS Gill.
Plectrypops Gill, Proc. Ac. Nat. Sci. Phila. 1862, 237 (*retrospinis*).

1267. Plectrypops retrospinis (Guichenot).
Cuba.
Holocentrum retrospinis Guichenot, in Ramon de la Sagra, Hist. Cuba, 35, pl. 1, fig. 3, 1850, Cuba.

Family CXVII. POLYMIXIIDÆ. The Barbudos.

Genus 386. POLYMIXIA Lowe.
Polymixia Lowe, Trans. Cambr. Phil. Soc. 1838, 198 (*nobilis*).

1268. Polymixia lowei Günther.
Caribbean Sea; Cuba.
Polymixia lowei Günther, Cat., I, 17, 1859, Caribbean Sea.

Family CXVIII. MULLIDÆ. The Surmullets.

Genus 387. MULLUS Linnæus. *Surmullets.*
Mullus Linnæus, Syst. Nat., ed. X, 299, 1758 (*barbatus*).

1269. Mullus auratus Jordan & Gilbert.
Eastern coast of North America, Cape Cod to Pensacola.
Mullus barbatus auratus Jordan & Gilbert, Proc. J. S. Nat. Mus. 1882, 280, Pensacola, Florida.

Genus 388. MULLOIDES Bleeker.
Mulloides Bleeker, Ceram., II, 697, 1865 (*flavolineatus*).

1270. Mulloides rathbuni (Evermann & Jenkins).
Gulf of California.
Upeneus rathbuni Evermann & Jenkins, Proc. U. S. Nat. Mus. 1891, 158, pl. 2, fig. 4, Bay of Guaymas, Sonora.

Genus 389. UPENEUS Cuvier. *Goatfishes.*
Upeneus Cuvier, Règne Animal, ed. 2, vol. 2, 157, 1829 (*vittatus; russellii; bifasciatus; trifasciatus;* restricted by Bleeker to *bifasciatus*).

1271. Upeneus maculatus (Bloch). *Red Goatfish; Salmonete.*
West Indies and Brazil; Key West to Rio Janeiro.
Mullus maculatus Bloch, Ichthyologia, 348, 1793, Brazil.

1272. Upeneus dentatus Gill.
Pacific Coast of Mexico, Cape San Lucas, La Paz, and the Tres Marias Islands.
Upeneus dentatus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 256, Cape San Lucas.

1273. Upeneus parvus Poey.
Cuba.
Upeneus parvus Poey, Memorias, I, 226, 1851, Cuba.

1274. Upeneus martinicus Cuvier & Valenciennes. *Yellow Goatfish; Salmonete Amarilla; King Mullet.*
West Indies, north to Key West.
Upeneus martinicus Cuvier & Valenciennes, Hist. Nat. Poiss., III, 483, 1829, Martinique.

1275. Upeneus xanthogrammus Gilbert.
La Paz, Lower California.
Upeneus xanthogrammus Gilbert, Proc. U. S. Nat. Mus. 1891, 553, La Paz, Lower California.

1276. Upeneus grandisquamis Gill. *Chivo.*
Pacific Coast of Mexico and Central America, Guaymas to Panama.
Upeneus grandisquamis Gill, Proc. Ac. Nat. Sci. Phila. 1863, 168, west coast of Central America.

Group SCOMBROIDEI. The Mackerel-like Fishes.

Family CXIX. SCOMBRIDÆ. The Mackerels.

Genus 390. SCOMBER (Artedi) Linnæus.
Scomber Artedi, in Linnæus, Syst. Nat., ed. x, 297, 1758 (*scombrus*).

Subgenus SCOMBER (Artedi) Linnæus.

1277. Scomber scombrus Linnæus. *Common Mackerel.*
North Atlantic; Norway and Labrador; south to Spain and Cape Hatteras.
Scomber scombrus Linnæus, Syst. Nat., ed. x, 297, 1758, Atlantic.

Subgenus PNEUMATOPHORUS Jordan & Gilbert.
Pneumatophorus Jordan & Gilbert. Proc. U.S. N. M. 1882, 593 (*pneumatophorus*).

1278. Scomber colias Gmelin. *Chub Mackerel; Tinker Mackerel; Easter Mackerel; Thimble-eyed Mackerel; "Spanish Mackerel" of England.*
Atlantic and Pacific, north to England, Maine, and San Francisco; Mediterranean and southern California.
Scomber colias Gmelin, Syst. Nat., ed. XIII, 1329, 1788, Sardinia.

Genus 391. AUXIS Cuvier. *Frigate Mackerels.*
Auxis Cuvier, Règne Animal, ed. II, vol. 2, 119, 1829 (*rochei*).

1279. Auxis thazard (Lacépède). *Frigate Mackerel.*
All warm seas, occasionally northward to Cape Cod.
Scomber thazard Lacépède, Hist. Nat. Poiss., III, 9, 1802, 6° and 7° S. lat., coast of New Guinea.

Genus 392. GYMNOSARDA Gill. *Little Tunnies.*
Gymnosarda Gill, Proc. Ac. Nat. Sci. Phila. 1862, 125 (*unicolor*).

1280. Gymnosarda pelamis (Linnæus). *Oceanic Bonito.*
Warm seas; north to Cape Cod and Bermudas on the Atlantic Coast.
Scomber pelamis Linnæus, Syst. Nat., ed. x, 297, 1758, "in Pelago inter Tropicos."

1281. Gymnosarda alleterata (Rafinesque). *Little Tunny; Bonito.*
Warm seas; Cape Cod; West Indies; Mediterranean.
Scomber alletteratus Rafinesque, Carat. Alcuni Gen., etc., 46, 1810, Palermo.

Genus 393. THUNNUS South. *Great Tunnies.*
Thunnus South, Encyclop. Metropol., v, 620, 1845 (*thynnus*).

1282. Thunnus thynnus (Linnæus). *Tunny; Horse-mackerel; Great Albacore; Tuna.*
Cape Cod and off all coasts; north to England, Newfoundland, San Francisco, and Japan.
Scomber thynnus Linnæus, Syst. Nat., ed. x, 297, 1758, Europe.

Genus 394. GERMO Jordan. *Albacores.*
Germo Jordan, Proc. Ac. Nat. Sci. Phila. 1888, 180 (*alalonga*).

1283. Germo alalunga (Gmelin). *Long-finned Albacore; Albecor; Alilonghi; Germon.*
Mediterranean; San Francisco; Santa Barbara Islands.
Scomber alalunga Gmelin, Syst. Nat., I, 1330, 1788, Sardinia.

Genus 395. SARDA Cuvier. *Bonitos.*
Sarda Cuvier, Règne Animal, ed. 2, II, 199, 1829 (*pelamys* = *sarda*).

1284. Sarda sarda (Bloch). *Bonito.*
Atlantic Ocean, on both coasts, north to Cape Cod.
Scomber sarda Bloch, Ichthyologia, x, 35, pl. 334, 1793, Europe.

1285. Sarda chilensis (Cuvier & Valenciennes). *California Bonito; Skipjack.*
San Francisco to Patagonia and Japan.
Pelamys chilensis Cuvier & Valenciennes, Hist. Nat. Poiss., VIII, 163, 1831, Valparaiso.

Genus 396. SCOMBEROMORUS Lacépède.

Scomberomorus Lacépède, Hist. Nat. Poiss., III, 292, 1802 (*plumierii*).

1286. Scomberomorus concolor (Lockington). *Monterey Spanish Mackerel.*

Monterey Bay, California; Santa Cruz.
Chriomitra concolor Lockington, Proc. Ac. Nat. Sci. Phila. 1879, 133, Monterey, California.

1287. Scomberomorus maculatus (Mitchill). *Spanish Mackerel.*

East coast of America from Cape Ann to Brazil; common in Gulf of Mexico, but rare or unknown about Cuba.
Scomber maculatus Mitchill, Trans. Lit. Phil. Soc. N. Y., I, 1815, 426, New York.

1288. Scomberomorus sierra Jordan & Starks. *Sierra.*

Pacific Coast of Tropical America.
Scomberomorus sierra Jordan & Starks, in Jordan, Fishes Sinaloa, 428, 1895, Mazatlan, Mexico.

1289. Scomberomorus regalis (Bloch). *Sierra; Pintado.*

Cape Cod to Brazil; Cuba.
Scomber regalis Bloch, Ichthyol., pl. 333, 1795, Martinique; after a drawing by Plumier.

1290. Scomberomorus cavalla (Cuvier). *Sierra; Kingfish; Cavalla; Cero.*

Tropical Atlantic; Florida Keys and Charleston; Cape Cod; Africa; Brazil.
Cybium cavalla Cuvier, Règne Animal, ed. 2, II, 200, 1829; after *Guarapucu* of Marcgrave.

Genus 397. ACANTHOCYBIUM Gill. *Petos.*

Acanthocybium Gill, Proc. Ac. Nat. Sci. Phila. 1862, 125 (*sara* = *solandri*).

1291. Acanthocybium solandri (Cuvier & Valenciennes). *Peto; Wahoo; Guarapucu.*

Tropical seas; Cuba; Key West.
Cybium solandri Cuvier & Valenciennes, Hist. Nat. Poiss., VIII, 192, 1831; after MS. of Solander, open sea; no locality.

Family CXX. GEMPYLIDÆ. The Escolars.

Genus 398. ESCOLAR Jordan & Evermann.

Escolar Jordan & Evermann, in Goode & Bean, Oceanic Ichthology, 519, 1896 (*violaceus*).

1292. Escolar violaceus (Bean).

Le Have Bank.
Thyrsitops violaceus Bean, Proc. U. S. Nat. Mus. 1887, 513, Le Have Bank.

Genus 399. RUVETTUS Cocco. *Escolars.*

Ruvettus Cocco, Giorn. Sci. Sicilia, XLII, 2, 1829 (*pretiosus*).

1293. Ruvettus pretiosus Cocco. *Escolar; Rovetto; Ruvetto; Chicola; Oilfish; Scourfish; Plain-tail.*

Mediterranean and westward in the Atlantic.
Ruvettus pretiosus Cocco, in Giornale di Scienz e per la Sicilia, XLII, 21, 1829, Messina.

Genus 400. EPINNULA Poey.

Epinnula Poey, Memorias, I, 369, 1854 (*magistralis*).

1294. Epinnula magistralis Poey. *Dómine.*

Havana.
Epinnula magistralis Poey, Memorias, I, 369, 1854, Havana.

Genus 401. NEALOTUS Johnson.

Nealotus Johnson, Proc. Zool. Soc. Lond. 1865, 434 (*tripes*).

1295. Nealotus tripes Johnson.

Madeira; between the Bahamas and Bermudas.
Nealotus tripes Johnson, Proc. Zool. Soc. Lond. 1865, 434, Madeira.

Genus 402. PROMETHICHTHYS Gill.

Promethichthys Gill, Mem. Nat. Ac. Sci., VI, 1893, 115 and 123 (*prometheus*).

1296. Promethichthys prometheus (Cuvier & Valenciennes). *Rabbit-fish; Coelbo; Concjo; Bermuda Catfish.*

Tropical Atlantic; Cuba; Bermudas.

Gempylus prometheus Cuvier & Valenciennes, Hist. Nat. Poiss., VIII, 213, pl. 222, 1831, St. Helena.

1297. Promethichthys parvipinnis (Goode & Bean).

Western Atlantic.

Dicrotus parvipinnis Goode & Bean, Oceanic Ichthyology, 201, 1896, Gulf Stream at Albatross Stations 2537, 2542, and 2601, at about 40° N., 70° W.

Genus 403. GEMPYLUS Cuvier & Valenciennes. *Snake Mackerels.*

Gempylus Cuvier & Valenciennes, Hist. Nat. Poiss., VIII, 207, 1831 (*serpens*).

1298. Gempylus serpens Cuvier & Valenciennes.

Deep seas.

Gempylus serpens Cuvier & Valenciennes, Hist. Nat. Poiss., VIII, 207, 1831, Martinique.

Family CXXI. LEPIDOPIDÆ.

Genus 404. APHANOPUS Lowe.

Aphanopus Lowe, Proc. Zool. Soc. Lond. 1839, 79 (*carbo*).

1299. Aphanopus minor Collett.

East coast of Greenland.

Aphanopus minor Collett, Vidensk. Selsk. Forhandl. Christiania, No. 19, 3, 1886, east coast of Greenland, at 65° N., 31° W.

Genus 405. EVOXYMETOPON Poey. *Tirantes.*

Evoxymetopon Poey, in Gill, Proc. Ac. Nat. Sci. Phila. 1863, 228 (*tæniatus*).

1300. Evoxymetopon tæniatus Poey. *Tirante.*

Cuba.

Evoxymetopon tæniatus Poey, in Gill, Proc. Ac. Nat. Sci. Phila. 1863, 228, Cuba.

Genus 406. LEPIDOPUS Gouan. *Frost-fishes.*

Lepidopus Gouan, Hist. Nat. Poiss., 185, 1770 (*gouani*).

1301. Lepidopus caudatus (Euphrasen). *Frost-fish; Scabbard-fish.*

Atlantic; Norway to South Africa and New Zealand.

Trichiurus caudatus Euphrasen, Stockh. K. Vet. Ac. Nya Handl., 52, pl. 9, fig. 2, 1788, Mediterranean.

Genus 407. BENTHODESMUS Goode & Bean.

Benthodesmus Goode & Bean, Proc. U. S. Nat. Mus., IV, 1881, 380 (*elongatus*).

1302. Benthodesmus atlanticus Goode & Bean.

Western edge Grand Bank of Newfoundland, in 80 fathoms.

Benthodesmus atlanticus Goode & Bean, Oceanic Ichth., 205, 1896, Grand Bank.

Family CXXII. TRICHIURIDÆ. The Cutlas-Fishes.

Genus 408. TRICHIURUS Linnæus. *Hairtails.*

Trichiurus Linnæus, Syst. Nat., ed. x, 246, 1758 (*lepturus*).

1303. Trichiurus lepturus Linnæus. *Cutlas-fish; Scabbard-fish; Silver-fish; Sable; Savola.*

Warm seas north to Virginia and Lower California; West Indies.

Trichiurus lepturus Linnæus, Syst. Nat., ed. x, 246, 1758, America; after *Lepturus* of Artedi.

Family CXXIII. ISTIOPHORIDÆ. The Sail-Fishes.

Genus 409. **ISTIOPHORUS** Lacépède. *Sail-fishes.*

Istiophorus Lacépède, Hist. Nat. Poiss., III, 374, 1802 (*gladifer* = *gladius*).

1304. **Istiophorus nigricans** (Lacépède). *Sail-fish; Spike-fish; Boohoo; Guebucu; Vollier; Aguja Voladora; Aguja Prieta.*

West Indies and warmer parts of the Atlantic, north to Key West and France; Florida Keys; Newport; south of Savannah.

Makaira nigricans Lacépède, Hist. Nat. Poiss., IV, 688, 1803, Rochelle; from a drawing by M. Traversay.

Genus 410. **TETRAPTURUS** Rafinesque. *Spear-fishes.*

Tetrapturus Rafinesque, Indice d'Ittiol. Sicil., 30, 1810 (*belone*).

1305. **Tetrapturus imperator** (Bloch & Schneider). *Bill-fish; Spear-fish; Aguja Blanca; Aguja de Paladar.*

West Indies; Cape Cod.

Xiphias imperator Bloch & Schneider, Syst. Ichth., 93, pl. XXI, 1801, Mediterranean; after Duhamel.

1306. **Tetrapturus amplus** Poey. *Aguja de Casta.*

West Indies.

Tetrapturus amplus Poey, Memorias, II, 243, 1861, Havana.

Family CXXIV. XIPHIIDÆ. The Sword-Fishes.

Genus 411. **XIPHIAS** Linnæus. *Sword-fishes.*

Xiphias Linnæus, Syst. Nat., ed. X, 248, 1758 (*gladius*).

1307. **Xiphias gladius** Linnæus. *Common Sword-fish; Espada; Espadon; Emperador.*

Atlantic Ocean on both coasts; Cuba to Cape Breton and Newfoundland Banks; Pacific at Santa Barbara Islands.

Xiphias gladius Linnæus, Syst. Nat., ed. X, 248, 1758, Europe.

Family CXXV. NEMATISTIIDÆ. The Papagallos.

Genus 412. **NEMATISTIUS** Gill.

Nematistius Gill, Proc. Ac. Nat. Sci. Phila. 1862, 258 (*pectoralis*).

1308. **Nematistius pectoralis** Gill.

Gulf of California to Panama; Cape San Lucas; Guaymas; Picheluogo, Mazatlan; Magdalena Bay; Panama.

Nematistius pectoralis Gill, Proc. Ac. Nat. Sci. Phila. 1862, 259, Cape San Lucas.

Family CXXVI. CARANGIDÆ. The Pampanos.

Genus 413. **OLIGOPLITES** Gill.

Oligoplites Gill, Proc. Ac. Nat. Sci. Phila. 1863, 166 (*occidentalis*).

1309. **Oligoplites saurus** (Bloch & Schneider). *Leather-jacket; Leather-coat.*

Both coasts of America, and West Indies, north to New York and Lower California.

Scomber saurus Bloch & Schneider, Syst. Ichth., 32, 1801, Jamaica.

1310. **Oligoplites saliens** (Bloch). *Sauteur.*

West Indies.

Scomber saliens Bloch, Ichthyologia, pl. 335, 1793, Martinique; on a figure by Plumier.

1310a. **Oligoplites saliens palometa** (Cuvier & Valenciennes).

Lake Maracaibo, Venezuela.

Chorinemus palometa Cuvier & Valenciennes, Hist. Nat. Poiss., VIII, 392, 1831, Lake Maracaibo, Venezuela.

1311. Oligoplites altus (Günther).
Pacific Coast of tropical America; Panama.
Chorinemus altus Günther, Fishes Central Amer., 433, 1869, Panama.

1312. Oligoplites mundus Jordan & Starks.
West coast of Mexico; Mazatlan.
Oligoplites mundus Jordan & Starks, in Jordan, Proc. Cal. Ac. Sci. 1896, Mazatlan, Mexico.

Genus 414. NAUCRATES Rafinesque.
Naucrates Rafinesque, Caratteri di Alcuni Nuovi Generi, etc., 44, 1810 (*conductor*).

1313. Naucrates ductor (Linnæus). *Pilot-fish; Romero.*
Atlantic Coast, from Cape Cod to the West Indies.
Gasterosteus ductor Linnæus, Syst. Nat., ed. x, 295, 1758, "in pelago."

Genus 415. SERIOLA Cuvier.
Seriola Cuvier, Règne Animal, ed. 2, II, 205, 1829 (*dumerili*).

1314. Seriola dorsalis (Gill). *Yellow-tail.*
Pacific Coast, from Point Conception southward to Mazatlan; Santa Barbara Islands.
Halatractus dorsalis Gill, Proc. Ac. Nat. Sci. Phila. 1863, 84, Cape San Lucas.

1315. Seriola zonata (Mitchill). *Shark Pilot; Rudder-fish.*
Atlantic Coast of the United States, from Cape Cod to Cape Hatteras.
Scomber zonatus Mitchill, Trans. Lit. Phil. Soc. N. Y. 1815, 427, New York Bay.

1315a. Seriola zonata carolinensis Holbrook.
Gulf of Mexico, and on Atlantic Coast north to Cape Hatteras.
Seriola carolinensis Holbrook, Ichthyol. S. C., 72, 1860, Charleston, S. C.

1316. Seriola lalandi Cuvier & Valenciennes. *Great Amber-fish; Amber Jack; Coronado.*
West Florida to Brazil; Key West.
Seriola lalandi Cuvier & Valenciennes, Hist. Nat. Poiss., IX, 208, 1833, Brazil.

1317. Seriola dumerili (Risso). *Amber Jack; Coronado.*
Mediterranean to West Indies, north to Key West and Pensacola.
Caranx dumerili Risso, Ichthyol. Nice, 175, pl. 6, fig. 20, 1810, Nice.

Subgenus ZONICHTHYS Swainson.
Zonichthys Swainson, Nat. Hist. Class. Fishes, II, 1839 (*fasciatus*).

1318. Seriola mazatlana Steindachner.
West coast of Mexico, Mazatlan.
Seriola mazatlana Steindachner, Ichth. Beitr., v, 8, 1876, Mazatlan, Mexico.

1319. Seriola fasciata (Bloch). *Madregal.*
West Indies, north to Charleston, South Carolina.
Scomber fasciatus Bloch, Ichthyologia, pl. 341, 1793, no locality.

1320. Seriola rivoliana Cuvier & Valenciennes.
Mediterranean to Brazil, West Indies, and South Carolina; Florida coast.
Seriola rivoliana Cuvier & Valenciennes, Hist. Nat. Poiss., IX, 207, 1833, the Greek Archipelago.

1321. Seriola falcata Cuvier & Valenciennes. *Madregal; "Rock Salmon."*
West Indies, north to Florida and Carolina.
Seriola falcata Cuv. & Val., Hist. Nat. Poiss., IX, 210, 1833, Gulf of Mexico.

Genus 416. ELAGATIS Bennett.
Elagatis Bennett, Narrative of a Whaling Voyage, II, 283, 1840 (*bipinnulata*).

1322. Elagatis bipinnulatus (Quoy & Gaimard). *Runner; Yellow-tail.*
Tropical seas; West Indies; Long Island.
Seriola bipinnulata Quoy & Gaimard, Voy. Uran., Zool., I, 363, pl. 61, fig. 3, 1824.

Genus 417. DECAPTERUS Bleeker. *Mackerel Scads.*
Decapterus Bleeker, Natuurk. Tydschr., v, 1855, 417 (*kurra*).

1323. Decapterus punctatus (Agassiz). *Scad; Round Robin; Cigar-fish; Quia-quia.*
Cape Cod to Brazil, coasts of Florida and the West Indies.
Caranx punctatus Agassiz, Spix, Pisc. Bras., 108, pl. 56*a*, fig. 2, 1829, Brazil.

1324. Decapterus scombrinus (Valenciennes).
Galapagos Islands.
Caranx scombrinus Valenciennes, Voyage de la Vénus, 332, pl. 7, fig. 1, 1846, Galapagos Islands.

1325. Decapterus sanctæ-helenæ Cuvier & Valenciennes.
South America, both coasts; Cuba.
Decapterus sanctæ-helenæ Cuvier & Valenciennes, Hist. Nat. Poiss., ix, 37, 1833, St. Helena.

1326. Decapterus hypodus Gill.
Cape San Lucas.
Decapterus hypodus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 261, Cape San Lucas.

1327. Decapterus macarellus (Cuvier & Valenciennes). *Mackerel Scad; Antonino.*
Warm parts of the Atlantic, northward to Cape Cod.
Caranx macarellus Cuv. & Val., Hist. Nat. Poiss., ix, 40, 1833, Martinique.

Genus 418. TRACHURUS Rafinesque. *Saurels.*
Trachurus Rafinesque, Indice d'Ittiologia Siciliana, 20, 1810 (*trachurus*).

1328. Trachurus picturatus (Bowdich). *Horse-mackerel; Xurel.*
Coast of California, from San Francisco southward to the Galapagos Islands and Chile; Mediterranean and New Zealand.
Scriola picturata Bowdich, Excursion to Madeira, 123, fig. 27, 1825, Madeira.

1329. Trachurus trachurus (Linnæus). *Gascon; Saurel.*
North Atlantic, chiefly on the coast of Europe, south to Spain and Naples; Newport, Rhode Island; Pensacola; also on the west coast at Cape San Lucas.
Scomber trachurus Linnæus, Syst. Nat., ed. x, 298, 1758, Mediterranean.

Genus 419. TRACHUROPS Gill.
Trachurops Gill, Proc. Ac. Nat. Sci. Phila. 1862, 431 (*crumenophthalmus*).

1330. Trachurops crumenophthalmus (Bloch). *Goggler; Big-eyed Scad; Goggle-eye Jack; Chicharro.*
Atlantic coast of the United States, Central America, South America, and Africa; West Indies; Cape San Lucas; Panama.
Scomber crumenophthalmus Bloch, Ichthyol., pl. 343, 1793, Acara in Guinea.

Genus 420. HEMICARANX Bleeker.
Hemicaranx Bleeker, Versl. Kon. Ak. Wet., xiv, 134, 1862 (*marginatus*).

1331. Hemicaranx amblyrhynchus (Cuvier & Valenciennes).
Cape Hatteras to Brazil; West Indies; Carolina and Florida.
Caranx amblyrhynchus Cuvier & Valenciennes, Hist. Nat. Poiss., ix, 100, pl. 248, 1833, Brazil.

1332. Hemicaranx atrimanus (Jordan & Gilbert).
Pacific Coast of tropical America; Panama.
Caranx atrimanus Jordan & Gilbert, Bull. U. S. F. C., i, 1881, 308, Panama.

1333. Hemicaranx secundus (Poey). *Segundo; Volantin.*
Cuba.
Caranx secundus, Poey, Memorias, ii, 223, 1860, Cuba.

1334. Hemicaranx furthii (Steindachner).
Panama.
Caranx fürthii Steindachner, Ichth. Beitr., iv, 12, 1875, Panama.

1335. Hemicaranx leucurus (Günther).
Pacific Coast of tropical America; Panama.
Caranops leucurus Günther, Proc. Zool. Soc. Lond. 1864, 24, Panama.

Genus 421. CARANX Lacépède.
Caranx Lacépède, Hist. Nat. Poiss., III, 72, 1802 (*trachurus, speciosus, carangus, ruber*, etc.).

Subgenus SELAR Bleeker.
Selar Bleeker, Verhandl. Batav. Genootsch., XIV, 1851 (*boops*).

1336. Caranx vinctus Jordan & Gilbert. *Cocinera.*
Pacific Coast of Mexico, Mazatlan to Punta Arenas; Gulf of California; Central America.
Caranx vinctus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 349, Mazatlan.

Subgenus CARANX Lacépède.

1337. Caranx ruber (Bloch). *Cibi; Carbonero; Green Jack.*
West Indies.
Scomber ruber Bloch, Ichthyologia, pl. 342, 1793, Ste. Croix.

1338. Caranx bartholomæi Cuvier & Valenciennes. *Yellow Jack; Cibi Amarillo.*
West Indies, northward to Florida and North Carolina; Cuba.
Caranx bartholomæi Cuvier & Valenciennes, Hist. Nat. Poiss., IX, 100, 1833, St. Bartholomew.

Subgenus TRICROPTERUS Rafinesque.
Tricropterus Rafinesque, Caratteri Alcuni Nuovi Generi, 41, 1810 (*carangus*=*hippos*).

1339. Caranx hippos (Linnæus). *Crevallé; Toro; Horse-cavallé; Crevally Jack; Jiguagua.*
Warm seas generally, both coasts of tropical America, north to Cape Cod and Gulf of California; East Indies.
Scomber hippos Linnæus, Syst. Nat., ed. XII, 494, 1766, Charleston, S. C.

Subgenus PARATRACTUS Gill.
Paratractus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 432 (*pisquetus*=*crysos*).

1340. Caranx crysos (Mitchill). *Hard-tail; Runner; Jurel; Yellow Mackerel; Cojinera; Crevallé.*
Cape Cod to Brazil.
Scomber crysos Mitchill, Trans. Lit. Phil. Soc. N. Y. 1815, 424, New York.

1341. Caranx caballus (Günther). *Cocinero; Jurel; Cocinero Dorado.*
Pacific Coast of tropical America, San Diego to Panama.
Caranx caballus Günther, Fish. Centr. Amer., 431, 1869, Panama.

Subgenus CARANGICHTHYS Bleeker.
Carangichthys Bleeker, Bijdragen Ichthyol. Fauna Celebes, III, 760, about 1852 (*typus*).

1342. Caranx marginatus Gill.
Pacific Coast of Mexico; Mazatlan and Panama.
Caranx marginatus Gill, Proc. Ac. Nat. Sci. Phila. 1866, 166, Panama.

1343. Caranx latus Agassiz. *Jurel; Xurel; Horse-eye Jack.*
All warm seas, north to Virginia; west coast of Mexico; Panama, Clarion Island, and Chatham Island.
Caranx latus Agassiz, Spix, Pisc. Bras., 105, 1829, Brazil.

1344. Caranx medusicola, Jordan & Starks.
Mazatlan, Mexico.
Caranx medusicola Jordan & Starks, in Jordan, Fishes Sinaloa, 430, pl. 34, 1895, Mazatlan.

1345. Caranx lugubris Poey. *Tiñosa.*
Rocky islands in the tropics; Clarion Island (Revillagigedo Archipelago); West Indies; mid-Atlantic; mid-Pacific.
Caranx lugubris Poey, Memorias, II, 222, 1860, Cuba.

1346. Caranx melampygus Cuvier & Valenciennes.
Pacific Ocean generally; Revillagigedo Islands.
Caranx melampygus Cuv. & Val., Hist. Nat. Poiss., IX, 116, 1833, East Indies.

Subgenus **URASPIS** Bleeker.
Uraspis Bleeker, Verhandl. Batav. Genootsch., XXIV, 1851 (*boops*).

1347. Caranx guara (Bonnaterre). *"Enxaréo."*
Tropical parts of the Atlantic; Mediterranean; Africa; Brazil; Madeiras; South Pacific.
Scomber guara Bonnaterre, Encycl., 139, pl. 58, 1788, on a specimen from America in Jussieu's collection.

Genus 422. GNATHANODON Bleeker.
Gnathanodon Bleeker, Verh. Batav. Genootsch., XXIV, Makreele, 1851 (*speciosus*).

1348. Gnathanodon speciosus (Forskål). *Mojarra Dorada.*
Tropical parts of the Pacific Ocean; East Indies; Mazatlan to Panama.
Scomber speciosus Forskål, Descr. Anim., XII, 54, 1775, Red Sea.

Genus 423. CARANGOIDES Bleeker.
Carangoides Bleeker, Verh. Batav. Genootsch., XXIV, Makreele, 1851 (*plagiotænia*).

1349. Carangoides orthogrammus (Jordan & Gilbert).
Revillagigedo Islands; Pacific islands.
Caranx orthogrammus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 226, Sulphur Bay, Clarion Island (Revillagigedo Archipelago).

Genus 424. CITULA Cuvier.
Citula Cuvier, Règne Animal, ed. I, 315, 1817 (*armata*).

1350. Citula dorsalis (Gill). *Pámpano.*
Pacific Coast of tropical America; Mazatlan; Panama.
Carangoides dorsalis Gill, Proc. Ac. Nat. Sci. Phila. 1863, 166, Panama.

Genus 425. ALECTIS Rafinesque.
Alectis Rafinesque, Analyse de la Nature, 1815 (substitute for *Gallus*).

1351. Alectis ciliaris (Bloch). *Thread-fish; Cobbler-fish; Sunfish.*
Tropical America on both coasts, ranging north to Cape Cod and Mazatlan, Florida Keys and Cuba.
Zeus ciliaris Bloch, Ichthyol., VI, 29, 1788, East Indies.

Genus 426. HYNNIS Cuvier & Valenciennes.
Hynnis Cuvier & Valenciennes, Hist. Nat. Poiss., IX, 195, 1833 (*yorcensis*).

1352. Hynnis cubensis (Poey).
Cuba.
Hynnis cubensis Poey, Memorias, II, 235, 1860, Havana.

1353. Hynnis hopkinsi Jordan & Starks. *Pámpano.*
Puerto Viejo, near Mazatlan.
Hynnis hopkinsi Jordan & Starks, in Jordan, Fishes Sinaloa, 435, pl. 35, 1895, Mazatlan.

Genus 427. VOMER Cuvier & Valenciennes.
Vomer Cuvier & Valenciennes, Hist. Nat. Poiss., IX, 189, 1833 (*brownii*).

1354. Vomer dorsalis Gill.
West Indies and west coast of Africa.
Vomer dorsalis Gill, Proc. Ac. Nat. Sci. Phila. 1862, 436; after Günther.

1355. Vomer setipinnis (Mitchill). *Blunt-nosed Shiner; Jorobado; Moonfish; Horsefish.*
Both coasts of America, from Maine to Florida, and Cape San Lucas to Peru.
Zeus setipinnis Mitchill, Trans. Lit. Philos. Soc. N. Y. 1815, 384, New York.

1356. Vomer spixii (Swainson).
West Indies south to Brazil.
Platysomus spixii Swainson, Class. Fishes, etc., II, 250 and 406, 1839, Brazil; after Spix & Agassiz, pl. 57.

Genus 428. SELENE Lacépède. *Moonfishes.*
Selene Lacépède, Hist. Nat. Poiss., IV, 560, 1803 (*argentea* = young of *vomer*).

1357. Selene œrstedii Lütken.
Pacific Coast, Mazatlan to Panama.
Selene œrstedii Lütken, Spolia Atlantica, 144, 1880, Punta Arenas.

1358. Selene vomer (Linnæus). *Moonfish; Jorobado; Look-down; Horsehead.*
Tropical America, on both coasts; Cape Cod to Brazil; Lower California to Peru.
Zeus vomer Linnæus, Syst. Nat., ed. X, 266, 1758, America.

Genus 429. CHLOROSCOMBRUS Girard. *Casabes.*
Chloroscombrus Girard, Proc. Ac. Nat. Sci. Phila. 1858, 168 (*cosmopolita*).

1359. Chloroscombrus orqueta Jordan & Gilbert. *Orqueta; Xurel de Castilla.*
Pacific Coast of tropical America; Magdalena Bay to Panama.
Chloroscombrus orqueta Jordan & Gilbert, Proc. U. S. N. M. 1882, 646, Panama.

1360. Chloroscombrus chrysurus (Linnæus). *Casabe; Bumper.*
Cape Cod to Brazil; common on our South Atlantic Coast and in Cuba.
Scomber chrysurus Linnæus, Syst. Nat., ed. XII, 494, 1766, Charleston, S. C.

Genus 430. TRACHINOTUS Lacépède. *Pámpanos.*
Trachinotus Lacépède, Hist. Nat. Poiss., III, 79, 1802 (*falcatus*).

1361. Trachinotus glaucus (Bloch). *Gaff-topsail; Pámpano; Old Wife; Palometa.*
Tropical America, from Virginia to the Caribbean Sea.
Chætodon glaucus Bloch, Ichthyol., pl. 210, 1787, Martinique; on a figure by Plumier.

1362. Trachinotus rhodopus Gill. *Pampanito.*
Pacific Coast of tropical America, south to Panama.
Trachinotus rhodopus Gill, Proc. Ac. Nat. Sci. Phila. 1863, 85, Cape San Lucas.

1363. Trachinotus falcatus (Linnæus). *Round Pámpano; Palometa; Permit of Indian River.*
East coast of United States, Cape Cod to Florida
Labrus falcatus Linnæus, Syst. Nat., ed. X, 284, 1758, America.

1364. Trachinotus rhomboides (Bloch). *Round Pámpano.*
West Indies to Brazil.
Chætodon rhomboides Bloch, Syst. Ichth., pl. 209, 1787, Martinique; on a drawing by Plumier.

1365. Trachinotus culveri Jordan & Starks.
Astillero, at Mazatlan, Mexico.
Trachinotus culveri Jordan & Starks in Jordan, Fishes Sinaloa, 439, pl. 36, 1895, Mazatlan.

1366. Trachinotus kennedyi Steindachner.
Tropical America; Magdalena Bay to Panama; Pacific Coast.
Trachinotus kennedyi Steindachner, Ichth. Beitr., III, 47, pl. VII, 1875, Magdalena Bay.

1367. Trachinotus goodei Jordan & Evermann. *Permit; Palometa; Great Pámpano.*
West Indies, north to southern Florida.
Trachinotus goodei, Jordan & Evermann, Fishes North and Middle America, 943, 1896, Key West, Fla.

1368. **Trachinotus argenteus** Cuvier & Valenciennes.
Atlantic Coast.
Trachinotus argenteus Cuvier & Valenciennes, Hist. Nat. Poiss., VIII, 413, 1831, New York and Rio Janeiro.

1369. **Trachinotus carolinus** (Linnæus). *Common Pompano; Pámpano; Cobbler-fish.*
South Atlantic and Gulf coasts of United States; Cape Cod; West Indies; Brazil.
Gasterosteus carolinus Linnæus, Syst. Nat., ed. XII, 490, 1766, Carolina.

1370. **Trachinotus paloma** Jordan & Starks.
Cape San Lucas, Mazatlan, San Juan Lagoon.
Trachinotus paloma Jordan & Starks, in Jordan, Fishes Sinaloa, 437, 1895, Mazatlan, Mexico.

1371. **Trachinotus cayennensis** Cuvier & Valenciennes.
Cayenne.
Trachinotus cayennensis Cuvier & Valenciennes, Hist. Nat. Poiss., VIII, 417, 1831, Cayenne.

Family CXXVII. POMATOMIDÆ. The Bluefishes.

Genus 431. POMATOMUS Lacépède.
Pomatomus Lacépède, Hist. Nat. Poiss., IV, 436, 1802 (*skib*).

1372. **Pomatomus saltatrix** (Linnæus). *Bluefish; Snap Mackerel; Skipjack.*
Atlantic and Indian oceans.
Perca saltatrix Linnæus, Syst. Nat., ed. X, I, 293, 1758, Carolina.

Family CXXVIII. RACHYCENTRIDÆ. Sergeant-Fishes.

Genus 432. RACHYCENTRON Kaup.
Rachycentron Kaup, Isis, XIX, col. 89, 1826 (*typus*).

1373. **Rachycentron canadum** (Linnæus). *Sergeant-fish; Crab-eater; Cobia.*
In all warm seas; Atlantic Coast, north to Cape Cod.
Gasterosteus canadus Linnæus, Syst. Nat., ed. XII, 491, 1766, Carolina.

Family CXXIX. NOMEIDÆ.

Genus 433. NOMEUS Cuvier.
Nomeus Cuvier, Règne Animal, ed. 1, II, 315, 1817 (*gronovii*).

1374. **Nomeus gronovii** (Gmelin). *Portuguese Man-of-war-fish; Harder; Pastor.*
Tropical parts of the Atlantic and Indian oceans; Sargasso Sea; Florida; Bermuda; Woods Hole, Massachusetts.
Gobius gronovii Gmelin, Syst. Nat., ed. XIII, 1205, 1788, Tropical America; after Gronow.

Genus 434. PSENES Cuvier & Valenciennes.
Psenes Cuvier & Valenciennes, Hist. Nat. Poiss., IX, 259, 1833 (*cyanophrys*).

1375. **Psenes pellucidus** Lütken.
Gulf Stream, at 32° 24′ N., 76° 55′ W., in 528 fathoms.
Psenes pellucidus Lütken, Spolia Atlantica, 516 (109), fig. 601 (198), 1880, Strait of Surabaja.

1376. **Psenes cyanophrys** Cuvier & Valenciennes.
Open sea; Atlantic, Pacific, and Indian oceans; Jamaica and Martinique.
Psenes cyanophrys Cuvier & Valenciennes, Hist. Nat. Poiss., IX, 260, pl. 265, 1833, New Iceland.

1377. **Psenes maculatus** Lütken.
Open Atlantic.
Psenes maculatus Lütken, Spolia Atlantica, 110, 1880, open Atlantic, 39° N., 25° 4′ S., and between 34° and 27° W., in 600 to 700 fathoms.

1378. Psenes regulus Poey.
Coasts of Cuba; East Indies.
Psenes regulus Poey, Synopsis, 375, 1868, Cuba.

Family CXXX. CORYPHÆNIDÆ. The Dolphins.

Genus 435. CORYPHÆNA Linnæus.
Coryphæna Linnæus, Syst. Nat., ed. x, 261, 1758 (*hippurus*).

1379. Coryphæna hippurus Linnæus. *Common Dolphin; Dorado; Dourade.*
Pelagic to Cape Cod and northward, South Carolina to Texas.
Coryphæna hippurus Linnæus, Syst. Nat., ed. x, 261, 1758, open seas.

1380. Coryphæna equisetis Linnæus. *Small Dolphin.*
Open Atlantic, West Indies.
Coryphæna equisetis Linnæus, Syst. Nat., ed. x, 261, 1758 (misprinted *equiselis*), high seas; after Osbeck.

Family CXXXI. LAMPRIDÆ. The Mariposas.

Genus 436. LAMPRIS Retzius.
Lampris Retzius, Nya Handlung, III, 91, 1799 (*guttatus* = *luna*).

1381. Lampris luna (Gmelin). *Mariposa; Opah; San Pedro Fish; Cravo; Jerusalem Haddock; Glance-fish; Gudlax; Moonfish.*
Atlantic and Pacific; Madeira; Newfoundland; Maine; Cuba; Monterey.
Zeus luna Gmelin, Syst. Nat., ed. XIII, 1225, 1788, Normandy.

Family CXXXII. PTERACLIDIDÆ.

Genus 437. PTERACLIS Gronow.
Pteraclis Gronow, Acta Helvetica, VII, 44, 1772 (*relifera*).

1382. Pteraclis carolinus Cuvier & Valenciennes.
Coast of South Carolina.
Pteraclis carolinus Cuvier & Valenciennes, Hist. Nat. Poiss., IX, 368, 1833, off coast South Carolina.

Family CXXXIII. BRAMIDÆ. The Pomfrets.

Genus 438. TARACTES Lowe.
Taractes Lowe, Proc. Zool. Soc. Lond. 1863, 82 (*asper;* probably young of *Brama longipinnis*).

1383. Taractes saussurii (Lunel).
Havana.
Brama saussurii Lunel, Revue du Genre Brama, Mém. Soc. Phys. Hist. Nat. Genève, XVIII, 1865, 185, tab. 2, Cuba.

Genus 439. BRAMA Bloch & Schneider. *Pomfret.*
Brama Bloch & Schneider, Syst. Ichth., 98, 1801 (*raii*).

1384. Brama agassizii Poey.
Cuba.
Brama agassizii Poey, Memorias, II, 204, 1860, Havana.

1385. Brama brevoortii Poey.
Cuba.
Brama brevoortii Poey, Memorias, II, 206, 1860, Havana.

1386. Brama raii (Bloch). *Pomfret; Castagnole; Rondanin.*
Open seas; Europe; Faroe Islands; Bermuda; Grand Banks; Pacific Coast, from Santa Catalina to Puget Sound.
Sparus raii Bloch, Ichthyol., tab. 273, 1791, after Ray, etc.

Family CXXXIV. STEINEGERIDÆ.

Genus 440. STEINEGERIA Jordan & Evermann.

Steinegeria Jordan & Evermann, Proc. U. S. Nat. Mus. 1886, 467 (*rubescens*).

1387. Steinegeria rubescens Jordan & Evermann.

Gulf of Mexico.

Steinegeria rubescens Jordan & Evermann, Proc. U. S. Nat. Mus. 1886, 467, Snapper Banks, off Pensacola, Florida.

Family CXXXV. CENTROLOPHIDÆ. The Rudder-Fishes.

Genus 441. CENTROLOPHUS Lacépède *Black Ruffs.*

Centrolophus Lacépède, Hist. Nat. Poiss., IV, 441, 1803 (*niger*).

1388. Centrolophus niger (Gmelin). *Blackfish; Black Ruffe; Borlase.*

Coasts of southern Europe; Dennis, Massachusetts.

Perca niger Gmelin, Syst. Nat., 1321, 1788, Cornwall.

Genus 442. PALINURICHTHYS Bleeker.

Palinurichthys Bleeker, Enum. Spec. Pisc. Arch. Ind., 22, November, 1859, (*perciformis*).

1389. Palinurichthys perciformis (Mitchill). *Rudder-fish; Log-fish.*

Atlantic Coast of North America, from Cape Hatteras to Maine; Cornwall.

Coryphena perciformis Mitchill, Am. Month. Mag., II, 1818, 244, N. Y. Harbor.

Family CXXXVI. STROMATEIDÆ. The Fiatolas.

Genus 443. RHOMBUS Lacépède. *Butter-fishes.*

Rhombus Lacépède, Hist. Nat. Poiss., II, 321, 1800 (*alepidotus*).

Subgenus RHOMBUS Lacépède.

1390. Rhombus paru (Linnæus). *Harvest-fish; Pappy-fish.*

South Atlantic Coast of United States, West Indies, Cape Cod to Jamaica and Brazil.

Stromateus paru Linnæus, Syst. Nat., ed. x, 248, 1758, Jamaica; based on Sloane.

1391. Rhombus xanthurus (Quoy & Gaimard).

Coast of South America, Cayenne to Montevideo.

Scserinus xanthurus Quoy & Gaimard, Voy. Freyc., Zool., 384, 1824, Brazil.

Subgenus PALOMETA Jordan & Evermann.

Palometa Jordan & Evermann, Fishes N. and M. A., 966, 1896 (*palometa*).

1392. Rhombus palometa (Jordan & Bollman).

Pacific Ocean, off Colombia.

Stromateus palometa Jordan & Bollman, Proc. U. S. N. M. 1889, 156, off coast of Colombia, 8° 16′ 30″ N., 79° 37′ 45″ W., at Albatross Station 2804.

1393. Rhombus medius (Peters). *Palometa.*

Pacific Coast of North America, Mazatlan to Panama.

Stromateus medius Peters, Berl. Monatsb., 1869, 707, Mazatlan, Mexico.

1394. Rhombus simillimus (Ayres). *California Pompano.*

Pacific Coast of United States, Puget Sound to San Diego.

Poronotus simillimus Ayres, Proc. Cal. Ac. Sci. 1860, 84, San Francisco.

Subgenus PORONOTUS Gill.

Poronotus Gill, Cat. Fish. E. Coast N. Am., 35, 1861 (*triacanthus*).

1395. Rhombus triacanthus (Peck). *Dollar-fish; Harvest-fish; Butter-fish; Lafayette.*

Nova Scotia to Florida.

Stromateus triacanthus Peck, Mem. Am. Ac., II, part 2, 48, pl. 2, fig. 2, 1800, Piscataqua River, New Hampshire.

Family CXXXVII. ICOSTEIDÆ. The Rag-Fishes.

Genus 444. ICICHTHYS Jordan & Gilbert.

Icichthys Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 305 (*lockingtoni*).

1396. Icichthys lockingtoni Jordan & Gilbert.

San Francisco, California.

Icichthys lockingtoni Jordan & Gilbert, Proc. U. S. Nat. Mus., III, 1880, 305, off San Francisco.

Genus 445. SCHEDOPHILUS Cocco.

Schedophilus Cocco, Giorn. Innom. Messina, Ann., III, 7, 57, 1834 (*medusophagus*).

1397. Schedophilus medusophagus Cocco.

Mid-Atlantic; Mediterranean; Ireland; Samoa.

Schedophilus medusophagus Cocco, Giorn. Innom. Messina, III, 7, 57, Messina.

Genus 446. ICOSTEUS Lockington.

Icosteus Lockington, Proc. U. S. Nat. Mus. 1880, 63 (*ænigmaticus*).

1398. Icosteus ænigmaticus Lockington.

Coast of California, Oregon, and Washington.

Icosteus ænigmaticus Lockington, Proc. U. S. Nat. Mus., III, 1880, 63, off San Francisco.

Genus 447. ACROTUS Bean.

Acrotus Bean, Proc. U. S. Nat. Mus. 1887, 631 (*willoughbyi*).

1399. Acrotus willoughbyi Bean.

On coast of Washington.

Acrotus willoughbyi Bean, Proc. U. S. Nat. Mus. 1887, 631, Quinaielt Agency, Washington.

Family CXXXVIII. ZAPRORIDÆ.

Genus 448. ZAPRORA Jordan.

1400. Zaprora silenus Jordan.

Known only from the harbor at Nanaimo, Vancouver Island, British Columbia.

Zaprora silenus Jordan, Proc. Cal. Ac. Sci., 1896, 202, harbor at Nanaimo, Vancouver Island.

Family CXXXIX. GRAMMICOLEPIDIDÆ.

Genus 449. GRAMMICOLEPIS Poey.

Grammicolepis Poey, Anal. Soc. Esp. Hist. Nat., II, 1873 (*brachiusculus*).

1401. Grammicolepis brachiusculus Poey.

Cuba.

Grammicolepis brachiusculus Poey, Anal. Soc. Esp. Hist. Nat., II, 1873, Cuba.

Family CXL. TETRAGONURIDÆ. The Square-Tails.

Genus 450. TETRAGONURUS Risso.

Tetragonurus Risso, Ichth. Nice, 347, 1810 (*cuvieri*).

1402. Tetragonurus cuvieri Risso. *Escolar de Natura; Courpata; Square-tail; Sea Raven.*

Nice; Toulon and Marseilles; Madeira.

Tetragonurus cuvieri Risso, Ichth. Nice, 347, 1810, Nice.

Family CXLI. PEMPHERIDÆ. The Deep-water Catalufas.

Genus 451. **PEMPHERIS** Cuvier & Valenciennes.
Pempheris Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 296, 1831 (*onalensis*).

1403. Pempheris mexicanus Cuvier & Valenciennes.
Pacific Coast of Mexico, Acapulco.
Pempheris mexicanus Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 308, 1831, Acapulco, Mexico.

1404. Pempheris schomburgki Müller & Troschel.
Barbados and Cuba.
Pempheris schomburgki Müller & Troschel, in Schomburgk's History of Barbados, 669, 1845, Barbados.

1405. Pempheris mulleri Poey. *Catalufa de la Alto.*
West Indies to Brazil; coast of Cuba.
Pempheris mulleri Poey, Memorias, II, 203, 1860, Cuba.

1406. Pempheris poeyi Bean.
Cuba.
Pempheris poeyi Bean, Proc. U. S. Nat. Mus. 1885, 229, Havana.

Group PERCOIDEA. The Perch-like Fishes.

Family CXLII. ELASSOMATIDÆ. Pigmy Sunfishes.

Genus 452. **ELASSOMA** Jordan.
Elassoma Jordan, Bull. U. S. Nat. Mus., X, 50, 1877 (*zonata*).

1407. Elassoma zonatum Jordan.
Southern Illinois to Texas and Alabama.
Elassoma zonata Jordan, Bull. U. S. Nat. Mus., X, 50, 1877, Little Red River, White County, Ark.

1408. Elassoma evergladei Jordan.
Swamps of southern Georgia and Florida, locally common in dark waters tributary to the Everglades.
Elassoma evergladei Jordan, Proc. U. S. Nat. Mus. 1884, 323, Indian, St. Johns, and Suwanee rivers, Florida.

Family CXLIII. CENTRARCHIDÆ. The Sunfishes.

Genus 453. **POMOXIS** Rafinesque. *Crappies.*
Pomoxis Rafinesque, Amer. Month. Magazine 1818, 41 (*annularis*).

1409. Pomoxis annularis Rafinesque. *Crappie; Bachelor; Sac-a-lait; New Light; Campbellite; Crapet.*
Eastern United States, from the Great Lakes south to Texas and west to Kansas and Nebraska.
Pomoxis annularis Rafinesque, Amer. Month. Mag., 1818, 41, Falls of the Ohio River.

1410. Pomoxis sparoides (Lacépède). *Calico Bass; Grass Bass; Barfish; Strawberry Bass.*
Great Lakes and Upper Mississippi Valley to New Jersey and southward to Florida, Louisiana, and Texas.
Labrus sparoides Lacépède, Hist. Nat. Poiss., III, 517, 1802, South Carolina.

Genus 454. **CENTRARCHUS** Cuvier & Valenciennes. *Round Bass.*
Centrarchus Cuvier & Valenciennes, Hist. Nat. Poiss., III, 84, 1829 (*iridens*).

1411. Centrarchus macropterus (Lacépède). *Round Sunfish; Flier.*
Lowland streams from Virginia southward to Florida and Louisiana; northward in the Mississippi Valley to southern Illinois.
Labrus macropterus Lacépède, Hist. Nat. Poiss., III, 447, 1802, Charleston, S. C.

Genus 455. ACANTHARCHUS Gill.

Acantharchus Gill, Amer. Jour. Sci. Arts, 1864, 92 (*pomotis*).

1412. Acantharchus pomotis (Baird). *Mud Sunfish.*

Southern New York to South Carolina.

Centrarchus pomotis Baird, Ninth Smithson. Report 1854, 325, New Jersey; New York.

Genus 456. AMBLOPLITES Rafinesque. *Rock Bass.*

Ambloplites Rafinesque, Ichth. Ohiensis, 33, 1820 (*ictheloides* = *rupestris*).

1413. Ambloplites rupestris (Rafinesque). *Common Rock Bass; Red-eye; Red-eye Perch; Goggle-eye.*

Vermont to Great Lakes region and Manitoba, south to Louisiana; very abundant west of the Alleghanies.

Bodianus rupestris Rafinesque, Am. Month. Mag., 1817, 120, Lakes of New York, Vermont, and Canada.

1413a. Ambloplites rupestris cavifrons Cope.

Roanoke River, Virginia.

Ambloplites cavifrons Cope, Jour. Ac. Nat. Sci. Phila. 1868, 217, Roanoke River, Virginia.

Genus 457. ARCHOPLITES Gill.

Archoplites Gill, Proc. Ac. Nat. Sci. Phila. 1861, 165 (*interruptus*).

1414. Archoplites interruptus (Girard). *Sacramento Perch.*

Sacramento and San Joaquin rivers, California.

Centrarchus interruptus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 129, San Joaquin and Sacramento rivers, California.

Genus 458. CHÆNOBRYTTUS Gill.

Chænobryttus Gill, Amer. Jour. Sci. Arts 1864, 92 (*melanops* = *gulosus*).

1415. Chænobryttus gulosus (Cuvier & Valenciennes). *Warmouth; "Goggle-eye."*

Eastern United States from the Great Lakes to Florida and Texas, west to Kansas and the Dakotas; chiefly west or south of the Alleghanies; common in South Carolina.

Pomotis gulosus Cuvier & Valenciennes, Hist. Nat. Poiss., III, 498, 1829, Lake Pontchartrain and lagoons about New Orleans.

Genus 459. ENNEACANTHUS Gill.

Enneacanthus Gill, Amer. Jour. Sci. Arts 1864, 92 (*obesus*).

1416. Enneacanthus obesus (Baird).

Charles River, Massachusetts, to Florida.

Pomotis obesus Baird, Ninth Smithson. Report, 1854, 324, Beesley Point, New Jersey.

1417. Enneacanthus gloriosus (Holbrook).

Atlantic States, from New Jersey to Florida.

Bryttus gloriosus Holbrook, Jour. Ac. Nat. Sci. Phila. 1855, 51, Cooper River, South Carolina.

Genus 460. MESOGONISTIUS Gill.

Mesogonistius Gill, Amer. Jour. Sci. Arts 1864, 92 (*chætodon*).

1418. Mesogonistius chætodon (Baird). *Black-banded Sunfish.*

New Jersey to Maryland.

Pomotis chætodon Baird, Ninth Smithson. Report, 1854, 324, Cedar Swamp Creek, New Jersey.

Genus 461. **APOMOTIS** Rafinesque.

Apomotis Rafinesque, Jour. de Physique 1819, 420 (*cyanellus*).

1419. Apomotis cyanellus (Rafinesque). *Red-eye; Blue-spotted Sunfish; Green Sunfish; Little Red-eye.*

Great Lakes region to Mexico; very abundant from Ohio southwestward to the Rio Grande.

Lepomis cyanellus Rafinesque, Jour. de Physique 1819, 420, Ohio River.

1420. Apomotis ischyrus (Jordan & Nelson).

Upper Mississippi Valley.

Lepiopomus ischyrus Jordan & Nelson, Bull. U. S. Nat. Mus., x, 25, 1877, Illinois River, Illinois.

1421. Apomotis phenax Cope & Jordan.

Beesley Point, New Jersey.

Apomotis phenax Cope & Jordan, Bull. U. S. Nat. Mus., x, 26, 1877, Beesley Point, New Jersey; locality possibly erroneous.

1422. Apomotis punctatus (Cuvier & Valenciennes).

South Carolina to Florida.

Bryttus punctatus Cuvier & Valenciennes, Hist. Nat. Poiss., vii, 462, 1831, Charleston, South Carolina.

1423. Apomotis symmetricus (Forbes).

Mississippi Valley; Illinois to Louisiana and Texas.

Lepomis symmetricus Forbes, in Jordan & Gilbert, Synopsis, 473, 1883, Illinois River, Illinois.

Genus 462. **LEPOMIS** Rafinesque. *The Sunfishes.*

Lepomis Rafinesque, Jour. de Physique 1819, 402 (*auritus*).

Subgenus **LEPOMIS** Rafinesque.

1424. Lepomis auritus (Linnæus). *Yellowbelly; Redbreast Bream.*

Maine to Louisiana; abundant in all streams east of the Alleghanies.

Labrus auritus Linnæus, Syst. Nat., ed. x, 283, 1758, Philadelphia.

1424a. Lepomis auritus solis (Cuvier & Valenciennes).

Virginia to Louisiana, in coastwise streams.

Pomotis solis Cuvier & Valenciennes, Hist. Nat. Poiss., vii, 468, 1831, Lake Pontchartrain, Louisiana.

1425. Lepomis miniatus Jordan.

Mississippi Valley; southern Illinois to Louisiana and Texas.

Lepomis miniatus Jordan, Bull. U. S. Nat. Mus., x, 26, 1877, Tangipahoa River.

Subgenus **XENOTIS** Jordan.

Xenotis Jordan, Proc. Ac. Nat. Sci. Phila. 1877, 76 (*fallax*).

1426. Lepomis garmani Forbes.

Lower Wabash River basin.

Lepomis garmani Forbes, Bull. Ill. Lab. Nat. Hist., vol. ii, art. 2, 135, January, 1885, Little Fox River at Phillipstown, and Wabash River and Drew Pond at Carmi, Illinois.

1427. Lepomis megalotis (Rafinesque). *Long-eared Sunfish.*

Michigan to Minnesota, South Carolina, and southward to the Rio Grande.

Ichthelis megalotis Rafinesque, Ichth. Ohiensis, 29, 1820, Kentucky, Licking, and Sandy rivers, Kentucky.

Subgenus **HELIOPERCA** Jordan.

Helioperca Jordan, Ann. Lyc. Nat. Hist. N. Y. 1876, 335 (*pallidus*).

1428. Lepomis humilis (Girard). *Red-spotted Sunfish.*

Ohio and Kentucky to the Dakotas, Kansas, and Texas; locally abundant, especially in the lower Missouri Basin.

Bryttus humilis Girard, Proc. Ac. Nat. Sci. Phila. 1857, 201, Sugar Loaf Creek, Arkansas.

1429. Lepomis haplognathus Cope.

Monterey, Nuevo Leon, Mexico.

Lepomis haplognathus Cope, Proc. Amer. Philos. Soc. 1884 (1885), 168, Monterey, Nuevo Leon, Mexico.

1430. Lepomis macrochirus Rafinesque.

Ohio Valley and southwestward to Missouri and Kentucky.

Lepomis macrochira Rafinesque, Jour. de Physique 1819, 420, Ohio, Wabash, Green, and Licking rivers.

1431. Lepomis pallidus (Mitchill). *Blue-gill; Blue Bream; Blue Sunfish; Copper-nosed Bream; Dollardee.*

Great Lakes to Florida and the Rio Grande.

Labrus pallidus Mitchill, Trans. Lit. and Philos. Soc. N. Y. 1815, 407, New York.

Genus 463. EUPOMOTIS Gill & Jordan.

Eupomotis Gill & Jordan, Field and Forest 1877, 190 (*aureus* = *gibbosus*).

Subgenus XYSTROPLITES Jordan.

Xystroplites Jordan, in Cope, Proc. Amer. Philos. Soc., XVII, 1878, 67 (*gillii* = *pallidus*).

1432. Eupomotis pallidus (Agassiz).

Georgia to Texas.

Pomotis pallidus Agassiz, Amer. Jour. Sci. Arts 1854, 303 (name preoccupied in *Lepomis* by *Labrus pallidus* Mitchill, but not in *Eupomotis*).

Subgenus EUPOMOTIS Gill & Jordan.

1433. Eupomotis heros (Baird & Girard).

Southern Indiana to Florida and the Rio Grande Basin.

Pomotis heros Baird & Girard, Proc. Ac. Nat. Sci. Phila., March, 1854, 25, Rio Cibolo, Texas.

1434. Eupomotis holbrooki (Cuvier & Valenciennes).

Virginia to Florida.

Pomotis holbrooki Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 466, 1831, Charleston, South Carolina.

1435. Eupomotis euryorus (McKay).

Upper Great Lakes region.

Lepomis euryorus McKay, Proc. U. S. Nat. Mus. 1881, 89, Lake Huron at Fort Gratiot, Michigan.

1436. Eupomotis gibbosus (Linnæus). *Common Sunfish; Bream; Pumpkin-seed; Sunny; Tobacco-box.*

Great Lakes region to Maine, and southward to Florida, east of the Alleghanies.

Perca gibbosa Linnæus, Syst. Nat., ed. X, 293, 1758, Carolina; after *Perca fluviatilis gibbosa, ventre luteo*, of Catesby.

Genus 464. MICROPTERUS Lacépède. *Black Bass.*

Micropterus Lacépède, Hist. Nat. Poiss., IV, 325, 1802 (*dolomieu*).

1437. Micropterus dolomieu Lacépède. *Small-mouthed Black Bass.*

Lake Champlain to Manitoba and southward on both sides of the mountains to South Carolina and Arkansas.

Micropterus dolomieu Lacépède, Hist. Nat. Poiss., IV, 325, 1802, type locality uncertain, perhaps South Carolina.

1438. Micropterus salmoides (Lacépède). *Large-mouthed Black Bass; Oswego Bass; Green Bass; Bayou Bass.*

Rivers of the United States, from the Great Lakes and Red River of the North to Florida, Texas, and Mexico; west to the Dakotas, Nebraska, and Kansas.

Labrus salmoides Lacépède, Hist. Nat. Poiss., IV, 716, 1802, South Carolina.

Family CXLIV. KUHLIIDÆ.

Genus 465. KUHLIA Gill.

Kuhlia Gill, Proc. Ac. Nat. Sci. Phila. 1861, 48 (*ciliatus*).

1439. Kuhlia argē Jordan & Bollman.

Galapagos and Revillagigedo archipelagoes.
Kuhlia argē Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 159, Chatham Island, Galapagos Archipelago.

1440. Kuhlia xenura (Jordan & Gilbert).

Tropical seas; probably west coast of Central America.
Xenichthys xenurus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 454, type locality supposed to be San Salvador.

Family CXLV. PERCIDÆ. The Perches.

Genus 466. STIZOSTEDION Rafinesque. *American Pike-perches.*

Stizostedion Rafinesque, Ichth. Ohiensis, 23, 1820 (*salmonea=vitreum*).

Subgenus STIZOSTEDION Rafinesque.

1441. Stizostedion vitreum (Mitchill). *Wall-eyed Pike; Pike-perch; Dory; Glass-eye; Yellow Pike; Blue Pike; Jack Salmon; White-eye.*

Great Lakes region, Upper Mississippi, north to Assiniboia; east to Vermont and Pennsylvania, south to Georgia and Alabama, especially common northward.
Perca vitrea Mitchill, Supp. Am. Month. Mag., II, 1818, 247, Cayuga Lake, N. Y.

Subgenus CYNOPERCA Gill & Jordan.

Cynoperca Gill & Jordan, Bull. U. S. Nat. Mus., X, 44, 1877 (*canadense*).

1442. Stizostedion canadense (Smith). *Sauger; Sand Pike.*

Northeastern North America, from Vermont and the Great Lakes to Tennessee, Arkansas, and the upper Missouri; especially abundant northward.
Lucioperca canadense C. H. Smith, in Griffith's edition of Cuvier's Règne Animal, Fishes, 275, pl. 1, 1836, Canada.

1442a. Stizostedion canadense griseum (DeKay). *Sauger; Sand Pike; Gray Pike; Pickering.*

Great Lakes region and southwestward to Kentucky and Arkansas.
Lucioperca grisea DeKay, New York Fauna: Fishes, 19, 1842, New York.

1442b. Stizostedion canadense boreum (Girard).

Upper Missouri Basin.
Lucioperca borca Girard, Proc. Ac. Nat. Sci. Phila. 1857, 201, Fort Sarpi, Nebr.

Genus 467. PERCA (Artedi) Linnæus. *River Perch.*

Perca (Artedi) Linnæus, Syst. Nat., ed. X, I, 1758, and ed. XII, I, 481, 1766 (*fluviatilis*).

1443. Perca flavescens (Mitchill). *Yellow Perch; American Perch; Ringed Perch; Raccoon Perch.*

Fresh waters of the eastern United States, chiefly northward and eastward; abundant in the Great Lakes and in coastwise streams from Nova Scotia to North Carolina; common in the tributaries of the Upper Mississippi, especially in Iowa and Minnesota; unknown from central Ohio southwestward; not known from the Ohio River or the lower Missouri.
Morone flavescens Mitchill, Rept. Fish. N. Y., 18, 1814, near New York City.

Genus 468. PERCINA Haldeman. *Log Perches.*

Percina Haldeman, Jour. Ac. Nat. Sci. Phila., VIII, 1842, 330 (*nebulosa*).

1444. Percina rex (Jordan & Evermann).

Roanoke River, Roanoke, Virginia.
Etheostoma rex Jordan & Evermann, Proc. U. S. Nat. Mus. 1888, 357, Roanoke River, near Roanoke, Va.

1445. Percina caprodes (Rafinesque). *Log Perch; Rockfish; Hog-molly; Hogfish.*
Great Lakes and streams of the South and West from Quebec to Lake Superior, Iowa, and south to Texas, Mississippi, and the Rio Grande.
Sciæna caprodes Rafinesque, Amer. Month. Mag. 1818, 534, Ohio River.

1445a. Percina caprodes zebra (Agassiz). *Manitou Darter.*
Lakes of northern Indiana, Michigan, Wisconsin, and northward to Lake Superior.
Pileoma zebra Agassiz, Lake Superior, 308, 1850, Lake Superior.

Genus 469. HADROPTERUS Agassiz. *Black-sided Darters.*
Hadropterus Agassiz, Am. Jour. Sci. Arts 1854, 305 (*nigrofasciatus*).

Subgenus ALVORDIUS Girard.
Alvordius Girard, Proc. Ac. Nat. Sci. Phila. 1859, 68 (*maculatus*).

1446. Hadropterus phoxocephalus (Nelson).
Ohio to Iowa, south to Kentucky and Oklahoma, in sandy rivers; locally common.
Etheostoma phoxocephalum Nelson, Bull. Ill. Lab. Nat. Hist., I, 35, 1876, Illinois River and its tributaries.

1447. Hadropterus macrocephalus (Cope).
West slope of the Alleghanies from Pennsylvania southward in mountain streams; known from Youghiogheny River, Pennsylvania; North Fork of Holston River, Saltville, Virginia; Middle Fork of Holston River; Glade Spring, Virginia; Big Sandy, Upper Green, and Cumberland rivers, Kentucky; Clinch River, Tennessee.
Etheostoma macrocephalum Cope, Trans. Amer. Philos. Soc. 1866, 400, Youghiogheny River, Pennsylvania.

1448. Hadropterus maculatus (Girard).
Fort Gratiot, Lake Huron.
Alvordius maculatus Girard, Proc. Ac. Nat. Sci. Phila. 1859, 67, Fort Gratiot, Michigan.

1449. Hadropterus aspro (Cope & Jordan). *Black-sided Darter.*
Great Lakes region to the middle Missouri and north to Minnesota, southward through Missouri, Indiana, and Kentucky to Arkansas; especially common in the Ohio Valley.
Alvordius aspro Cope & Jordan, Proc. Ac. Nat. Sci. Phila. 1877, 51, White River, Indianapolis, Indiana; substitute for *Etheostoma blennioides* of Kirtland and Agassiz.

1450. Hadropterus guntheri (Eigenmann & Eigenmann).
Souris River, Winnipeg, south to Iowa.
Etheostoma guntheri Eigenmann & Eigenmann, Am. Nat., November, 1892, 962, Souris River, Winnipeg, and Cedar River near Cedar Rapids, Iowa.

1451. Hadropterus peltatus (Stauffer).
Southeastern Pennsylvania, southward to South Carolina in coastwise streams.
Etheostoma peltatum Stauffer, in Cope, Proc. Ac. Nat. Sci. Phila. 1864, 233, Conestoga Creek, near Lancaster, Pennsylvania.

1452. Hadropterus ouachitæ (Jordan & Gilbert).
Southern Indiana, western Kentucky, southwest to Arkansas, not rare; known from Patoka River, Indiana; lower Green and Obion rivers, Kentucky; Saline River, Arkansas.
Etheostoma (*Hadropterus*) *ouachitæ* Jordan & Gilbert, Proc. U. S. Nat. Mus. 1887, 49, Saline River, Benton, Arkansas, a tributary of the Washita.

1453. Hadropterus roanoka (Jordan & Jenkins).
Roanoke River, Virginia.
Etheostoma roanoka Jordan & Jenkins, Proc. U. S. Nat. Mus. 1888, 358, Roanoke River, near Roanoke, Virginia.

Subgenus ERICOSMA Jordan & Copeland.

Ericosma Jordan & Copeland, Bull. U. S. Nat. Mus., x, 8, 1877 (*evides*)

1454. Hadropterus evides (Jordan & Copeland).

Indiana, in the Wabash Basin, west to Cedar River, Iowa, and southward in Arkansas, Kentucky, and Tennessee; French Broad River and the Ozark region.

Alvordius evides Jordan & Copeland, Proc. Ac. Nat. Sci. Phila. 1877, 51, White River near Indianapolis, Indiana.

Subgenus SERRARIA Gilbert.

Serraria Gilbert, Proc. U. S. Nat. Mus. 1884, 205 (*scierus*).

1455. Hadropterus scierus Swain.

Northern Indiana to Tennessee and Texas.

Hadropterus scierus Swain, Proc. U. S. Nat. Mus. 1883, 252, Bean Blossom Creek, Monroe County, Indiana.

1455a. Hadropterus scierus serrula Jordan & Gilbert.

From southern Arkansas southward through eastern Texas.

Hadropterus scierus serrula Jordan & Gilbert, Proc. U. S. Nat. Mus. 1886, 16, Red River, Fulton, Arkansas.

Subgenus HADROPTERUS Agassiz.

Hadropterus Agassiz, Am. Jour. Sci. Arts, XVII, 1854, 305 (*nigrofasciatus*).

1456. Hadropterus nigrofasciatus Agassiz. *Crawl-a-bottom.*

South Carolina to Louisiana.

Hadropterus nigrofasciatus Agassiz, Am. Jour. Sci. Arts, XVII, 1854, 305, Mobile, Alabama.

Genus 470. HYPOHOMUS Cope.

Hypohomus Cope, Proc. Amer. Phil. Soc. Phila. 1870, 449 (*aurantiacus*).

Subgenus SWAINIA Jordan & Evermann.

Swainia Jordan & Evermann, Fishes North and Middle America, 1040, 1896 (*squamatus*).

1457. Hypohomus squamatus (Gilbert & Swain).

Upper Tennessee River basin; known from Watauga and French Broad rivers.

Ethcostoma (*Hadropterus*) *squamatus* Gilbert & Swain, Proc. U. S. Nat. Mus. 1887, 50, French Broad River at mouth of Wolf Creek, Tennessee.

Subgenus HYPOHOMUS Cope.

1458. Hypohomus aurantiacus (Cope).

Upper Tennessee Basin; North Fork of Holston, Clinch, Watauga, and French Broad rivers.

Cottogaster aurantiacus Cope, Jour. Ac. Nat. Sci. Phila. 1869, 211, North Fork of Holston River, Saltville, Virginia.

1459. Hypohomus cymatotænia (Gilbert & Meek).

Western Kentucky and southern Missouri.

Ethcostoma (*Hadropterus*) *cymatotænia* Gilbert & Meek, Proc. U. S. Nat. Mus. 1887, 51, Niangua River and Osage Fork of the Gasconade near Marshfield, Missouri; Sac River near Greenfield, Missouri.

1460. Hypohomus nianguæ (Gilbert & Meek).

Niangua River, Missouri.

Ethcostoma (*Hadropterus*) *nianguæ* Gilbert & Meek, Proc. U. S. Nat. Mus. 1887, 52, Niangua River near Marshfield, Missouri.

1461. Hypohomus spilotus (Gilbert).

Kentucky River.

Ethcostoma nianguæ spilotum Gilbert, Proc. U. S. Nat. Mus. 1887, 53, Sturgeon Creek, a tributary of Kentucky River, near Travellers Rest, Owsley County, Kentucky.

Genus 471. COTTOGASTER Putnam.

Cottogaster Putnam, Bull. Mus. Comp. Zool., I, 5, 1863 (*tessellatum* Thompson, not of DeKay = *copelandi*).

Subgenus COTTOGASTER Putnam.

1462. Cottogaster uranidea Jordan & Gilbert.

Lower Wabash Basin to southern Missouri, south through Arkansas and Alabama to Escambia River, Florida.

Etheostoma (*Cottogaster*) *uranidea* Jordan & Gilbert, Proc. U. S. Nat. Mus. 1887, 48, Washita River, Arkadelphia, Arkansas.

1463. Cottogaster copelandi (Jordan).

Great Lakes region, from Lake Champlain to Lake Huron and south to the Black Warrior, westward to Missouri and through the Ozark region, where it is abundant, as also about Indianapolis in clear brooks.

Rheocrypta copelandi Jordan, Bull. U. S. Nat. Mus., X, 9, 1877, White River near Indianapolis, Indiana.

Subgenus IMOSTOMA Jordan.

Imostoma Jordan, Proc. Ac. Nat. Sci. Phila. 1877, 49 (*shumardi*).

1464. Cottogaster shumardi (Girard).

Michigan, Ohio, Indiana, and Illinois southward to Kentucky and Arkansas.

Hadropterus shumardi Girard, Proc. Ac. Nat. Sci. Phila. 1859, 100, Arkansas River near Fort Smith, Arkansas.

Genus 472. ULOCENTRA Jordan.

Ulocentra Jordan, Man. Vert. E. U. S., ed. 2, 223, 1878 (*atripinnis*).

1465. Ulocentra stigmæa (Jordan). *Speck.*

Tennessee and Arkansas to Georgia and Louisiana.

Boleosoma stigmæum Jordan, Ann. Lyc. Nat. Hist. N. Y. 1876, 311, small tributaries of Etowah and Oostanaula rivers near Rome, Georgia.

1466. Ulocentra gilberti Evermann & Thoburn.

Clinch River at Walker Ford, near Tazewell, Tennessee.

Ulocentra gilberti Evermann & Thoburn, in Jordan & Evermann, Fishes of North and Middle America, 1049, 1896, Clinch River at Walker Ford, near Tazewell, Claiborne County, Tennessee.

1467. Ulocentra verecunda (Jordan & Evermann).

Tributaries of Holston River, Virginia.

Etheostoma verecundum Jordan & Evermann, Proc. U. S. Nat. Mus. 1888, 360, Middle Fork of Holston River, about 5 miles south of Glade Spring, Virginia.

1468. Ulocentra histrio Jordan & Gilbert.

Southern Indiana, southwestward to Arkansas; known from the lower Wabash and tributaries, Green River, Kentucky, and Black, Poteau, and Washita rivers, Arkansas.

Etheostoma (*Ulocentra*) *histrio* Jordan & Gilbert, Proc. U. S. Nat. Mus. 1887, 47, Poteau River near Hackett City, Arkansas; Saline River at Benton, and Washita River at Arkadelphia, Arkansas.

1469. Ulocentra simotera (Cope).

Western Virginia, eastern Kentucky and Tennessee, in the basins of the Green, Cumberland, and Tennessee rivers, southward through Alabama to the Escambia River.

Hyostoma simoterum Cope, Jour. Ac. Nat. Sci. Phila. 1868, 215, Holston River and its tributaries, near Nashville, Tennessee.

1470. Ulocentra phlox (Cope).

Trinity River, Texas.

Boleosoma phlox Cope, Bull. U. S. Nat. Mus., XVII, 30, 1880, Trinity River at Fort Worth, Texas.

Genus 473. DIPLESION Rafinesque.

Diplesion Rafinesque, Ichth. Ohiensis, 37, 1820 (*blennioides*).

1471. Diplesion blennioides Rafinesque. *Green-sided Darter.*

Pennsylvania to South Dakota and Kansas, south to lower Alabama Basin.

Etheostoma (Diplesion) blennioides Rafinesque, Jour. de Physique 1819, 419, Ohio River.

Genus 474. BOLEOSOMA DeKay. *Tessellated Darters.*

Boleosoma DeKay, New York Fauna: Fishes, 20, 1842 (*tessellatum=olmstedi*).

1472. Boleosoma longimanus (Jordan).

James River, Virginia; recorded from North River at Loch Laird, Virginia; Buffalo Creek near Lexington, Virginia; Elk Creek near Natural Bridge, Virginia.

Etheostoma longimana Jordan, Proc. Ac. Nat. Sci. Phila. 1888, 179, tributary of James River, Virginia.

1473. Boleosoma podostemone (Jordan & Jenkins).

Roanoke River basin, Virginia.

Etheostoma podostemone Jordan & Jenkins, Proc. U. S. Nat. Mus. 1888, 359, Roanoke River at Roanoke, Salem, and Alleghany Spring, Virginia.

1474. Boleosoma nigrum (Rafinesque). *Johnny Darter.*

Eastern United States, Ohio Valley, Great Lakes region, and Upper Mississippi, west to Colorado and north to Manitoba.

Etheostoma nigrum Rafinesque, Ichth. Ohiensis, 37, 1820, Green River, Kentucky.

1474a. Boleosoma nigrum olmstedi (Storer). *Tessellated Darter; Grand Oranchee.*

Lake Ontario to Massachusetts and south to North Carolina east of the Alleghanies.

Etheostoma olmstedi Storer, Jour. Bost. Soc. Nat. Hist., IV, 1841, 61, pl. 5, fig. 2, Hartford, Connecticut.

1474b. Boleosoma nigrum effulgens (Girard).

Maryland to North Carolina.

Arlina effulgens Girard, Proc. Ac. Nat. Sci. Phila. 1859, 64, brooks and streams flowing into Potomac River.

1474c. Boleosoma nigrum vexillare (Jordan).

Tributaries of the James, Roanoke, and Rappahannock rivers.

Boleosoma vexillare Jordan, Proc. U. S. Nat. Mus. 1880, 237, Rappahannock River at Warrenton, Virginia.

1474d. Boleosoma nigrum maculaticeps Cope.

Upper waters of Catawba River, North Carolina.

Boleosoma maculaticeps Cope, Proc. Amer. Philos. Soc. 1870, 269, upper waters of Catawba River, North Carolina.

1474e. Boleosoma nigrum mesæum (Cope).

Platte River near Fort Kearney, Nebraska.

Pœcilichthys mesæus Cope, Proc. Ac. Nat. Sci. Phila. 1864, 232, Platte River near Fort Kearney, Nebraska.

1475. Boleosoma susanæ Jordan & Swain.

Basin of upper Cumberland River, Kentucky.

Boleosoma susanæ Jordan & Swain, Proc. U. S. Nat. Mus. 1883, 249, Wolf Creek and other tributaries of the Clear Fork of Cumberland River, near Pleasant View, Whitley County, Kentucky.

Subgenus VAILLANTIA Jordan.

Vaillantia Jordan, Bull. U. S. Nat. Mus., XII, 89, 1878 (*camurum*).

1476. Boleosoma camurum Forbes.

Indiana to Iowa and Mississippi, southwest to Houston, Texas.

Boleosoma camura Forbes, Bull. Ill. Lab. Nat. Hist., I, 40, 1878 (name preoccupied in *Etheostoma*, not in *Boleosoma*); Cache River and Clear Creek, Union County; Johnson County, and Pekin, Illinois.

Genus 475. CRYSTALLARIA Jordan & Gilbert.

Crystallaria Jordan & Gilbert, in Jordan, Cat. Fishes N. A., 78, 1885 (*asprellus*).

1477. Crystallaria asprella (Jordan).

Southern Indiana and Illinois to Arkansas and Alabama, chiefly in the larger, clearer streams. Recorded from Ohio River at Rising Sun, Indiana; Wabash River at New Harmony, Vincennes, and Terre Haute; Green River, Kentucky; Choccolo Creek, Alabama, and Washita River, Arkansas; besides the original locality in Illinois.

Pleurolepis asprellus Jordan, Bull. Ill. Lab. Nat. Hist., II, 38, 1878, rocky tributary of Mississippi River in Hancock County, Illinois.

Genus 476. AMMOCRYPTA Jordan. *Sand Darters.*

Ammocrypta Jordan, Bull. U. S. Nat. Mus., X, 6, 1877 (*beanii*).

1478. Ammocrypta pellucida (Baird). *Sand Darter.*

Lake Erie to Minnesota, Kentucky, and Texas.

Pleurolepsis pellucidus Baird, in Agassiz, Bull. Mus. Comp. Zool., I, 5, 1863, no locality; the specimens from Black River, Ohio, the types of *Etheostoma pellucidum* Baird MS. 1853.

1478a. Ammocrypta pellucida clara Jordan & Meek.

Mississippi Valley, Wabash River west to central Iowa and Minnesota, and south to Arkansas and northern Texas.

Ammocrypta clara Jordan & Meek, Proc. U. S. Nat. Mus. 1885, 8, Des Moines River, Ottumwa, Iowa.

1478b. Ammocrypta pellucida vivax (Hay).

Mississippi and northwest through Arkansas and south to Texas.

Ammocrypta vivax Hay, Bull. U. S. Fish Com., II, 1882 (1883), 58, Pearl River, Jackson, Mississippi.

1479. Ammocrypta beanii Jordan.

Gulf States, Alabama to Louisiana.

Ammocrypta beanii Jordan, Bull. U. S. Nat. Mus., X, 5, 1877, Notalbany River, Tickfaw, Louisiana.

Genus 477. IOA Jordan & Brayton.

Ioa Jordan & Brayton, Bull. U. S. Nat. Mus., XII, 88, 1878 (*vitrea*).

1480. Ioa vitrea (Cope).

Southeastern Virginia and eastern North Carolina.

Pœcilichthys vitreus Cope, Proc. Amer. Philos. Soc. Phila. 1870, 263, Walnut Creek, a tributary of Neuse River, Wake County, North Carolina.

1481. Ioa vigil Hay.

Pearl River, Jackson, Mississippi.

Ioa vigil Hay, Bull. U. S. Fish Com. II, 1882 (1883), 59, Pearl River, Jackson, Mississippi.

Genus 478. ETHEOSTOMA Rafinesque.

Etheostoma Rafinesque, Jour. de Physique 1819, 419 (*caprodes, blennioides, flabellaris;* first restricted by Agassiz, 1854, to *aspro*, wrongly identified as "*blennioides*"; restricted by Cope & Jordan 1877 to *flabellaris*).

Subgenus PŒCILICHTHYS Agassiz.

Pœcilichthys Agassiz, Am. Jour. Sci. Arts 1854, 305 (*variatus*).

1482. Etheostoma variatum Kirtland.

Ohio River basin, from western Pennsylvania to Kentucky.

Etheostoma variatum Kirtland, Zoology of Ohio, 168, 192, 1838, Mahoning River, Ohio.

Subgenus NANOSTOMA Putnam.

Nanostoma Putnam, in Jordan, Bull. U. S. Nat. Mus., x, 6, 1877 (*zonalis*); not *Nannostomus* Günther.

1483. Etheostoma swannanoa Jordan & Evermann.

Upper waters of the Tennessee River in Middle and South Forks of the Holston and the South Fork of the Swannanoa.

Etheostoma swannanoa Jordan & Evermann, Proc. U. S. Nat. Mus. 1888, 360, South Fork of Holston River, Holstein Mills, Virginia; Middle Fork of Holston River, Marion, Virginia, and South Fork of Swannanoa River, Black Mountain, North Carolina.

1484. Etheostoma thalassinum (Jordan & Brayton).

Santee River basin in North and South Carolina.

Nothonotus thalassinus Jordan & Brayton, Bull. U. S. Nat. Mus., XII, 13, 1878, Reedy River, Greenville, South Carolina; Catawba River and tributaries in North Carolina; Ennoree River, Chick Springs, South Carolina, and Saluda River, Farr's Mill, South Carolina.

1485. Etheostoma inscriptum (Jordan & Brayton).

Oconee River, Georgia.

Nothonotus inscriptus Jordan & Brayton, Bull. U. S. Nat. Mus., XII, 34, 1878, Oconee River, Sulphur Springs, Hall County, Georgia.

1486. Etheostoma blennius Gilbert & Swain.

Northern Alabama, in streams tributary to the Tennessee River.

Etheostoma (*Rhothæca*) *blennius* Gilbert & Swain, Proc. U. S. Nat. Mus. 1887, 55, Cox Creek and Shoal Creek, tributary to Tennessee River, Florence, Alabama.

1487. Etheostoma rupestre Gilbert & Swain.

North River, a tributary of Black Warrior River, Alabama.

Etheostoma rupestre Gilbert & Swain, Proc. U. S. Nat. Mus. 1887, 57, North River, near Tuscaloosa, Alabama.

1488. Etheostoma elegans (Hay).

Chickasawha River, Mississippi.

Nanostoma elegans Hay, Proc. U. S. Nat. Mus. 1880, 493, shallow rocky branch of Chickasawha River, Enterprise, Mississippi.

1489. Etheostoma zonale (Cope).

Mississippi Valley from Ohio and northern Indiana (Kankakee River) west through Iowa and south through Kentucky and Tennessee into Alabama, Louisiana, and Arkansas.

Pœcilichthys zonalis Cope, Jour. Ac. Nat. Sci. Phila. 1868, 212, Holston River, Virginia.

1489a. Etheostoma zonale arcansanum Jordan & Gilbert.

Ozark region of Missouri and Arkansas.

Etheostoma zonale arcansanum Jordan & Gilbert, Proc. U. S. Nat. Mus. 1886, 5, Spring River, Carthage, Missouri; James River, Marshfield, Missouri; Poteau River, Hackett City, Arkansas; Washita River, Arkadelphia, Arkansas, and Saline River, Benton, Arkansas.

Subgenus NOTHONOTUS Agassiz.

Nothonotus Agassiz, Bull. Mus. Comp. Zool., I, 3, 1863 (*maculatus*).

1490. Etheostoma camurum (Cope). *Blue-breasted Darter.*

Indiana and Ohio to Tennessee.

Pœcilichthys camurus Cope, Proc. Amer. Philos. Soc. Phila. 1870, 265, headwaters of Cumberland River in Tennessee.

1491. Etheostoma vulneratum (Cope).

French Broad River.

Pœcilichthys vulneratus Cope, Proc. Amer. Philos. Soc. Phila. 1870, 266, tributary of French Broad River, Warm Springs, North Carolina.

1492. Etheostoma maculatum Kirtland.

Ohio and Indiana southward through Kentucky and Tennessee to northern Alabama, in tributaries of the Wabash, Ohio, Cumberland, and Tennessee rivers.

Etheostoma maculata Kirtland, Jour. Bost. Soc. Nat. Hist. 1840, 276, Mahoning River, Ohio.

1493. Etheostoma cinereum Storer.

Tennessee and Cumberland rivers; Tennessee River at Florence, Alabama; Obeys River at Olympus, Tennessee; Rock Creek near Whitley Station, Kentucky.

Etheostoma cinerea Storer, Proc. Bost. Soc. Nat. Hist. 1845, 49, Florence, Ala.

1494. Etheostoma tessellatum Storer.

Florence, Alabama.

Etheostoma tessellata Storer, Proc. Bost. Soc. Nat. Hist. 1845, 48, Tennessee River at Florence, Alabama.

1495. Etheostoma rufilineatum (Cope).

Upper tributaries of the Tennessee, Cumberland, and Green rivers.

Pœcilichthys rufilineatus Cope, Proc. Amer. Philos. Soc. 1870, 267, Warm Springs Creek, French Broad River, Madison County, North Carolina.

1496. Etheostoma jordani Gilbert.

Tributaries of Coosa River in the Alabama River basin.

Etheostoma (*Nothonotus*) *jordani* Gilbert, Bull. U. S. Fish Com., IX, 1889 (1891), 156, pl. 43, fig. 3, Choccolo Creek, Oxford, Alabama, and Chestnut Creek, Verbena, Alabama.

Subgenus **TORRENTARIA** Jordan & Evermann.

Torrentaria Jordan & Evermann, Fishes N. and M. Am., 1080, 1896 (*australe*).

1497. Etheostoma sagitta (Jordan & Swain).

Cumberland River.

Pœcilichthys sagitta Jordan & Swain, Proc. U. S. Nat. Mus. 1883, 250, Wolf Creek, near Pleasant View, Whitley County, Kentucky.

1498. Etheostoma australe Jordan.

Chihuahua River, Mexico, in Rio Grande Basin.

Etheostoma australe Jordan, Proc. U. S. Nat. Mus. 1884, 362, Chihuahua River, Mexico; based on the types of *Diplesion fasciatus* Girard.

Subgenus **NIVICOLA** Jordan & Evermann.

Nivicola Jordan & Evermann, Fishes N. and M. Am., 1082, 1896 (*boreale*).

1499. Etheostoma boreale (Jordan).

St. Lawrence River at Montreal, Canada.

Pœcilichthys borealis Jordan, Proc. U. S. N. M. 1884, 477, Montreal, Canada.

Subgenus **RAFINESQUIELLUS** Jordan & Evermann.

Rafinesquiellus Jordan & Evermann, Fishes N. and M. Am., 1082, 1896 (*pottsii*).

1500. Etheostoma pottsii (Girard).

Streams of Chihuahua, Mexico, in Rio Grande Basin.

Aplesion pottsii (misprinted *potsii*) Girard, Proc. Ac. Nat. Sci. Phila. 1859, 102, tributaries of Chihuahua River, Mexico.

Subgenus **OLIGOCEPHALUS** Girard.

Oligocephalus Girard, Proc. Ac. Nat. Sci. Phila. 1859, 67 (*lepidus*).

1501. Etheostoma iowæ Jordan & Meek.

Upper Mississippi Valley from Iowa and Nebraska north to Assiniboia; common northwestward.

Etheostoma iowæ Jordan & Meek, Proc. U. S. Nat. Mus. 1885, 10, Charitou River, Chariton, Iowa.

1502. Etheostoma jessiæ (Jordan & Brayton).

Indiana to Iowa and south to Mississippi and Texas.

Pœcilichthys jessiæ Jordan & Brayton, in Jordan, Man. Vert., ed. 2, 227, 1877, Chickamauga River, Ringgold, Georgia.

1503. Etheostoma luteovinctum Gilbert & Swain.

Stone River, Tennessee.
Etheostoma luteovinctum Gilbert & Swain, Proc. U. S. Nat. Mus. 1887, 58, Stone River near Nashville, Tennessee.

1504. Etheostoma lepidogenys Evermann & Kendall.

Rio Comal, Texas.
Etheostoma lepidogenys Evermann & Kendall, Bull. U. S. Fish Com., XII, 1892 (Feb. 6, 1894), 114, pl. 35, fig. 3, Rio Comal, New Braunfels, Texas.

1505. Etheostoma cœruleum Storer. *Blue Darter; Rainbow Darter; Soldier-fish.*

Mississippi Valley; Ohio Valley.
Etheostoma cœrulea Storer, Proc. Bost. Soc. Nat. Hist. 1845, 47.

1505a. Etheostoma cœruleum spectabile (Agassiz).

Mississippi Valley, Indiana to Missouri.
Pœcilichthys spectabilis Agassiz, Am. Jour. Sci. Arts 1854, 304, Osage River, Missouri.

1506. Etheostoma lepidum (Baird & Girard).

Streams of Arkansas, Texas, and Chihuahua.
Boleosoma lepida Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1853, 388, upper tributaries of the Rio Nueces, Texas.

1507. Etheostoma tippecanoe Jordan & Evermann.

Tippecanoe River, Indiana.
Etheostoma tippecanoe Jordan & Evermann, Proc. U. S. Nat. Mus. 1890, 3, (figure that of *Etheostoma camurum* by mistake), Tippecanoe River, Marshland, Indiana.

1508. Etheostoma punctulatum (Agassiz).

Ozark region of southwestern Missouri.
Pœcilichthys punctulatus Agassiz, Am. Jour. Sci. Arts 1854, 304, Osage River, Missouri.

1509. Etheostoma cragini Gilbert.

Western portion of the Arkansas River basin, from Garden City, Kansas, to Canyon City, Colorado.
Etheostoma cragini Gilbert, Bull. Washburn College Laboratory for March and April, 1885, 99, small stream connecting the "Lake" at Garden City, Kansas, with Arkansas River.

1510. Etheostoma obeyense Kirsch.

Tributaries of Cumberland River in Clinton County, Kentucky.
Etheostoma obeyense Kirsch, Bull. U. S. Fish Com., X, 1890 (1892), 292, Indian Creek, Spring Creek, Smith Creek, and Albany Branch, all tributaries of Cumberland River in Clinton County, Kentucky.

1511. Etheostoma pagei Meek.

Spring branch, tributary to Neosho River, Neosho, Mo., in Arkansas Basin.
Etheostoma pagei Meek, Am. Nat. 1894, 957, spring branch on U. S. Fish Commission grounds, Neosho, Missouri.

1512. Etheostoma virgatum (Jordan).

Tributaries of Cumberland River in western Kentucky.
Pœcilichthys virgatus Jordan, Proc. U. S. Nat. Mus. 1879, 236, Rock Castle River, Livingston, Kentucky.

Subgenus CLARICOLA Jordan & Evermann.

Claricola Jordan & Evermann, Fishes N. and M. Amer., 1093, 1896 (*juliæ*).

1513. Etheostoma juliæ Meek.

Basin of White River, Missouri.
Etheostoma juliæ Meek, Bull. U. S. Fish Com., IX, 1889 (1891), 130, pl. 42, fig. 2, James River, near Springfield, Missouri.

1514. Etheostoma artesiæ (Hay).

Georgia to central Texas.
Pœcilichthys artesiæ Hay, Proc. U. S. Nat. Mus. 1880, 494, from a small branch of Catawba River, Artesia, Lowndes County, Mississippi.

1515. Etheostoma alabamæ (Gilbert & Swain).

Black Warrior and Big Catawba rivers, Alabama.

Etheostoma whipplei alabamæ Gilbert & Swain, Proc. U. S. Nat. Mus. 1887, 62, Black Warrior River near Morris and Tuscaloosa, Alabama.

1516. Etheostoma whipplii (Girard).

Lower Arkansas Basin, locally abundant in clear tributaries of the Saline, Washita, etc.

Boleichthys whipplii Girard, Proc. Ac. Nat. Sci. Phila. 1859, 103, Coal Creek, Arkansas.

1517. Etheostoma squamiceps Jordan.

Lower Wabash Valley, Indiana, through western Kentucky and Tennessee to Georgia and western Florida.

Etheostoma squamiceps Jordan, Bull. U. S. Nat. Mus., x, 11, 1877, Russellville, Kentucky.

Subgenus ETHEOSTOMA Rafinesque.

1518. Etheostoma flabellare Rafinesque. *Fan-tailed Darter.*

New York to Virginia, west to Iowa, and south to South Carolina and northern Alabama.

Etheostoma flabellaris Rafinesque, Jour. de Physique 1819, 419, tributaries of Ohio River.

1518a. Etheostoma flabellare cumberlandicum (Jordan & Swain).

Brooks in Cumberland Mountains tributary to Cumberland River.

Etheostoma cumberlandicum Jordan & Swain, Proc. U. S. Nat. Mus. 1883, 251, small streams of the Cumberland Mountains; Wolf Creek and Briar Creek near Pleasant View, Whitley County, Kentucky.

1518b. Etheostoma flabellare lineolatum (Agassiz).

Minnesota to northern Indiana and northern Missouri.

Catonotus lineolatus Agassiz, Am. Jour. Sci. Arts 1854, 305, small creek, near Quincy, Illinois.

Genus 479. ALVARIUS Girard.

Alvarius Girard, Proc. Ac. Nat. Sci. Phila. 1859, 101 (*lateralis*).

1519. Alvarius lateralis Girard.

Rio Grande.

Alvarius lateralis Girard, Proc. Ac. Nat. Sci. Phila. 1859, 101, mouth of Rio Grande.

Genus 480. PSYCHROMASTER Jordan & Evermann.

Psychromaster Jordan & Evermann, Fishes North and Middle America, 1099, 1896 (*tuscumbia*).

1520. Psychromaster tuscumbia (Gilbert & Swain).

Tennessee River basin in northern Alabama.

Etheostoma tuscumbia Gilbert & Swain, Proc. U. S. Nat. Mus. 1887, 63, streams flowing from the large spring at Tuscumbia, Alabama.

Genus 481. COPELANDELLUS Jordan & Evermann.

Copelandellus Jordan & Evermann, Fishes North and Middle America, 1100, 1896 (*quiescens*).

1521. Copelandellus quiescens (Jordan).

Swamps and streams of the lowlands from Virginia to Florida; known from Blackwater River, Zuni, Virginia; Allapaha River, Nashville, Georgia; and various streams in Florida.

Pœcilichthys quiescens Jordan, Proc. U. S. Nat. Mus. 1884, 478, tributary of Allapaha River, Nashville, Georgia.

Genus 482. BOLEICHTHYS Girard.

Boleichthys Girard, Proc. Ac. Nat. Sci. Phila. 1859, 103 (*exilis*).

1522. Boleichthys fusiformis (Girard).

Massachusetts to the Rio Grande and west to Minnesota.

Boleosoma fusiformis Girard, Proc. Bost. Soc. Nat. Hist. 1854, 41, Charles River, Massachusetts.

1523. Boleichthys exilis Girard.

Upper Missouri River basin and Red River of the North.
Boleichthys exilis Girard, Proc. Ac. Nat. Sci. Phila. 1859, 103, Little Muddy River, a tributary of the Upper Missouri.

Genus 483. MICROPERCA Putnam.

Microperca Putnam, Bull. Mus. Comp. Zool., I, 4, 1863 (*punctulata*).

1524. Microperca prœliaris (Hay).

Alabama and Mississippi, in lowland streams and ponds.
Alvarius prœliaris Hay, Proc. U. S. Nat. Mus. 1880, 496, small branch of the Tuscumbia River at Corinth, Mississippi.

1525. Microperca punctulata Putnam. *Least Darter.*

Northwestern States; Indiana, Michigan, and Minnesota, south to Arkansas; rare outside of tributaries of the Great Lakes.
Microperca punctulata Putnam, Bull. Mus. Comp. Zool., I, 4, 1863, various points in Michigan, Wisconsin, Illinois, and Alabama; those from Alabama were probably *M. prœliaris* (Hay).

1526. Microperca fonticola (Jordan & Gilbert).

Arkansas and Texas, in clear rocky streams; known only from Washita River at Arkadelphia; San Marcos River at San Marcos, Texas; Comal Creek at New Braunfels, Texas.
Alvarius fonticola Jordan & Gilbert, Proc. U. S. Nat. Mus. 1886, 23, San Marcos River at San Marcos, Texas.

Family CXLVI. CHEILODIPTERIDÆ. The King of the Mullets.

Genus 484. APOGON Lacépède. *King of Mullets.*

Apogon Lacépède, Hist. Nat. Poiss., III, 411, 1802 (*rubcr* = *imberbis*).

1527. Apogon imberbis (Linnæus). *King of the Mullets; Alfoncino; Fucinita.*

Mediterranean and neighboring waters; one from Newport, Rhode Island, and one from the island of Fernando Noronha.
Mullus imberbis Linnæus, Syst. Nat., ed. X, 300, 1758, Malta; after Artedi.

1528. Apogon dovii Günther.

Mazatlan to Panama.
Apogon dovii Günther, Proc. Zool. Soc. Lond. 1861, 371, Panama.

1529. Apogon retrosella (Gill). *Cardenal.*

Pacific Coast of Mexico.
Amia retrosella Gill, Proc. Ac. Nat. Sci. Phila. 1862, 251, Cape San Lucas.

1530. Apogon maculatus (Poey).

Pensacola to Bahia; common on the "Snapper Banks"; often found in the stomachs of snappers and groupers.
Monoprion maculatus Poey, Memorias, II, 123, 1860, Cuba

1531. Apogon binotatus (Poey).

Cuba.
Amia binotata Poey, Repertorio, 234, 1867, Cuba.

1532. Apogon pigmentarius (Poey).

Cuba; common at Havana.
Monoprion pigmentarius Poey, Memorias, II, 123, 1860, Cuba.

Genus 485. APOGONICHTHYS Bleeker.

Apogonichthys Bleeker, Floris, 321, 1854 (*perdix*).

1533. Apogonichthys alutus (Jordan & Gilbert).

Snapper Banks off Pensacola and Tampa, Florida.
Apogon alutus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 279, and in Synopsis, 931, 1883, Snapper Banks off Pensacola, Fla.

1534. Apogonichthys stellatus Cope.

Bahamas.

Apogonichthys stellatus Cope, Trans. Amer. Philos. Soc. 1866, 400, Nassau, Bahama Islands.

1535. Apogonichthys puncticulatus Poey.

Cuba.

Apogonichthys puncticulatus Poey, Repertorio, II, 233, 1867, Cuba.

Genus 486. GLOSSAMIA Gill.

Glossamia Gill, Proc. Ac. Nat. Sci. Phila. 1863, 82 (*aprion*).

1536. Glossamia pandionis (Goode & Bean).

Deep water off Chesapeake Bay.

Apogon pandionis Goode & Bean, Proc. U. S. Nat. Mus. 1881, 160, deep water off Chesapeake Bay.

Genus 487. EPIGONUS Rafinesque.

Epigonus Rafinesque, Indice Ittiol. Sicil., 64, 1810 (*macrophthalmus=telescopum*).

1537. Epigonus occidentalis Goode & Bean.

Off Barbados.

Epigonus occidentalis Goode & Bean, Oceanic Ichthyology, 233, 1896, off Barbados.

Genus 488. CHEILODIPTERUS Lacépède.

Cheilodipterus Lacépède, Hist. Nat. Poiss., III, 539, 1802 (*saltatrix, macrodon*, etc.; restricted by Cuvier & Valenciennes in 1828 to *macrodon*).

1538. Cheilodipterus affinis Poey.

Cuba.

Cheilodipterus affinis Poey, Ann. Ac. Nat. Sci. N. Y., XI, 1876, 58, Havana.

Genus 489. AMIICHTHYS Poey.

Amiichthys Poey, in Jordan, Proc. U. S. Nat. Mus. 1886, 586 (*diapterus*).

1539. Amiichthys diapterus (Poey).

Cuba.

Genus? —— *diapterus* Poey, Synopsis, 305, 1861, Cuba.

Genus 490. SPHYRÆNOPS Gill.

Sphyrænops Gill, in Poey, Memorias, II, 349, 1861 (*bairdianus*).

1540. Sphyrænops bairdianus Poey.

Cuba.

Sphyrænops bairdianus Poey, Memorias, II, 350, 1861, Cuba.

Genus 491. SCOMBROPS Temminck & Schlegel.

Scombrops Temminck & Schlegel, Fauna Japonica, 118, 1842 (*cheilodipteroides*).

Subgenus LATEBRUS Poey.

Latebrus Poey, Memorias, II, 168, 1860 (*oculatus*).

1541. Scombrops oculatus (Poey). *Escolar Chino.*

Coast of Cuba.

Latebrus oculatus Poey, Memorias, II, 168, with plate, 1860, Cuba.

Genus 492. HYPOCLYDONIA Goode & Bean.

Hypoclydonia Goode & Bean, Oceanic Ichthyology, 236, fig. 237, 1896 (*bella*).

1542. Hypoclydonia bella Goode & Bean.

Gulf Stream.

Hypoclydonia bella Goode & Bean, Oceanic Ichthyology, 236, 1896, Gulf Stream at Albatross Stations 2314 in 159 fathoms, 2397 in 280 fathoms, 2401 in 142 fathoms, 2417 in 95 fathoms, 2418 in 90 fathoms, 2425 in 119 fathoms, and 2426 in 93 fathoms.

Family CXLVII. CENTROPOMIDÆ. The Robalos.

Genus 493. CENTROPOMUS Lacépède. *Robalos.*

Centropomus Lacépède, Hist. Nat. Poiss., IV, 248, 1802 (*lucioperca, undecimalis,* etc.; restricted to *undecimalis* by Cuvier & Valenciennes).

1543. Centropomus viridis Lockington. *Robalo.*

Pacific Coast of Mexico; common from Gulf of California to Panama.
Centropomus viridis Lockington, Proc. Cal. Ac. Sci., VII, 1876 (1877), 110, off Ascension Island, Lower California.

1544. Centropomus undecimalis (Bloch). *Robalo; Sergeant-fish; Snook; Brochet de Mer.*

Coasts of Florida and Texas southward among the West Indies to Surinam or beyond.
Sciæna undecimalis Bloch, Ichthyol., VI, 60, pl. 303, 1792, Jamaica.

1545. Centropomus nigrescens Günther. *Robalo Prieto.*

Pacific Coast of tropical America; generally common from Mazatlan to Panama.
Centropomus nigrescens Günther, Fishes Central America, 407, 1869, Chiapas.

1546. Centropomus pedimacula Poey. *Constantino de las Aletas Prietas; Robalito de las Aletas Prietas.*

Both coasts of tropical America; common in Cuba, Jamaica, and south to Brazil and from Mazatlan to Panama.
Centropomus pedimacula Poey, Memorias, II, 122, 1860, Havana and Cienfuegos, Cuba.

1547. Centropomus grandoculatus Jenkins & Evermann.

Pacific Coast of Mexico.
Centropomus grandoculatus Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 139, Guaymas, Sonora.

1548. Centropomus cuvieri Bocourt.

Haiti.
Centropomus cuvieri Bocourt, Ann. Sc. Nat. Paris 1868, 91, Haiti.

1549. Centropomus mexicanus Bocourt.

Both coasts of Mexico; recorded from Gulf of Mexico and from Oaxaca.
Centropomus mexicanus Bocourt, Ann. Sc. Nat. Paris 1868, 90, Gulf of Mexico.

1550. Centropomus parallelus Poey.

Coasts of Cuba; San Domingo, Jamaica, Barbados, and Rio Chagres; Guiana, Pernambuco, and Bahia.
Centropomus parallelus Poey, Memorias, II, 120, 1860, Havana and Cienfuegos, Cuba.

1551. Centropomus pectinatus Poey.

Coasts of Cuba.
Centropomus pectinatus Poey, Memorias, II, 122, 1860, Havana and Cienfuegos, Cuba.

1552. Centropomus unionensis Bocourt.

Pacific Coast of Central America; rather common at Panama.
Centropomus unionensis Bocourt, Ann. Sc. Nat. Paris 1868, 90, La Union, San Salvador.

1553. Centropomus armatus Gill.

Pacific Coast of Central America; common from Chiapas to Panama.
Centropomus armatus Gill, Proc. Ac. Nat. Sci. Phila. 1863, 163, Panama.

1554. Centropomus robalito Jordan & Gilbert. *Constantino; Robalito de las Aletas Amarillas.*

Pacific Coast of Mexico from Mazatlan to Panama.
Centropomus robalito Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 462, Mazatlan; Acapulco.

1555. Centropomus affinis Steindachner.

Coast of Brazil, north to Belize.
Centropomus affinis Steindachner, Ichth. Notizen, I, 1, pl. 1, fig. 1, 1864, Rio Janeiro and Cajahiba, Brazil; Demerara.

1556. Centropomus ensiferus Poey.
West Indies; generally common from Cuba to Surinam.
Centropomus ensiferus Poey, Memorias, II, 122, 1860, Havana.

Family CXLVIII. SERRANIDÆ. The Sea Basses.

Genus 494. ROCCUS Mitchill. *Striped Basses.*
Roccus Mitchill, Fishes of New York, 25, 1814 (*striatus* = *lineatus*).

Subgenus LEPIBEMA Rafinesque.
Lepibema Rafinesque, Ichth. Ohiensis, 23, 1820 (*chrysops*).

1557. Roccus chrysops (Rafinesque). *White Bass; White Lake-Bass.*
Great Lakes region, Upper Mississippi and Ohio valleys, south to Washita River.
Perca chrysops Rafinesque, Ichth. Ohiensis, 22, 1820, Falls of the Ohio.

Subgenus ROCCUS Mitchill.

1558. Roccus lineatus (Bloch). *Striped Bass; Rockfish; Rock.*
Atlantic coasts of North America from New Brunswick to Escambia River, Florida; introduced by the U. S. Fish Commission into Sacramento River, California.
Sciæna lineata Bloch, Ichth., IX, 53, pl. 305, 1792, "Mediterranean."

Genus 495. MORONE Mitchill. *White Perch.*
Morone Mitchill, Fishes of New York, 18, 1814 (*rufa* and *flavescens*); the genus properly a synonym of *Perca*.

1559. Morone interrupta Gill. *Yellow Bass.*
Lower Mississippi Valley north to Cincinnati, Terre Haute, and St. Louis.
Morone interrupta Gill, Proc. Ac. Nat. Sci. Phila. 1860, 118, St. Louis; New Orleans.

1560. Morone americana (Gmelin). *White Perch.*
Atlantic Coast of North America from Nova Scotia to South Carolina in brackish water, ascending streams, and frequently landlocked in ponds.
Perca americana Gmelin, Syst. Nat., I, III, 1308, 1788, New York; after Schöpf.

Genus 496. LIOPROPOMA Gill.
Liopropoma Gill, Proc. Ac. Nat. Sci. Phila. 1862, 236 (*aberrans*).

1561. Liopropoma aberrans Poey.
Coast of Cuba.
Perca aberrans Poey, Memorias, II, 125, 1860, Cuba.

Genus 497. CHORISTISTIUM Gill.
Chorististium Gill, Proc. Ac. Nat. Sci. Phila. 1862, 236 (*rubrum*).

1562. Chorististium rubrum (Poey).
Coast of Cuba.
Liopropoma rubra Poey, Memorias, II, 418, 1861, Havana.

Genus 498. STEREOLEPIS Ayres. *Jewfishes.*
Stereolepis Ayres, Proc. Cal. Ac. Sci. 1859, 28 (*gigas*).

1563. Stereolepis gigas Ayres. *California Jewfish.*
Coast of California, north to the Farallones.
Stereolepis gigas Ayres, Proc. Cal. Ac. Sci. 1859, 28, southern California.

Genus 499. POLYPRION Cuvier. *Wreckfishes.*
Polyprion Cuvier, in Valenciennes, Mém. Mus., XI, 265, 1824 (*cernium*).

1564. Polyprion americanus (Bloch & Schneider). *Wreckfish; Stone Bass; Cernier.*
Off coast of Europe; Gulf Stream.
Amphiprion americanus Bloch & Schneider, Syst. Ichth., 205, pl. 47, 1801, based on a drawing sent by Latham to Schneider representing some fish called in America "*gnom*"; called *Amphiprion australis* on pl. 47.

Genus 500. **GONIOPLECTRUS** Gill. *Spanish Flags.*

Gonioplectrus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 236, 237 (*hispanum*).

1565. Gonioplectrus hispanus (Cuvier & Valenciennes). *"Spanish Flag"; Ouatilibi Espagnol; Biajaiba de lo Alto.*

West Indies; Cuba.

Plectropoma hispanus Cuv. & Val., Hist. Nat. Poiss., II, 396, 1828, Martinique.

Genus 501. **PETROMETOPON** Gill. *Enjambres.*

Petrometopon Gill, Proc. Ac. Nat. Sci. Phila. 1865, 105 (*guttatus* Poey = *cruentatus*).

1566. Petrometopon panamensis (Steindachner).

Panama.

Serranus panamensis Steindachner, Ichth. Beitr., IV, 1, with plate, 1871, Panama.

1567. Petrometopon cruentatus (Lacépède). *Enjambre; Coney; Rock Hind.*

West Indian fauna, Brazil to Florida Keys; very common on Cuba coast.

Sparus cruentatus Lacépède, Hist. Nat. Poiss., IV, 157, pl. 4, fig. 1, 1803, Martinique; on a copy of Plumier's drawing.

1567a. Petrometopon cruentatus coronatus (Cuvier & Valenciennes).

West Indies, north to Key West.

Serranus coronatus Cuv. & Val., Hist. Nat. Poiss., II, 371, 1828, Martinique.

Genus 502. **BODIANUS** Bloch. *Jacob Evertzens.*

Bodianus Bloch, Ichthyologia, 1790 (*guttatus, bodianus,* etc., species with entire preopercle and spine on opercle).

1568. Bodianus tæniops (Cuvier & Valenciennes).

West coast of Africa, straying to Florida.

Serranus tæniops Cuv. & Val., Hist. Nat. Poiss., II, 370, 1828, Cape Verdes.

1569. Bodianus fulvus (Linnæus). *Guativere; Nigger-fish; Yellow-fish; Butter-fish; Lemon-yellow Butter-fish; Guativere Amarilla.*

West Indies; Bermuda and Florida Keys to Bahia.

Labrus fulvus Linnæus, Syst. Nat., ed. X, 287, 1758, Bahamas; after Catesby.

1569a. Bodianus fulvus ruber (Bloch & Schneider). *Red Guativere; Ouatilibi; Rock Hind.*

West Indies, etc.; very common.

Gymnocephalus ruber Bloch & Schneider, Syst. Ichth., 346, pl. 67, 1801, on *Carauna* of Marcgrave; not *Epinephelus ruber* Bloch.

1569b. Bodianus fulvus punctatus (Linnæus). *Nigger-fish; Negro-fish; Black Guativere.*

West Indies, etc.; everywhere common.

Perca punctata Linnæus, Syst. Nat., ed. X, 291, 1758, Bahamas; based on Catesby.

Subgenus **MENEPHORUS** Poey.

Menephorus Poey, Ann. Lyc. Nat. Hist. N. Y., X, 1869, 50 (*dubius*).

1570. Bodianus dubius (Poey).

Cuba.

Serranus dubius Poey, Memorias, II, 142, 1860, Cuba.

1571. Bodianus punctiferus (Poey).

Cuba.

Menephorus punctiferus Poey, Enumeratio, 21, 1875, Havana.

Subgenus **ENNEISTUS** Jordan & Evermann.

Enneistus Jordan & Evermann, Fishes N. and M. Am., 1147, 1896 (*acanthistius*).

1572. Bodianus acanthistius Gilbert.

Cape Lobos, eastern shore of Gulf of California.

Bodianus acanthistius Gilbert, Proc. U. S. N. M. 1891, 552, Cape Lobos, eastern shore of Gulf of California at Albatross Station 3017, in 58 fathoms.

Genus 503. **EPINEPHELUS** Bloch. *Groupers.*

Epinephelus Bloch, Ichthyologia, 1793 (after *marginalis, brunneus, merra, ruber,* etc.; restricted to *marginalis* by authors).

Subgenus **SCHISTORUS** Gill.

Schistorus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 237 (*mystacinus*).

1573. Epinephelus mystacinus (Poey). *Cherna de lo Alto.*

West Indies south to Brazil.

Serranus mystacinus Poey, Memorias, I, 52, tab. 10, fig. 1, 1851, Cuba.

Subgenus **EPINEPHELUS** Bloch.

1574. Epinephelus analogus Gill. *Cabrilla Pinta.*

Pacific Coast of tropical America; common on Pacific Coast of Mexico.

Epinephelus analogus Gill, Proc. Ac. Nat. Sci. Phila. 1863, 163, Panama.

1575. Epinephelus adscensionis (Osbeck). *Rock Hind; Cabra Mora.*

West Indies; Florida Keys to Brazil; Ascension and St. Helena islands.

Trachinus adscensionis Osbeck, Iter Chin., etc., 1757, and English edition, 96, 1771, Ascension Island.

1576. Epinephelus guaza (Linnæus). *Meron; Méro; Guasa.*

Coasts of southern Europe and western Africa, ranging north to England, southward to Cape of Good Hope, and westward to Rio Janeiro and to Guiana.

Labrus guaza Linnæus, Syst. Nat., ed. x, 285, 1758, "Habitat in Pelago."

1577. Epinephelus labriformis (Jenyns).

Pacific Coast of tropical America; Cape San Lucas to Galapagos Islands.

Serranus labriformis Jenyns, Zool. Beagle, Fishes, 8, pl. 3, 1840, Galapagos.

1578. Epinephelus flavolimbatus Poey. *Yellow-finned Grouper.*

West Indies, north to Pensacola.

Epinephelus flavolimbatus Poey, Repertorio, I, 183, 1867, Cuba.

1579. Epinephelus niveatus (Cuvier & Valenciennes).

West Indies to Brazil, occasionally northward in the Gulf Stream as far as Newport, Rhode Island, and Woods Hole, Massachusetts.

Serranus niveatus Cuvier & Valenciennes, Hist. Nat. Poiss., II, 380, 1828, Brazil.

1580. Epinephelus striatus (Bloch). *Nassau Grouper; Hamlet; Cherna Criolla; Grouper; Rockfish.*

West Indian fauna; Key West to Brazil.

Anthias striatus Bloch, Ichthyologia, pl. 324, 1792, Martinique; on figure by Plumier.

1581. Epinephelus maculosus (Cuvier & Valenciennes). *Cabrilla; Red Hind.*

West Indies, occasionally north to Charleston, Florida Keys, and the Bermudas; south to Brazil.

Serranus maculosus Cuvier & Valenciennes, Hist. Nat. Poiss., II, 332, 1828, Martinique.

1582. Epinephelus drummond-hayi Goode & Bean. *Speckled Hind; John Paw.*

Bermudas, South Atlantic and Gulf Coast of United States; Charleston, South Carolina.

Epinephelus drummond-hayi Goode & Bean, Proc. U. S. Nat. Mus. 1878, 173, 174, Pensacola; Bermuda.

1583. Epinephelus morio (Cuvier & Valenciennes). *Red Grouper; Cherna Americana; Cherna de Vivero; Nègre.*

Atlantic Coast of America, Virginia to Rio Janeiro.

Serranus morio Cuvier & Valenciennes, Hist. Nat. Poiss., II, 285, 1828, New York and San Domingo.

Genus 504. **GARRUPA** Jordan. *Black Groupers.*
Garrupa Jordan, Bull. U. S. Fish Com., VIII, 1888 (1890), 353 (*nigritus*).

1584. Garrupa nigrita (Holbrook). *Black Jewfish; Black Grouper; Mero de lo Alto.*
South Atlantic and Gulf Coast of the United States, Charleston and Pensacola to Cuba and Brazil; straying to Sicily.
Serranus nigritus Holbrook, Ichth. South Carolina, ed. I, 173, pl. 25, fig. 11, 1856, Charleston, S. C.

Genus 505. **PROMICROPS** Gill. *Guasas.*
Promicrops Gill, in Poey, Synopsis, 287, 1868 (*guasa*).

1585. Promicrops guttatus (Linnæus). *Guasa; Spotted Jewfish; Meron.*
Both coasts of tropical America, north to Florida and Gulf of California, south to Brazil.
Perca guttata Linnæus, Syst. Nat., x, 292, 1758; after Marcgrave, Willughby, etc.

Genus 506. **ALPHESTES** Bloch & Schneider.
Alphestes Bloch & Schneider, Syst. Ichthyol., 236, 1801 (*afer*).

1586. Alphestes afer (Bloch). *Quaseta.*
West Indies; Cuba to Brazil.
Epinephelus afer Bloch, Ichthyologia, pl. 327, 1793, Acara, in Guinea.

1587. Alphestes multiguttatus (Günther).
Pacific Coast of tropical America; Mazatlan to Panama.
Plectropoma multiguttatum Günther, Proc. Zool. Soc. Lond. 1866, 600, Panama.

Genus 507. **DERMATOLEPIS** Gill.
Dermatolepis Gill, Proc. Ac. Nat. Sci. Phila. 1861, 54 (*punctatus*).

Subgenus **LIOPERCA** Gill.
Lioperca Gill, Proc. Ac. Nat. Sci. Phila. 1862, 237 (*inermis*).

1588. Dermatolepis inermis (Cuvier & Valenciennes).
West Indies.
Serranus inermis Cuvier & Valenciennes, Hist. Nat. Poiss., IX, 436, 1833, Antilles.

Subgenus **DERMATOLEPIS** Gill.
Dermatolepis Gill, Proc. Ac. Nat. Sci. Phila. 1861, 54 (*punctatus*).

1589. Dermatolepis punctatus Gill.
West coast of Mexico; Cape San Lucas; the Venados; the Revillagigedos.
Dermatolepis punctatus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 54, Cape San Lucas.

Genus 508. **MYCTEROPERCA** Gill.
Mycteroperca Gill, Proc. Ac. Nat. Sci. Phila. 1863, 80 (*olfax*).

Subgenus **ARCHOPERCA** Jordan & Evermann.
Archoperca Jordan & Evermann, Fishes North and Middle America, 1171, 1896 (*boulengeri*).

1590. Mycteroperca boulengeri Jordan & Starks. *Cabrilla Raizer; Mangrove Grouper.*
Mazatlan, Mexico.
Mycteroperca boulengeri Jordan & Starks, in Jordan, Fishes Sinaloa, 445, pl. 38, 1895, taken in the Astillero at Mazatlan, Mexico.

Subgenus **TRISOTROPIS** Gill.
Trisotropis Gill, Proc. Ac. Nat. Sci. Phila. 1865, 104 (*guttatus=venenosus*).

1591. Mycteroperca venenosa (Linnæus). *Rockfish; Yellow-finned Grouper; Bonaci de Piedra.*
Bahamas, Florida Keys, and southward.
Perca venenosa Linnæus, Syst. Nat., ed. x, 292, 1758, Bahamas; after Catesby.

1591a. Mycteroperca venenosa apua (Bloch). *Bonaci Cardenal.*
West Indies, Florida Keys, and southward to Brazil.
Bodianus apua Bloch, Ichth., VII, 37, taf. 229, 1790, Brazil; after a drawing by Prince Maurice—the same used by Marcgrave.

1592. Mycteroperca bonaci (Poey). *Marbled Rockfish.*
West Indies, Pensacola to Brazil.
Serranus bonaci Poey, Memorias, II, 129, 1860, Cuba.

1592a. Mycteroperca bonaci xanthosticta Jordan & Swain.
Snapper Banks off Pensacola, Florida.
Mycteroperca bonaci xanthosticta Jordan & Swain, Proc. U. S. Nat. M u 1884, 371, Snapper Banks off Pensacola, Florida.

1593. Mycteroperca jordani (Jenkins & Evermann). *Cabrilla de Astillero; Baya.*
Pacific Coast of Mexico from Gulf of California to Mazatlan.
Epinephelus jordani Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 140, Guaymas, Sonora.

1594. Mycteroperca microlepis (Goode & Bean). *Gog; Aquaji.*
South Atlantic and Gulf Coast of the United States, north to Beaufort, North Carolina, and Pensacola, Florida.
Trisotropis microlepis Goode & Bean, Proc. U. S. N. M. 1879, 141, west Florida.

1595. Mycteroperca interstitialis (Poey).
Coast of Cuba.
Serranus interstitialis Poey, Memorias, II, 127, 1860, Cuba.

1596. Mycteroperca dimidiata (Poey).
Coast of Cuba.
Serranus dimidiatus Poey, Memorias, II, 129, 1860, Cuba.

1597. Mycteroperca xenarcha Jordan.
Galapagos Archipelago; coast of Peru.
Mycteroperca xenarcha Jordan, Proc. Ac. Nat. Sci. Phila. 1887, 387, Galapagos Islands; Payta.

Subgenus PAREPINEPHELUS Bleeker.
Parepinephelus Bleeker, Systema Percarum Revisum, 257, 1875 (*acutirostris*).

1598. Mycteroperca rubra (Bloch). *Scirenga.*
West Indies, Brazil, Mediterranean Sea, and islands of the eastern Atlantic.
Epinephelus ruber Bloch, Ichthyologia, VII, 22, 1793, pl. 330, "Japan."

Subgenus XYSTROPERCA Jordan & Evermann.
Xystroperca Jordan & Evermann, Fishes North and Middle America, 1181, 1896 (*pardalis*).

1599. Mycteroperca pardalis Gilbert. *Cabrilla Piritita.*
Gulf of California.
Mycteroperca pardalis Gilbert, Proc. U. S. Nat. Mus. 1891, 551, La Paz Bay, Lower California.

Subgenus MYCTEROPERCA Gill.

1600. Mycteroperca olfax (Jenyns). *Yellow Grouper.*
James Island, Galapagos Archipelago; Panama.
Serranus olfax Jenyns, Zool. Beagle, Fishes, 9, pl. 4, 1840, Galapagos Islands.

1600a. Mycteroperca olfax ruberrima Jordan & Bollman.
Abingdon Island, Galapagos Archipelago.
Mycteroperca olfax ruberrima Jordan & Bollman, in Jordan & Eigenmann, Review Serranidæ, 367, 1890, Abingdon Island, Galapagos Archipelago.

1601. Mycteroperca rosacea (Streets). *Cabrilla Calamaria.*
Gulf of California.
Epinephelus rosaceus Streets, Bull. U. S. Nat. Mus., VII, 51, 1877, Angel Island, Gulf of California.

1602. Mycteroperca falcata (Poey). *Scamp; Bacalao; Abadejo.*
West Indies, north to Bermuda.
Serranus falcatus Poey, Memorias, II, 138, 1860, Havana.

1602a. Mycteroperca falcata phenax Jordan & Swain. *Scamp; Bacalao.*
Coasts of southern Florida, abundant about the Keys.
Mycteroperca falcata phenax Jordan & Swain, Proc. U. S. Nat. Mus. 1884, 363, Key West, Florida.

1603. Mycteroperca venadorum Jordan & Starks. *Garlopa.*
West coast of Mexico at Mazatlan.
Mycteroperca venadorum Jordan & Starks, in Jordan, Proc. Cal. Ac. Sci. 1895, 446, Mazatlan, Mexico.

1604. Mycteroperca calliura Poey.
Coast of Cuba.
Mycteroperca calliura Poey, Repertorio, I, 181, 309, 1867, Cuba.

1605. Mycteroperca tigris (Cuvier & Valenciennes). *Bonaci Gato; Rockfish.*
West Indies, north to Bermuda.
Serranus tigris Cuv. & Val., Hist. Nat. Poiss., IX, 440, 1833, San Domingo.

1605a. Mycteroperca tigris camelopardalis (Poey).
West Indies.
Serranus camelopardalis Poey, Memorias, II, 132, 1860, Havana.

Genus 509. CRATINUS Steindachner.
Cratinus Steindachner, Ichth. Beitr., VII, 19, 1878 (*agassizii*).

1606. Cratinus agassizii Steindachner.
Galapagos Archipelago.
Cratinus agassizii Steindachner, Ichth. Beitr., VII, 19, 1878, Galapagos Islands.

Genus 510. HYPOPLECTRUS Gill. *Vacas.*
Hypoplectrus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 236 (*puella*).

1607. Hypoplectrus lamprurus (Jordan & Gilbert).
Panama.
Serranus lamprurus Jordan & Gilbert, Bull. U. S. Fish Com., I, 1881, 322, Panama.

1608. Hypoplectrus unicolor (Walbaum). *Vaca; Petit-nègre.*
West Indies, north to Florida Keys.
Perca unicolor Walbaum, Artedi Piscium, III, 352, 1792, locality unknown.

1608a. Hypoplectrus unicolor puella (Cuvier & Valenciennes). *Vaca.*
Martinique.
Plectropoma puella Cuvier & Valenciennes, Hist. Nat. Poiss., II, 405, pl. 37, 1828, Martinique.

1608b. Hypoplectrus unicolor vitulinus (Poey).
Havana.
Plectropoma vitulinum Poey, Memorias, I, 68, 1851, Havana.

1608c. Hypoplectrus unicolor pinnivarius Poey.
Havana.
Hypoplectrus pinnivarius Poey, Synopsis, 291, 1868, Havana.

1608d. Hypoplectrus unicolor guttavarius (Poey).
Havana.
Plectropoma guttavarium Poey, Memorias, I, 70, 1851, Havana.

1608e. Hypoplectrus unicolor gummigutta (Poey).
Havana.
Plectropoma gummigutta Poey, Memorias, I, 70, 1851, Havana.

1608f. Hypoplectrus unicolor crocotus (Cope).
West Indies.
Plectropoma crocota Cope, Trans. Am. Phil. Soc. Phila., XIV, 1871, 466, St. Martins, West Indies.

1608g. Hypoplectrus unicolor aberrans Poey.
Havana.
Hypoplectrus aberrans Poey, Synopsis, 291, 1868, Havana.

1608h. Hypoplectrus unicolor accensus (Poey).
Havana.
Plectropoma accensum Poey, Memorias, I, 72, 1851, Havana.

1608i. Hypoplectrus unicolor affinis (Poey).
Havana.
Plectropoma affine Poey, Memorias, II, 427, 1861, Havana.

1608j. Hypoplectrus unicolor chlorurus (Cuvier & Valenciennes).
Martinique.
Plectropoma chlorurum Cuv. & Val., Hist. Nat. Poiss., II, 406, 1828, Martinique.

1608k. Hypoplectrus unicolor nigricans (Poey).
Havana.
Plectropoma nigricans Poey, Memorias, I, 71, 1851, Havana.

1608l. Hypoplectrus unicolor indigo (Poey). *Añil.*
Havana.
Plectropoma indigo Poey, Memorias, I, 69, pl. 3, fig. 1, 1851, Havana.

1608m. Hypoplectrus unicolor bovinus (Poey).
Havana.
Plectropoma bovinum Poey, Memorias, I, 69, 1851, Havana.

1609. Hypoplectrus gemma Goode & Bean.
Florida Keys; known from one specimen from Garden Key, Florida.
Hypoplectrus gemma Goode & Bean, Proc. U. S. Nat. Mus. 1882, 428, Garden Key, Florida.

Genus 511. PARALABRAX Girard. *Cabrillas Verdes.*
Paralabrax Girard, Proc. Ac. Nat. Sci. Phila. 1856, 131 (*nebulifer*).

1610. Paralabrax nebulifer (Girard). *"Johnny Verde."*
Southern California, from Monterey to Magdalena Bay.
Labrax nebulifer Girard, Proc. Ac. Nat. Sci. Phila. 1854, 142, Monterey, Cal.

1611. Paralabrax maculatofasciatus (Steindachner). *Spotted Cabrilla.*
Pacific coast of America from Lower California to San Pedro and Mazatlan.
Serranus maculatofasciatus Steindachner, Ichth. Notizen, VII, 5, 1868, Mazatlan, Mexico.

1612. Paralabrax humeralis (Cuvier & Valenciennes).
Pacific Coast of South America; Panama to Juan Fernandez.
Serranus humeralis Cuv. & Val., Hist. Nat. Poiss., II, 246, 1828, Chile.

1613. Paralabrax clathratus (Girard). *Cabrilla; Rock Bass.*
Coast of southern California, from San Francisco to the Cerros Islands.
Labrax clathratus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 143, San Diego.

Genus 512. CENTROPRISTES Cuvier & Valenciennes. *Black Sea-bass.*
Centropristes Cuvier, Hist. Nat. Poiss., III, 36, 1829 (*nigricans*).

Subgenus CENTROPRISTES Cuvier & Valenciennes.

1614. Centropristes rufus Cuvier & Valenciennes.
Martinique.
Centropristes rufus Cuv. & Val., Hist. Nat. Poiss., III, 47, 1829, Martinique.

1615. Centropristes striatus (Linnæus). *Black Sea-bass; Blackfish; Tally-wag; Hannahill; Black Will; Black Harry.*
Atlantic Coast of United States, Cape Ann to northern Florida.
Labrus striatus Linnæus, Syst. Nat., ed. x, 285, 1758, "America"; description very brief, but not to be referred to any other fish.

1616. Centropristes ocyurus (Jordan & Evermann). *Gulf Sea-bass.*
Gulf of Mexico at Snapper Banks off Pensacola, Florida.
Serranus ocyurus Jordan & Evermann, Proc. U. S. Nat. Mus. 1886, 468, Snapper Banks off Pensacola, Florida.

Subgenus TRILOBURUS Gill.
Triloburus Gill, Cat. Fish. East Coast U. S., 30, 1861 (*trifurca*).

1617. Centropristes philadelphicus (Linnæus).
Coast of South Carolina.
Perca philadelphica Linnæus, Syst. Nat., ed. x, 291, 1758, America.

Genus 513. DIPLECTRUM Holbrook. *Squirrel-fishes.*
Diplectrum Holbrook, Ichthyology of South Carolina, ed. 1, 32, 1856 (*fasciularis* = *formosus*).

Subgenus HALIPERCA Gill.
Haliperca Gill, Proc. Ac. Nat. Sci. Phila. 1862, 236 (*bivittatus* = *radialis* and other species; restricted to *bivittatus* by Jordan & Gilbert, Syn., 535).

1618. Diplectrum sciurus Gilbert.
Gulf of California.
Diplectrum sciurus Gilbert, Proc. U. S. Nat. Mus. 1891, 550, Gulf of California, at Albatross stations Nos. 3014, 3021, 3026, and 3033, all in shallow water.

1619. Diplectrum radiale (Quoy & Gaimard). *Aguavina.*
Both coasts of tropical America, north to Havana and Guaymas; common on the coast of Brazil and in the Gulf of California.
Serranus radialis Quoy & Gaimard, Voyage Uranie, 316, 1824, Rio Janeiro.

1620. Diplectrum macropoma (Günther).
Pacific Coast of tropical America.
Centropristis macropoma Günther, Proc. Zool. Soc. Lond. 1864, 145, Panama.

1621. Diplectrum euryplectrum Jordan & Bollman.
Coast of Colombia, southwest of Panama.
Diplectrum euryplectrum Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 157, Pacific Ocean, off coast of Colombia.

Subgenus DIPLECTRUM Holbrook.

1622. Diplectrum formosum (Linnæus). *Squirrel-fish; Serrano; Sandfish.*
West Indies; common on the South Atlantic and Gulf coasts of the United States, from Charleston south to Montevideo.
Perca formosa Linnæus, Syst. Nat., ed. xii, 488, 1766, Carolina.

Genus 514. PRIONODES Jenyns.
Prionodes Jenyns, Voyage Beagle, Fishes, 46, 1840 (*fasciatus*).

Subgenus PRIONODES Jenyns.

1623. Prionodes æquidens (Gilbert).
Gulf of California.
Serranus æquidens Gilbert, Proc. U. S. Nat. Mus. 1890, 61, Gulf of California, at Albatross Station No. 2996, in 112 fathoms.

1624. Prionodes fusculus (Poey).
Cuba.
Centropristes fusculus Poey, Memorias, ii, 342, 1861, Havana.

1625. Prionodes phœbe (Poey). *Phœbe.*
West Indies, north to Pensacola, Florida.
Serranus phœbe Poey, Memorias, i, 55, pl. 2, fig. 3, 1851, Havana.

1626. Prionodes fasciatus Jenyns.
Pacific Coast of Mexico, Cape San Lucas to Galapagos Islands.
Prionodes fasciatus Jenyns, Voyage Beagle, Fishes, 46, 1840, Chatham Island, Galapagos Archipelago.

1627. Prionodes bulleri (Boulenger).

Coast of Jalisco, western Mexico.

Serranus bulleri Boulenger, Cat., I, 288, 1895, Las Peñas, Jalisco, Mexico.

Subgenus MENTIPERCA Gill.

Mentiperca Gill, Proc. Ac. Nat. Sci. Phila. 1862, 236 (*luciopercanus*).

1628. Prionodes tigrinus (Bloch).

West Indies.

Holocentrus tigrinus Bloch, pl. 237, 1790, East Indies; after Leba, Thesaurus, III, pl. XXVII, fig. 5.

1629. Prionodes tabacarius (Cuvier & Valenciennes). *Jacome; Bout de Tabac.*

West Indies.

Centropristes tabacarius Cuvier & Valenciennes, Hist. Nat. Poiss., III, 44, 1829, Martinique.

1630. Prionodes flavescens (Cuvier & Valenciennes).

Martinique.

Serranus flavescens Cuvier & Valenciennes, Hist. Nat. Poiss., VI, 506, 1830, Martinique.

1631. Prionodes luciopercanus (Poey).

Coast of Cuba.

Serranus luciopercanus Poey, Memorias, I, 56, pl. 9, fig. 1, 1851, Havana.

1632. Prionodes stilbostigma Jordan & Bollman.

Coast of Ecuador.

Prionodes stilbostigma Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 158, Pacific Ocean off the coast of Ecuador, 0° 50′ S., 89° 36′ W., in 45 fathoms, at Albatross Station 2809.

Genus 515. DULES Cuvier.

Dules Cuvier, Règne Animal, ed. II, vol. II, 147, 1829 (*auriga*).

1633. Dules subligarius (Cope).

South Atlantic coasts of United States; known from Beaufort, Charleston, and Pensacola Snapper Banks.

Centropristis subligarius Cope, Proc. Ac. Nat. Sci. Phila. 1870, 120, Pensacola, Florida.

1634. Dules dispilurus (Günther). *Grassy-ground Rockfish.*

Trinidad; Jamaica.

Centropristis dispinosus Günther, Proc. Zool. Soc. Lond. 1867, 99, Trinidad.

1635. Dules auriga Cuvier & Valenciennes.

Coast of Brazil and Uruguay, occasionally northward.

Dules auriga Cuvier & Valenciennes, Hist. Nat. Poiss., III, 112, pl. 51, 1829, Brazil.

Genus 516. PARANTHIAS Guichenot.

Paranthias Guichenot, Ann. Soc. Linn. Maine-et-Loire, X, 1868 (*furcifer* = *creolus*).

1636. Paranthias furcifer (Cuvier & Valenciennes). *Rabirubia de lo Alto; Creole-fish.*

Both coasts of tropical America, Cuba to Brazil, Cape San Lucas to the Galapagos Archipelago.

Serranus furcifer Cuvier & Valenciennes, Hist. Nat. Poiss., II, 264, 1828, Brazil.

Genus 517. HEMIANTHIAS Steindachner.

Hemianthias Steindachner, Ichth. Beitr., I, 4, 1874 (*peruanus*).

1637. Hemianthias peruanus Steindachner.

Coasts of Peru and Chile, occasionally northward; off the coast of Lower California.

Anthias (*Hemianthias*) *peruanus* Steindachner, Ichth. Beitr., I, 4, 1874, Payta; Trujillo.

1638. Hemianthias vivanus (Jordan & Swain).
Gulf of Mexico; Snapper Banks between Pensacola and Tampa, Florida.
Anthias vivanus Jordan & Swain, Proc. U. S. Nat. Mus. 1884, 514, from stomach of a red snapper taken at the Snapper Banks off Pensacola, Florida.

Genus 518. PRONOTOGRAMMUS Gill.
Pronotogrammus Gill, Proc. Ac. Nat. Sci. Phila. 1863, 81 (*multifasciatus*).

1639. Pronotogrammus eos Gilbert.
Pacific Coast of tropical America.
Pronotogrammus eos Gilbert, Proc. U. S. Nat. Mus. 1890, 62, west coast of Mexico, at Albatross Station 2996, in 112 fathoms.

1640. Pronotogrammus multifasciatus Gill.
Cape San Lucas, Lower California.
Pronotogrammus multifasciatus Gill, Proc. Ac. Nat. Sci. Phila. 1863, 81, Cape San Lucas, Lower California.

Genus 519. ANTHIAS Bloch. *Barbiers.*
Anthias Bloch, Auslanische Fische, VI, 97, 1792 (*anthias*).

1641. Anthias asperilinguis Günther.
Atlantic Coast of South America; only the type known.
Anthias asperilinguis Günther, Cat., I, 89, 1859, South America; probably Guiana.

Genus 520. OCYANTHIAS Jordan & Evermann.
Ocyanthias Jordan & Evermann, Fishes North and Middle America, 1227, 1896 (*martinicensis*).

1642. Ocyanthias martinicensis (Guichenot).
West Indies.
Aylopon martinicensis Guichenot, Anthiani, Ann. Linn. Soc., vol. X, 1868, Martinique.

Genus 521. GRAMMA Poey.
Gramma Poey, Synopsis, 296, 1868 (*loreto*).

1643. Gramma loreto Poey.
Matanzas, Cuba; only the type known.
Gramma loreto Poey, Synopsis, 296, 1868, Matanzas, Cuba.

Genus 522. RYPTICUS Cuvier. *Soapfishes.*
Rypticus Cuvier, Règne Animal, ed. 2, vol. II, 144, 1829 (*saponaceus*).

1644. Rypticus xanti Gill.
Pacific Coast of Mexico, from Cape San Lucas to Colima and Mazatlan.
Rhypticus xanti Gill, Proc. Ac. Nat. Sci. Phila. 1862, 250, Cape San Lucas.

1645. Rypticus bicolor (Valenciennes).
Galapagos Archipelago.
Smecticus bicolor Valenciennes, Voyage de la Vénus, Poissons, 307, pl. 2, fig. 2, 1855, Galapagos Archipelago.

1646. Rypticus saponaceus (Bloch & Schneider). *Soapfish; Jabon; Jaboncillo.*
West Indies; Pensacola to west Africa and Brazil.
Anthias saponaceus Bloch & Schneider, Syst. Ichth., 310, 1801, Havana.

1647. Rypticus arenatus Cuvier & Valenciennes.
West Indies and coast of Brazil; recorded from Jamaica, Trinity, Barbados, and St. Thomas.
Rypticus arenatus Cuvier & Valenciennes, Hist. Nat. Poiss., III, 65, pl. 45, 1829, Brazil.

1648. Rypticus coriaceus (Cope). *Black Soapfish.*
West Indies; recorded from St. Martins and Jamaica.
Eleutheractis coriaceus Cope, Trans. Amer. Philos. Soc. 1870, 467, St. Martins.

Subgenus **PROMICROPTERUS** Gill.

Promicropterus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 53 (*maculatus*).

1649. Rypticus bistrispinus (Mitchill).

South Atlantic Coast of United States; frequent off Charleston, Pensacola, and Key West; occasional as far north as Newport, Rhode Island.

Bodianus bistrispinosus Mitchill, Am. Monthly Magazine and Crit. Review, February, 1818, 247, Straits of Bahama.

1650. Rypticus nigripinnis Gill.

Pacific Coast of tropical America, Cape San Lucas to Panama.

Rhypticus nigripinnis Gill, Proc. Ac. Nat. Sci. Phila. 1861, 53, Panama.

Family CXLIX. LOBOTIDÆ. The Triple-tails.

Genus **523. LOBOTES** Cuvier.

Lobotes Cuvier, Règne Animal, ed. 2, II, 177, 1829 (*erate*=*surinamensis*).

1651. Lobotes surinamensis (Bloch). *Flasher; Triple-tail; Dormeur.*

Atlantic Coast from Cape Cod to Surinam; Mediterranean.

Holocentrus surinamensis Bloch, Ichth., pl. 243, 1790, Surinam.

1652. Lobotes pacificus Gilbert.

Known only from Panama.

Lobotes pacificus Gilbert, Proc. Cal. Ac. Sci. 1896, Panama.

Family CL. PRIACANTHIDÆ. Catalufas.

Genus **524. PRIACANTHUS** Cuvier.

Priacanthus Cuvier, Règne Animal, ed. I, 281, 1817 (*macrophthalmus*).

1653. Priacanthus arenatus Cuvier & Valenciennes. *Catalufa.*

West Indies, south to Brazil; occasionally northward in the Gulf Stream to Newport and Woods Hole.

Priacanthus arenatus Cuvier & Valenciennes, Hist. Nat. Poiss., III, 101, 1829, Brazil.

1654. Priacanthus cruentatus (Lacépède). *Big Eye; Catalufa.*

West Indies to St. Helena and the Canaries.

Labrus cruentatus Lacépède, Hist. Nat. Poiss., III, 522, 1800, Martinique; from a copy by Aubriet of a plate made by Plumier at Martinique.

Genus **525. PSEUDOPRIACANTHUS** Bleeker.

Pseudopriacanthus Bleeker, Versl. Ak. Wet. Amsterd. (2), III, 241, 1869 (*niphonius*).

1655. Pseudopriacanthus serrula (Gilbert).

Pacific Coast of Colombia.

Priacanthus serrula Gilbert, Proc. U. S. Nat. Mus. 1890, 450, west coast of Colombia, at Albatross Station 2797.

1656. Pseudopriacanthus altus (Gill).

West Indies, north to Pensacola and Charleston.

Priacanthus altus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 132, Narragansett Bay.

Family CLI. LUTIANIDÆ. The Snappers.

Genus **526. HOPLOPAGRUS** Gill.

Hoplopagrus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 253 (*guntheri*).

1657. Hoplopagrus guntheri Gill. *Pargo.*

Pacific Coast of tropical America, from Guaymas to Panama.

Hoplopagrus guntheri Gill, Proc. Ac. Nat. Sci. Phila. 1862, 253, Cape San Lucas, Lower California.

Genus 527. EVOPLITES Gill.

Evoplites Gill, Proc. Ac. Nat. Sci. Phila. 1862, 236 (*pomacanthus*=young of *kasmira*).

1658. Evoplites viridis (Valenciennes).

Rocky islands of the eastern Pacific; known from Galapagos, Tres Marias, and Revillagigedo islands.

Diacope viridis Valenciennes, Voyage de la Vénus, 303, pl. 1, fig. 2 (very bad), 1845, Galapagos Islands.

Genus 528. NEOMÆNIS Girard. *Snappers.*

Neomænis Girard, U. S. Mex. Boun. Sur., Zool., 18, 1859 (*emarginatus*=*griseus*).

Subgenus NEOMÆNIS Girard.

1659. Neomænis jordani Gilbert.

Panama.

Neomænis jordani Gilbert, Fishes Panama, Proc. Cal. Ac. Sci. 1896, Panama.

1660. Neomænis novemfasciatus (Gill). *Pargo Prieto; Pargo Mareño; Pargo Negro.*

Pacific Coast of tropical America; Cape San Lucas; Guaymas; Mazatlan; Punta Arenas; San Blas; Panama.

Lutjanus novemfasciatus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 251, Cape San Lucas, Lower California.

1661. Neomænis cyanopterus (Cuvier & Valenciennes). *Cubera.*

West Indies to Brazil.

Mesoprion cyanopterus Cuv. & Val., Hist. Nat. Poiss , II, 472, 1828, Brazil.

1662. Neomænis griseus (Linnæus). *Gray Snapper; Mangrove Snapper; Caballerote; Lawyer.*

West Indies; ranging from New Jersey to Brazil.

Labrus griseus Linnæus, Syst. Nat., ed. X, 283, 1758; after Catesby.

1663. Neomænis jocu (Bloch & Schneider). *Dog Snapper; Jocú.*

West Indies, north to Florida Keys, south to Bahia.

Anthias jocu Bloch & Schneider, Syst. Ichth., 310, 1801, Cuba; after Parra.

1664. Neomænis apoda (Walbaum). *Schoolmaster; Caji.*

West Indies, north to Key West, south to Bahia.

? *Perca apoda* Walbaum, Artedi Piscium, 351, 1792; based on the "*Schoolmaster*" of Catesby.

1665. Neomænis argentiventris (Peters). *Pargo Amarillo.*

Pacific Coast of tropical America.

Mesoprion argentiventris Peters, Berlin. Monatsber. 1869, 704, Mazatlan.

1666. Neomænis lutjanoides (Poey).

Cuba.

Ocyurus lutjanoides Poey, Ann. Lyc. Nat. Hist., IX, 1871, 319, Cuba.

1667. Neomænis buccanella (Cuvier & Valenciennes). *Sesi de lo Alto; Oreille Noire; Boucanelle; Blackfin Snapper.*

West Indies; Havana.

Mesoprion buccanella Cuvier & Valenciennes, Hist. Nat. Poiss , II, 455, 1828, Martinique.

1668. Neomænis vivanus (Cuvier & Valenciennes). *Pargo de lo Alto; Silk Snapper.*

West Indies; Havana.

Mesoprion vivanus Cuv. & Val., Hist. Nat. Poiss., II, 454, 1828, Martinique.

1669. Neomænis aya (Bloch). *Red Snapper; Pargo Colorado; Pargo Guachinango; Acara Aya.*

Long Island to Brazil; Gulf of Mexico, and about Yucatan.

Bodianus aya Bloch, Ichthyol., pl. 227, 1790, Brazil; after Maregrave.

1670. Neomænis analis (Cuvier & Valenciennes). *Mutton-fish; Pargo; Pargo Criollo.*

West Indies; Pensacola to Brazil.

Mesoprion analis Cuv. & Val., Hist. Nat. Poiss., II, 452, 1828, San Domingo.

1671. Neomænis colorado (Jordan & Gilbert). *Pargo Colorado.*
Pacific Coast of Mexico, Guaymas to Panama.
Lutjanus colorado Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 338, 351, 355, Mazatlan, Mexico.

1672. Neomænis brachypterus (Cope).
Bahama Islands.
Lutjanus brachypterus Cope, Trans. Amer. Philos. Soc. 1871, 470, New Providence, Bahama Islands.

1673. Neomænis guttatus (Steindachner). *Flamenco.*
Pacific Coast of Mexico, from Guaymas to Panama.
Mesoprion guttatus Steindachner, Ichthyol. Notizen, IX, 18, pl. 8, 1869, Mazatlan, Mexico.

1674. Neomænis synagris (Linnæus). *Lane Snapper; Biajaiba; Red-tail Snapper.*
West Indies; Florida Keys to Colon and Brazil.
Sparus synagris Linnæus, Syst. Nat., ed. X, 280, 1758, Carolina; after Catesby.

1675. Neomænis ambiguus (Poey).
Cuba.
Mesoprion ambiguus Poey, Mem., II, 152, pl. 12, fig. 4, pl. 13, fig. 8, 1860, Cuba.

1676. Neomænis mahogoni (Cuvier & Valenciennes). *Ojanco; Mahogany Snapper.*
West Indies; Havana.
Mesoprion mahogoni Cuvier & Valenciennes, Hist. Nat. Poiss., II, 447, 1828, Martinique.

Subgenus RAIZERO Jordan & Fesler.
Raizero Jordan & Fesler, Rept. U. S. Fish Com. 1889 (1893), 438 (*aratus*).

1677. Neomænis aratus (Günther). *Pargo de Raizero.*
Pacific Coast of tropical America.
Mesoprion aratus Günther, Proc. Zool. Soc. Lond. 1864, 145, Panama; Chiapas.

Genus 529. RABIRUBIA Jordan & Fesler.
Rabirubia Jordan & Fesler, Rept. U. S. Fish Com. 1889 (1893), 438 (*inermis*).

1678. Rabirubia inermis (Peters).
Pacific Coast of America from Mazatlan to Panama.
Mesoprion inermis Peters, Berliner Monatsber. 1869, 705, Mazatlan, Mexico.

Genus 530. OCYURUS Gill. *Rabirubias.*
Ocyurus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 236 (*chrysurus*).

1679. Ocyurus chrysurus (Bloch). *Yellow-tail; Rabirubia.*
West Indies, southern Florida to Brazil.
Sparus chrysurus Bloch, Ichthyol., pl. 262, 1790, Brazil; after Maregrave.

Genus 531. RHOMBOPLITES Gill.
Rhomboplites Gill, Proc. Ac. Nat. Sci. Phila. 1862, 237 (*aurorubens*).

1680. Rhomboplites aurorubens (Cuvier & Valenciennes). *Cayon de lo Alto.*
West Indies, north to Charleston, south to Rio Janeiro.
Centropristis aurorubens Cuvier & Valenciennes, Hist. Nat. Poiss., III, 45, 1829, Brazil, Martinique, and San Domingo.

Genus 532. APSILUS Cuvier & Valenciennes. *Arnillos.*
Apsilus Cuvier & Valenciennes, Hist. Nat. Poiss., VI, 548, 1830 (*fuscus*, an East Indian species).

Subgenus TROPIDINIUS Gill.
Tropidinius Gill, in Poey, Synopsis, 296, 1868 (*arnillo* = *dentatus*).

1681. Apsilus dentatus Guichenot. *Arnillo.*
West Indies; Havana.
Apsilus dentatus Guichenot, in Ramon de la Sagra, Hist. Cuba: Poiss., 29, pl. 1, fig. 2, 1845, Havana.

Genus 533. APRION Cuvier & Valenciennes. *Vorazes.*
Aprion Cuvier & Valenciennes, Hist. Nat. Poiss., VI, 543, 1830 (*virescens*).

Subgenus PLATYINIUS Gill.
Platyinius Gill, Proc. Ac. Nat. Sci. Phila. 1863, 237 (*rorax*=*macrophthalmus*).

1682. Aprion macrophthalmus (Müller & Troschel). *Voraz.*
West Indies; Havana.
Centropristis macrophthalmus Müller & Troschel, in Schomburgk, Hist. Barbados, 666, 1848, Barbados.

Genus 534. ETELIS Cuvier & Valenciennes.
Etelis Cuvier & Valenciennes, Hist. Nat. Poiss., II, 127, 1828 (*carbunculus*, a Japanese species).

1683. Etelis oculatus (Cuvier & Valenciennes). *Cachucho.*
West Indies to Madeira.
Serranus oculatus Cuvier & Valenciennes, Hist. Nat. Poiss., II, 266, 1828, Martinique.

1684. Etelis aquilonaris (Goode & Bean).
Gulf of Mexico in deep water.
Anthias aquilonaris Goode & Bean, Oceanic Ichthyology, 238, 1896, Gulf of Mexico, at Albatross Station 2402, 28° 36′ N., 85° 33′ 30″ W., in 111 fathoms.

Genus 535. VERILUS Poey.
Verilus Poey, Memorias, II, 125, 1860 (*sordidus*).

1685. Verilus sordidus Poey. *Escolar Chino.*
West Indies.
Verilus sordidus Poey, Memorias, II, 125, pl. 12, fig. 6, 1860, Cuba.

Genus 536. XENOCYS Jordan & Bollman.
Xenocys Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 160 (*jessiæ*).

1686. Xenocys jessiæ Jordan & Bollman.
Galapagos Islands.
Xenocys jessiæ Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 160, Charles Island, Galapagos Archipelago.

Genus 537. XENISTIUS Jordan & Gilbert.
Xenistius Jordan & Gilbert, Synopsis, 920, 1883 (*californiensis*).

1687. Xenistius californiensis (Steindachner).
Pacific Coast of America, from San Diego southward to Guaymas.
Xenichthys californiensis Steindachner, Ichth. Beitr., III, 3, 1875, San Diego.

Genus 538. XENICHTHYS Gill.
Xenichthys Gill, Proc. Ac. Nat. Sci. Phila. 1863, 82 (*xanti*).

1688. Xenichthys agassizii Steindachner.
Galapagos Islands.
Xenichthys agassizii Steindachner, Ichth. Beitr., III, 6, 1875, Galapagos Islands.

1689. Xenichthys xanti Gill.
Pacific Coast of tropical America, from Cape San Lucas to Panama.
Xenichthys xanti Gill, Proc. Ac. Nat. Sci. Phila. 1863, 82, Cape San Lucas.

Genus 539. NEMIPTERUS Swainson.
Nemipterus Swainson, Nat. Hist. Fishes, etc., II, 223, 1839 (*filamentosus*).

1690. Nemipterus macronemus (Günther).
Surinam.
Synagris macronemus Günther, Cat., I, 380, 1859, Surinam; after Cuvier.

Family CLII. HÆMULIDÆ. *The Grunters.*

Genus 540. **HÆMULON** Cuvier. *Roncos* or *Grunts.*

Hæmulon Cuvier, Règne Animal, ed. 2, vol. 2, 1829 (*elegans*, etc., restricted later to *elegans* = *sciurus*).

1691. Hæmulon sexfasciatum Gill. *Mojarra Almejero.*

Pacific Coast of tropical America, Guaymas to Panama.

Hæmulon sexfasciatus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 254, Cape San Lucas.

1692. Hæmulon album Cuvier & Valenciennes. *Margate-fish; Jallao; Margaret Grunt.*

West Indies; Florida Keys to Brazil.

Hæmulon album Cuvier & Valenciennes, Hist. Nat. Poiss., v, 241, 1830, St. Thomas.

1693. Hæmulon macrostoma Günther. *Gray Grunt; Yellow-tail.*

West Indies, north to Florida Keys.

Hæmulon macrostoma Günther, Cat., I, 308, 1859, Jamaica.

1694. Hæmulon bonariense Cuvier & Valenciennes. *Black Grunt; Ronco Prieto.*

West Indies, south to Buenos Ayres.

Hæmulon bonariense Cuvier & Valenciennes, Hist. Nat. Poiss., v, 254, 1830, Buenos Ayres.

1695. Hæmulon parra (Desmarest). *Sailor's Choice; Ronco Blanco; Ronco Prieto; Bastard Margaret.*

West Indies; southern Florida to Brazil; very common at Key West and Havana.

Diabasis parra Desmarest, Prem. Décade Ichth., 30, pl. 2, fig. 2, 1823, Havana.

1696. Hæmulon scudderi Gill. *Mojarra Prieta.*

Pacific Coast of tropical America, Guaymas to Panama.

Hæmulon scudderi Gill, Proc. Ac. Nat. Sci. Phila. 1862, 253, Cape San Lucas.

1697. Hæmulon carbonarium Poey. *Ronco Carbonero; Cæsar Grunt.*

West Indies and the Bermudas, south to Brazil; Havana.

Hæmulon carbonarium Poey, Memorias, II, 176, 1860, Cuba.

1698. Hæmulon steindachneri (Jordan & Gilbert). *Roncador Raiado.*

Both coasts of tropical America; Guaymas to Panama; St. Lucia to Rio Janeiro.

Diabasis steindachneri Jordan & Gilbert, Bull. U. S. Fish Com. 1881 (1882), 322, Panama and Mazatlan.

1699. Hæmulon melanurum (Linnæus). *Jeniguana; Cæsar Grunt.*

West Indies; Havana and southward.

Perca melanura Linnæus, Syst. Nat., ed. X, 292, 1758, and ed. XII, 486, 1766, Bahamas; based on Catesby.

1700. Hæmulon sciurus (Shaw). *Yellow Grunt; Ronco Amarillo; Humpback Grunt; Boar Grunt.*

West Indies; Florida Keys to Brazil.

Sparus sciurus Shaw, General Zoology, IV, pl. 64, 1803, Antilles; based on the description and figure of Bloch.

1701. Hæmulon plumieri (Lacépède). *Common Grunt; Ronco Ronco; Ronco Arará.*

West Indies; abundant from Cape Hatteras to Rio Janeiro.

Labrus plumieri Lacépède, Hist. Nat. Poiss., III, 480, pl. 2, fig. 2, 1802, Martinique; on a copy of a drawing by Plumier, identified with this species by Cuvier.

1702. Hæmulon flavolineatum (Desmarest). *French Grunt; Open-mouthed Grunt; Ronco Condenado.*

West Indies; Florida Keys and Bermudas to Brazil.

Diabasis flavolineatus Desmarest, Prem. Décade Ichth., 35, pl. 2, fig. 1, 1823, Cuba.

Genus 541. BRACHYGENYS Scudder.

Brachygenys Scudder, in Poey, Synopsis, 310, 1868 (*tæniatum*).

1703. Brachygenys chrysargyreus (Günther).

Key West, Havana, and Trinidad.
Hæmulon chrysargyreum Günther, Cat., I, 314, 1859, Trinidad.

Genus 542. BATHYSTOMA Scudder. *Tom-tates.*

Bathystoma Scudder, in Putnam, Bull. Mus. Comp. Zool., I, 12, 1863 (*jeniguano*, etc.; no definition).

1704. Bathystoma rimator (Jordan & Swain). *Tom-tate; Red-mouth Grunt; Cæsar.*

West Indies; Cape Hatteras to Trinidad.
Hæmulon rimator Jordan & Swain, Proc. U. S. Nat. Mus. 1884, 308, Charleston; Key West; Pensacola.

1705. Bathystoma aurolineatum (Cuvier & Valenciennes). *Jeniguano.*

West Indies; Florida Keys to Brazil.
Hæmulon aurolineatum Cuvier & Valenciennes, Hist. Nat. Poiss., V, 237, 1830, Brazil; San Domingo.

1706. Bathystoma striatum (Linnæus). *White Grunt.*

West Indies; Bermudas to Brazil.
Perca striata Linnæus, Syst. Nat., ed. X, 233, 1758, North America.

Genus 543. LYTHRULON Jordan & Swain.

Lythrulon Jordan & Swain, Proc. U. S. Nat. Mus. 1884, 287 (*flaviguttatum*).

1707. Lythrulon flaviguttatum (Gill).

Pacific Coast of tropical America, Guaymas to Panama.
Hæmulon flaviguttatus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 254, Cape San Lucas, Lower California.

1708. Lythrulon opalescens Jordan & Starks.

Mazatlan, Mexico.
Lythrulon opalescens Jordan & Starks, in Jordan, Proc. Cal. Ac. Sci. 1895, 459, pl. 40, Mazatlan, Mexico.

Genus 544. ORTHOSTŒCHUS Gill. *Striped Grunts.*

Orthostœchus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 255 (*maculicauda*).

1709. Orthostœchus maculicauda Gill. *Roncador Raiado.*

Pacific Coast of tropical America, Guaymas to Panama.
Orthostœchus maculicauda Gill, Proc. Ac. Nat. Sci. Phila. 1862, 225, Cape San Lucas, Lower California.

Genus 545. ANISOTREMUS Gill.

Anisotremus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 107 (*virginicus*).

Subgenus PARACONODON Bleeker.

Paraconodon Bleeker, Archiv Neerl., XI, 272, 1876 (*pacifici*).

1710. Anisotremus pacifici (Günther).

Pacific Coast of tropical America.
Conodon pacifici Günther, Proc. Zool. Soc. Lond. 1864, 147, Chiapas.

1711. Anisotremus cæsius (Jordan & Gilbert).

Pacific Coast of Mexico; Mazatlan and Acapulco.
Pomadasys cæsius Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 383, Mazatlan.

1712. Anisotremus dovii (Günther).

Pacific Coast of tropical America at Mazatlan and Panama.
Pristipoma dovii Günther, Proc. Zool. Soc. Lond. 1864, 23, Panama.

Subgenus ANISOTREMUS Gill.

1713. Anisotremus surinamensis (Bloch). *Pompon.*

Tropical America, from Cuba to Brazil.
Lutjanus surinamensis Bloch, Ichth., pl. 253, 1791, Surinam.

1714. Anisotremus interruptus (Gill). *Mojarron.*
Pacific Coast, Magdalena Bay to Panama and the Galapagos.
Genytremus interruptus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 256, Cape San Lucas, Lower California.

1715. Anisotremus bicolor (Castelnau). *Maria Prieta.*
Coast of Brazil; perhaps Cuba.
Pristipoma bicolor Castelnau, Anim. Nouv. ou Rares Amér. du Sud, 8, pl. 2, fig. 2, 1850, Bahia, Brazil.

1716. Anisotremus scapularis (Tschudi).
Coast of Peru; said to have been once taken at Mazatlan.
Pristipoma scapulare Tschudi, Fauna Peruana, 12, 1844, Huacho, Peru.

1717. Anisotremus davidsoni (Steindachner). *Sargo Raiado.*
Coast of southern California.
Pristipoma davidsoni Steindachner, Ichth. Beitr., III, 6, 1875, San Diego.

1718. Anisotremus spleniatus (Poey).
Havana.
Pristipoma spleniatum Poey, Memorias, II, 187, 1860, Havana.

1719. Anisotremus tæniatus Gill. *Catalina.*
Pacific Coast of tropical America; Magdalena Bay to Panama.
Anisotremus tæniatus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 107, Panama.

1720. Anisotremus virginicus (Linnæus). *Catalineta; Porkfish.*
West Indies; Florida Keys to Brazil.
Sparus virginicus Linnæus, Syst. Nat., ed. X, 281, 1758, South America.

1721. Anisotremus serrula (Cuvier & Valenciennes). *Tete-de-Roche; Petite Scie.*
Martinique.
Pristipoma serrula Cuv. & Val., Hist. Nat. Poiss., V, 272, 1830, Martinique.

Genus 546. CONODON Cuvier & Valenciennes.
Conodon Cuvier & Valenciennes, Hist. Nat. Poiss., V, 156, 1830 (*antillanus*=*nobilis*).

1722. Conodon nobilis (Linnæus).
West Indies; coast of Texas to Brazil.
Perca nobilis Linnæus, Syst. Nat., ed. X, 191, 1758, North America.

1723. Conodon serrifer Jordan & Gilbert.
Lower California.
Conodon serrifer Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 351, Boca Soledad, Lower California.

Genus 547. BRACHYDEUTERUS Gill. *Burritos.*
Brachydeuterus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 17 (*auritus;* an African species).

1724. Brachydeuterus nitidus (Steindachner).
Pacific Coast of tropical America; Panama, Mazatlan, and the Gulf of California.
Pristipoma nitidum Steindachner, Ichth. Notizen, VIII, 5, 1869, Mazatlan.

1725. Brachydeuterus leuciscus (Günther). *Burrito.*
Pacific Coast of tropical America; not rare at Mazatlan and Panama, south to northern Peru.
Pristopoma leuciscus Günther, Proc. Zool. Soc. Lond. 1864, 147, San Jose de Nicaragua; Chiapas.

1726. Brachydeuterus axillaris (Steindachner).
Pacific Coast of Mexico; Mazatlan and Guaymas.
Pristipoma axillare Steindachner, Ichth. Notizen, VIII, 7, 1869, Mazatlan.

1727. Brachydeuterus corvinæformis (Steindachner).
West Indies to Brazil; Jamaica.
Hæmulon corvinæformis Steindachner, Ichth. Notizen, VII, 16, 1868, Santos, Brazil.

Genus 548. POMADASIS Lacépède. *Burros.*
Pomadasis Lacépède, Hist. Nat. Poiss., IV, 516, 1803 (*argenteus*).

Subgenus RHENCUS Jordan & Evermann.
Rhencus Jordan & Evermann, Fishes North and Middle America, 1896 (*panamensis*).

1728. Pomadasis panamensis (Steindachner).
Pacific Coast of tropical America; Panama and Mazatlan.
Pristipoma panamensis Steindachner, Ichth. Beitr., III, 8, 1875, Panama.

Subgenus PRISTIPOMA Cuvier.
Pristipoma Cuvier, Règne Animal, ed. I, 279, 1817 (*hasta*, etc.).

1729. Pomadasis humilis (Kner & Steindachner).
Pacific Coast of Panama; Rio Bayano.
Pristipoma humile Kner & Steindachner, Sitzgb. Akad. Wiss. (Münch.) 1863, 222, Rio Bayano, near Panama.

1730. Pomadasis productus (Poey).
Cuba.
Pristipoma productum Poey, Memorias, II, 186, 1860, Havana.

1731. Pomadasis macracanthus (Günther). *Burro.*
Pacific Coast of tropical America; Panama; Mazatlan; Chiapas, and Punta Arenas.
Pristipoma macracanthum Günther, Proc. Zool. Soc. Lond. 1864. 146, Chiapas.

1732. Pomadasis andrei (Sauvage).
Rio Guayas, Ecuador.
Pristipoma andrei Sauvage, Bull. Sci. Philom. Paris, 7th series, III, 204, 1879, Rio Guayas, Ecuador.

Subgenus RHONCISCUS Jordan & Evermann.
Rhonciscus Jordan & Evermann, Fishes North and Middle America, 1896 (*crocro*).

1733. Pomadasis crocro (Cuvier & Valenciennes).
West Indies; Cuba to Brazil.
Pristipoma crocro Cuv. & Val., Hist. Nat. Poiss., V, 264, 1830, Martinique.

1734. Pomadasis branicki (Steindachner). *Burrito.*
Pacific Coast of tropical America; Mazatlan to Peru.
Pristipoma branicki Steindachner, Denkschr. kaiserl. Akad. Wiss. Wien, XII, 28, 1879, Tumbez, Peru.

1735. Pomadasis ramosus (Poey).
West Indies, south to Brazil.
Pristipoma ramosum Poey, Memorias, II, 186, 1860, Havana.

Genus 549. ORTHOPRISTIS Girard. *Pigfishes.*
Orthopristis Girard, U. S. Mex. Bound. Survey, Zool., 15, 1859 (*duplex*=*chrysopterus*).

1736. Orthopristis forbesi Jordan & Starks.
Albemarle Island, one of the Galapagos Archipelago.
Orthopristis forbesi Jordan & Starks, in Jordan & Evermann, Fishes North and Middle America, 1896, Albemarle Island.

1737. Orthopristis reddingi Jordan & Richardson.
La Paz, Lower California.
Orthopristis reddingi Jordan & Richardson, in Jordan, Proc. Cal. Ac. Sci. 1895, 509, pl. 41, La Paz, Lower California.

1738. Orthopristis chalceus (Günther).

Pacific Coast of tropical America, from Cape San Lucas to the Galapagos.
Pristipoma chalceum Günther, Proc. Zool. Soc. Lond. 1864, 146, Panama.

1739. Orthopristis chrysopterus (Linnæus). *Pigfish; Sailor's Choice; Hogfish.*

South Atlantic and Gulf coasts of the United States.
Perca chrysoptera Linnæus, Syst. Nat., ed. XII, 485, 1766, Charleston, S. C.

1740. Orthopristis poeyi Scudder.

West Indies; Havana.
Orthopristis poeyi Scudder, in Poey, Synopsis, 312, 1868, Havana.

1741. Orthopristis cantharinus (Jenyns).

Galapagos Islands.
Pristipoma cantharinum Jenyns, Voyage Beagle, Fishes, 49, 1842, Galapagos Islands.

Subgenus EVAPRISTIS Jordan & Evermann.

Evapristis Jordan & Evermann, Fishes North and Middle America, 1896 (*lethopristis*).

1742. Orthopristis lethopristis Jordan & Fesler.

Galapagos Archipelago.
Orthopristis lethopristis Jordan & Fesler, Proc. Ac. Nat. Sci. Phila. 1889, 36, Galapagos Islands.

Genus 550. ISACIELLA Jordan & Fesler.

Isaciella Jordan & Fesler, Review of the Sparoid Fishes of America and Europe, 497, 1893 (*brevipinnis*).

1743. Isaciella brevipinnis (Steindachner).

Pacific Coast of Mexico.
Pristipoma brevipinne Steindachner, Ichth. Notizen, VIII, 10, 1869, Mazatlan.

Genus 551. MICROLEPIDOTUS Gill.

Microlepidotus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 256 (*inornatus*).

1744. Microlepidotus inornatus Gill. *Japaton.*

Gulf of California; La Paz and Mazatlan.
Microlepidotus inornatus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 256, Cape San Lucas, Lower California.

Genus 552. GENYATREMUS Gill.

Genyatremus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 256 (*cavifrons*).

1745. Genyatremus luteus (Bloch).

Lesser Antilles to Brazil.
Lutianus luteus Bloch, Ichthyologia, pl. 247, 1793, Martinique; on a drawing by Plumier.

Family CLIII. SPARIDÆ. The Porgies.

Genus 553. OTRYNTER Jordan & Evermann. *Deep-water Porgies.*

Otrynter Jordan & Evermann, Fishes N. and M. Amer., 1896 (*caprinus*).

1746. Otrynter caprinus (Bean).

Deep waters off the west coast of Florida.
Stenotomus caprinus Bean, Proc. U. S. Nat. Mus. 1882, 426, Snapper Banks off Pensacola, Florida.

Genus 554. STENOTOMUS Gill.

Stenotomus Gill, Canadian Nat., 1865, 266 (*argyrops*).

1747. Stenotomus chrysops (Linnæus). *Common Scup; Porgy; Scuppaug.*

Atlantic Coast of United States, from Cape Cod to South Carolina.
Sparus chrysops Linnæus, Syst. Nat., ed. XII, 471, 1766, Charleston, South Carolina.

1748. Stenotomus aculeatus (Cuvier & Valenciennes). *Southern Porgy.*
South Atlantic and Gulf coasts of United States, Cape Hatteras to Texas.
Chrysophrys aculeata Cuvier & Valenciennes, Hist. Nat. Poiss., VI, 137, 1830, Charleston, South Carolina.

Genus 555. CALAMUS Swainson.
Calamus Swainson, Nat. Hist. Fishes, etc., II, 222, 1839 (*calamus*).

Subgenus CALAMUS Swainson.

1749. Calamus calamus (Cuvier & Valenciennes). *Saucer-eye Porgy; Pez de Pluma.*
West Indies, north to Florida Keys.
Pagellus calamus Cuvier & Valenciennes, Hist. Nat. Poiss., VI, 206, pl. 152, 1830, Martinique; San Domingo.

1750. Calamus proridens Jordan & Gilbert. *Little-head Porgy; Pez de Pluma.*
West Indies, north to the Florida Keys.
Calamus proridens Jordan & Gilbert, Proc. U. S. Nat. Mus. 1884, 150, Key West, Florida.

1751. Calamus pennatula Guichenot.
West Indies.
Calamus pennatula Guichenot, Revision des Pagels, 116, 1850, Martinique.

1752. Calamus bajonado (Bloch & Schneider). *Jolt-head Porgy; Bajonado.*
West Indies, north to Florida Keys.
Sparus bajonado Bloch & Schneider, Syst. Ichth., 284, 1801; after Parra. West Indies.

Subgenus GRAMMATEUS Poey.
Grammateus Poey, Ann. Lyc. Nat. Hist. N. Y. 1872, 182 (*microps*).

1753. Calamus brachysomus (Lockington). *Mojarra Garabata.*
Gulf of California and neighboring waters, locally abundant from Magdalena Bay to Mazatlan.
Sparus brachysomus Lockington, Proc. U. S. Nat. Mus. 1880, 284, Magdalena Bay, Lower California.

1754. Calamus leucosteus Jordan & Gilbert. *White-bone Porgy.*
South Atlantic Coast of United States, known only from the markets of Charleston, South Carolina.
Calamus leucosteus Jordan & Gilbert, in Jordan, Cat. Fishes N. A., 91, 1885, Charleston, South Carolina.

1755. Calamus macrops Poey.
Cuba.
Calamus macrops Poey, Ann. Lyc. Nat. Hist. N. Y. 1872, 181, fig. 3, Havana.

1756. Calamus taurinus (Jenyns).
Galapagos Islands to Peru.
Chrysophrys taurina Jenyns, Zool. Beagle, Fishes, 56, pl. 7, 12, 1842, Galapagos Islands.

1757. Calamus penna (Cuvier & Valenciennes). *Little-mouth Porgy; Sheepshead Porgy.*
Southern Florida to Brazil; known from Charlotte Harbor, Key West, Rio Janeiro, St. Thomas, Havana, Camaru, and Rio Grande do Sul.
Pagellus penna Cuvier & Valenciennes, Hist. Nat. Poiss., VI, 209, 1830, Brazil.

1758. Calamus arctifrons Goode & Bean. *Grass Porgy; Shad Porgy.*
Gulf of Mexico, from Pensacola to Key West.
Calamus arctifrons Goode & Bean, Proc. U. S. Nat. Mus. 1882, 425, Pensacola, Florida.

1759. Calamus medius (Poey).
West Indies; Havana.
Grammateus medius Poey, Ann. Lyc. Nat. Hist. N. Y. 1872, 183, pl. 7, fig. 4, Havana.

Genus 556. PAGRUS Cuvier.

Pagrus Cuvier, Règne Animal, ed. I, 272, 1817 (*argenteus*=*pagrus*).

1760. Pagrus pagrus (Linnæus). *Red Porgy; Besugo; Pargo Colorado.*

Southern Europe and South Atlantic and Gulf coasts of the United States, south to Uruguay.

Sparus pagrus Linnæus, Syst. Nat., ed. X, 279, 1758, southern Europe.

Genus 557. LAGODON Holbrook. *Chopa Spina.*

Lagodon Holbrook, Ichth. South Carolina, 59, 1860 (*rhomboides*).

1761. Lagodon rhomboides (Linnæus). *Pinfish; Bream; Sailor's Choice; Chopa Spina.*

Atlantic and Gulf coasts of United States; Cape Cod to Cuba.

Sparus rhomboides Linnæus, Syst. Nat., ed. XII, 470, 1766, Charleston, S. C.

Genus 558. ARCHOSARGUS Gill. *Sheepsheads.*

Archosargus Gill, Canadian Nat. 1865, 266 (*probatocephalus*).

Subgenus SALEMA Jordan & Evermann.

Salema Jordan & Evermann, Fishes N. and M. Amer., 1896 (*unimaculatus*).

1762. Archosargus unimaculatus (Bloch). *Salema.*

West Indies, north to Key West, south to Rio Janeiro.

Perca unimaculata Bloch, Ichthyologia, pl. 308, 1792, Brazil; on a figure by Prince Maurice.

1763. Archosargus pourtalesii (Steindachner).

Galapagos Islands.

Sargus pourtalesii Steindachner, Fische Afrikas, 39, 1881, Galapagos Islands.

1764. Archosargus tridens (Poey).

Cuba.

Sargus tridens Poey, Enumeratio, 57, 1875, Cuba.

Subgenus ARCHOSARGUS Gill.

1765. Archosargus probatocephalus (Walbaum). *Sheepshead; Sargo Raiado.*

Atlantic and Gulf coasts of the United States; Cape Cod to Florida Keys and Texas.

Sparus probatocephalus Walbaum, Artedi Pisc., 295, 1792, New York; based on Schöpf.

1766. Archosargus aries (Cuvier & Valenciennes).

Honduras to Brazil; Rio Janeiro; Maracaibo; Belize.

Sargus aries Cuvier & Valenciennes, Hist. Nat. Poiss., VI, 58, 1830, Rio Janeiro; Maracaibo.

Genus 559. DIPLODUS Rafinesque.

Diplodus Rafinesque, Indice d'Ittiologia Siciliana, 54, 1810 (*annularis*).

1767. Diplodus holbrookii (Bean).

South Atlantic and Gulf coasts of the United States; Cape Hatteras to Cedar Keys.

Sargus holbrookii Bean, Forest and Stream, June 13, 1878, Charleston, S. C

1768. Diplodus argenteus (Cuvier & Valenciennes). *Sargo.*

West Indies; Florida and the Bermudas, south to Argentina.

Sargus argenteus Cuvier & Valenciennes, Hist. Nat. Poiss., VI, 60, 1830, Brazil

1769. Diplodus sargus (Linnæus). *Sargo.*

Coast of southern Europe; Bermudas.

Sparus sargus Linnæus, Syst. Nat., ed. X, 278, 1758, Mediterranean.

Family CLIV. MÆNIDÆ. The Picarels.

Genus 560. SPICARA Rafinesque.

Spicara Rafinesque, Caratteri, etc., 51, 1810 (*flexuosa*=*smaris*).

1770. Spicara martinica (Cuvier & Valenciennes).

West Indies.

Smaris martinicus Cuv. & Val., Hist. Nat. Poiss., VI, 424, 1830, Martinique.

Genus 561. EMMELICHTHYS Richardson.

Emmelichthys Richardson, Voy. Erebus and Terror, Fishes, 47, 1846 (*nitidus*).

Subgenus INERMIA Poey.

Inermia Poey, Memorias, II, 193, 1860 (*vittata*).

1771. Emmelichthys vittatus (Poey). *Boga.*

Coasts of Cuba.

Inermia vittata Poey, Memorias, II, 193, 1860, Havana.

Family CLV. GERRIDÆ. The Mojarras.

Genus 562. EUCINOSTOMUS Baird & Girard. *Mojarritas.*

Eucinostomus Baird & Girard, Ninth Smithson. Rept., 1855, 20 (*argenteus*).

1772. Eucinostomus dowi (Gill).

Pacific coasts of tropical America; Galapagos Islands; Panama.

Diapterus dowi Gill, Proc. Ac. Nat. Sci. Phila. 1863, 162, Panama.

1773. Eucinostomus pseudogula Poey.

West Indies to Brazil; Bermudas; Cuba; St. Lucia; Bahia.

Eucinostomus pseudogula Poey, Enumeratio, 53, pl. I, 1875, Havana.

1774. Eucinostomus harengulus Goode & Bean.

Atlantic Coast of tropical America; western Florida; Key West; Jamaica; San Domingo; Bahia.

Eucinostomus harengulus Goode & Bean, Proc. U. S. Nat. Mus. 1879, 132, west Florida.

1775. Eucinostomus californiensis (Gill). *Mojarra Cantiléna.*

Pacific Coast of Mexico; Guaymas and Cape San Lucas to Panama.

Diapterus californiensis Gill, Proc. Ac. Nat. Sci. Phila. 1862, 245, Cape San Lucas, Lower California.

1776. Eucinostomus gula (Cuvier & Valenciennes). *Mojarra de Ley; Petite Gueule.*

Atlantic Coast of America from Carolina to Brazil, north to Long Island.

Gerres gula Cuv. & Val., Hist. Nat. Poiss., VI, 464, 1830, Martinique.

Genus 563. ULÆMA Jordan & Evermann.

Ulæma Jordan & Evermann, Proc. Cal. Ac. Sci. 1895, 471 (*lefroyi*).

1777. Ulæma lefroyi (Goode).

West Indies, on sandy shores north to Cedar Keys; Bermudas; Cuba; Key West.

Diapterus lefroyi Goode, Amer. Jour. Sci. Arts 1874, 123, Bermudas.

Genus 564. XYSTÆMA Jordan & Evermann. *Mojarras Blancas.*

Xystæma Jordan & Evermann, Proc. Cal. Ac. Sci. 1895, 471 (*cinereus*).

1778. Xystæma cinereum (Walbaum). *Mojarra de Casta; Mojarra Blanca; Broad Shad.*

Coasts of tropical America; West Indies, north to Florida; Havana; Jamaica; Martinique; Bahamas; Barbados; Florida Keys; Mazatlan; Rio Presidio; Guatemala; Panama; Chiapas.

Mugil cinereus Walbaum, Artedi Piscium, 228, 1792, Bahamas; after Catesby.

Genus 565. GERRES Cuvier. *Mojarras.*

Gerres Cuvier, Règne Animal, ed. 2, II, 104, 1829 (*lineatus*, etc.).

Subgenus MOHARRA Poey.

Moharra Poey, Enumeratio, 50, 1875 (*rhombea*).

1779. Gerres rhombeus Cuvier & Valenciennes.

West Indies and Atlantic coast of tropical America; Jamaica; San Domingo; Martinique; Puerto Cabello; Havana; Aspinwall; Rio Magdalena; Santa Lucia; Bahia.

Gerres rhombeus Cuvier & Valenciennes, Hist. Nat. Poiss., VI, 459, 1830, Martinique; San Domingo.

Subgenus **DIAPTERUS** Ranzani.

Diapterus Ranzani, Nov. Comment. Bonon., v, 1841, 340 (*auratus*).

1780. Gerres aureolus Jordan & Gilbert.

Panama; only original type known.

Gerres aureolus Jordan & Gilbert, Bull. U. S. Fish Com., I, 1881 (1882), 328, Panama.

1781. Gerres peruvianus Cuvier & Valenciennes. *Mojarra de las Aletas Amarillas.*

West coast of tropical America; Mazatlan; Salina Cruz; Chiapas; Panama; Peru.

Gerres peruvianus Cuvier & Valenciennes, Hist. Nat. Poiss., VI, 467, 1830, Payta, northern Peru.

1782. Gerres olisthostoma Goode & Bean. *Irish Pompano; Mutton-fish.*

West Indies, north to southern Florida.

Gerres olisthostoma Goode & Bean, Proc. U. S. Nat. Mus. 1882, 423, Indian River, Florida.

Subgenus **GERRES** Cuvier.

1783. Gerres brevimanus Günther.

Pacific coast of tropical America; only original type known.

Gerres brevimanus Günther, Proc. Zool. Soc. Lond. 1864, 152, Chiapas.

1784. Gerres lineatus (Humboldt). *Mojarra China.*

West coast of Mexico; Acapulco; Mazatlan; San Blas; Chiapas.

Smaris lineatus Humboldt, Observ. Zool., II, 185, pl. 46, 1807–1834, Acapulco.

1785. Gerres brasilianus Cuvier & Valenciennes. *Potao.*

Cuba to Bahia.

Gerres brasilianus Cuvier & Valenciennes, Hist. Nat. Poiss., VI, 458, 1830, Brazil; Porto Rico.

1786. Gerres embryx Jordan & Starks.

Coast of South Carolina.

Gerres embryx Jordan & Starks, in Jordan & Evermann, Fishes North and Middle America, 1896. South Carolina.

1787. Gerres plumieri Cuvier & Valenciennes. *Mojarra.*

Atlantic coast of tropical America and West Indies; Havana; Porto Rico; San Domingo; Jamaica; Pernambuco; Bahia; Aspinwall; Guatemala.

Gerres plumieri Cuvier & Valenciennes, Hist. Nat. Poiss., VI, 452, 1830, Antilles; Porto Rico.

1788. Gerres mexicanus Steindachner.

Rio Teapa, Mexico.

Gerres mexicanus Steindachner, Ueber eine Neue Gerres-Art aus Mexico, Verh. K. K. Geo. Wien., XIII, 383, 1863, Rio Teapa, Mexico.

Family CLVI. KYPHOSIDÆ. The Rudder-Fishes.

Genus 566. **GIRELLA** Gray.

Girella Gray, Illustrations of Indian Zoology, about 1840 (*punctata*).

1789. Girella nigricans (Ayres). *California Bluefish.*

Coast of southern California, from Monterey to Cape San Lucas.

Camarina nigricans Ayres, Proc. Cal. Ac. Sci. 1861, 81, fig. 22, California.

Genus 567. **DOYDIXODON** Valenciennes.

Doydixodon Valenciennes, Voyage de la Vénus, v, 318, 1855 (*freminvillei*).

1790. Doydixodon freminvillei Valenciennes.

Galapagos Islands and coast of Peru.

Doydixodon freminvillei Valenciennes, Voyage Vénus, 323, pl. 5, 1855, Galapagos Islands.

Genus 568. **HERMOSILLA** Jenkins & Evermann.
Hermosilla Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 144 (*azurea*).

1791. Hermosilla azurea Jenkins & Evermann.
Gulf of California.
Hermosilla azurea Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 144, Guaymas, Mexico.

Genus 569. **KYPHOSUS** Lacépède.
Kyphosus Lacépède, Hist. Nat. Poiss., III, 114, 1802 (*bigibbus* = *fuscus*).

1792. Kyphosus analogus (Gill). *Salema.*
Pacific Coast of tropical America, Gulf of California to Panama.
Pimelepterus analogus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 245, Cape San Lucas.

1793. Kyphosus incisor (Cuvier & Valenciennes). *Chopa Amarilla.*
Cuba.
Pimelepterus incisor Cuv. & Val., Hist. Nat. Poiss., VII, 266, 1831, Brazil.

1794. Kyphosus elegans (Peters). *Chopa.*
Pacific Coast of tropical America, from Guaymas to Mazatlan.
Pimelepterus elegans Peters, Berlin. Monatsb., 707, 1869, Mazatlan, Mexico.

1795. Kyphosus sectatrix (Linnæus). *Rudder-fish; Bermuda Chub; Chopa Blanca.*
West Indies, ranging from Cape Cod to Brazil, crossing the ocean to the Canary Islands; accidental in the Mediterranean; one taken at Palermo.
Perca sectatrix Linnæus, Syst. Nat., ed. XII, 486, 1766, "America."

1796. Kyphosus lutescens (Jordan & Gilbert).
Revillagigedo Archipelago.
Pimelepterus lutescens Jordan & Gilbert, Proc. U. S. N. M. 1881, 229, Braithwaite Bay, Socorro Island.

Genus 570. **SECTATOR** Jordan & Fesler.
Sectator Jordan & Fesler, Review Sparoid Fishes, 534, 1893 (*ocyurus*).

1797. Sectator ocyurus (Jordan & Gilbert).
Panama.
Pimelepterus ocyurus Jordan & Gilbert, Bull. U. S. Fish Com. 1881, 327, 328, Bay of Panama.

Genus 571. **MEDIALUNA** Jordan & Fesler. *Medialunas.*
Medialuna Jordan & Fesler, Review Sparoid Fishes, 536, 1893 (*californiensis*).

1798. Medialuna californiensis (Steindachner). *Medialuna; Half-moon.*
Coast of southern California, from Point Conception southward to Cerros Island.
Scorpis californiensis Steindachner, Ichth. Beitr., III, 19, 1875, San Diego.

Family CLVII. SCIÆNIDÆ. The Croakers.

Subfamily OTOLITHINÆ.

Genus 572. **SERIPHUS** Ayres.
Seriphus Ayres, Proc. Cal. Ac. Sci., II, 1861, 80 (*politus*).

1799. Seriphus politus Ayres. *Queenfish; White Croaker.*
Coast of southern California, from Point Conception to Cerros Island; common on sandy shores.
Seriphus politus Ayres, Proc. Cal. Ac. Sci., II, 1861, 80, no locality given.

Genus 573. **ISOPISTHUS** Gill.
Isopisthus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 18 (*parvipinnis*).

1800. Isopisthus remifer Jordan & Gilbert.
Panama, on sandy shores, rather common.
Isopisthus remifer Jordan & Gilbert, Bull. U. S. Fish Com. 1881, 320, Panama.

1801. Isopisthus parvipinnis (Cuvier & Valenciennes).

Coast of Brazil, north to Cayenne.

Ancylodon parvipinnis Cuv. & Val., Hist. Nat. Poiss., v, 84, 1830, Cayenne.

Genus 574. CYNOSCION Gill. *Weakfishes.*

Cynoscion Gill, Proc. Ac. Nat. Sci. Phila. 1862, 18 (*regalis*).

Subgenus BUCCONE Jordan & Evermann.

Buccone Jordan & Evermann, new subgenus (*prædatorius*).

1802. Cynoscion prædatorius (Jordan & Gilbert). *Bocone.*

Coast of Panama; scarce.

Cestreus prædatorius Jordan & Gilbert, in Jordan & Eigenmann, Review of the Sciænidæ, 363, 1889, Panama.

Subgenus CYNOSCION Gill.

1803. Cynoscion acoupa (Lacépède). *Acoupa; Tocroe.*

Atlantic Coast of South America, Brazil north to Venezuela; generally common.

Cheilodipterus acoupa Lacépède, Hist. Nat. Poiss., III, 546, 1802, Cayenne.

1804. Cynoscion squamipinnis (Günther).

Pacific Coast of tropical America; known from a few specimens taken at La Union and Panama.

Otolithus squamipinnis Günther, Fishes Cent. Am., 387 and 429, 1869, Panama.

1805. Cynoscion othonopterus Jordan & Gilbert.

Gulf of California.

Cynoscion othonopterum Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 274, Punta San Felipe, Mexico.

1806. Cynoscion obliquatus (Valenciennes).

Martinique.

Otolithus obliquatus Valenciennes, in Sauvage, Bull. Soc. Philom. Paris, III, 209, 1879, Martinique.

1807. Cynoscion jamaicensis (Vaillant & Bocourt).

Jamaica.

Otolithus jamaicensis Vaillant & Bocourt, Miss. Sci. au Mexique, Poissons, 156, 1874, Jamaica.

1808. Cynoscion nothus (Holbrook). *Bastard Weakfish.*

South Atlantic and Gulf coasts of United States; rather rare at Charleston.

Otolithus nothus Holbrook, Ichth. S. C., 134, pl. 19, fig. 1, 1860, South Carolina.

1809. Cynoscion regalis (Bloch & Schneider). *Common Weakfish; Squeteague; "Sea Trout."*

Atlantic and Gulf coasts of United States, Cape Cod southward to Mobile.

Johnius regalis Bloch & Schneider, Syst. Ichth., 75, 1801, New York.

1810 Cynoscion thalassinus (Holbrook).

Pensacola; Pass Christian, Mississippi; Hampton Roads, Virginia.

Otolithus thalassinus Holbrook, Ichth. South Carolina, 132, pl. 18, fig. 2, 1859, Charleston, South Carolina.

1811. Cynoscion reticulatus (Günther). *Corvina.*

Pacific Coast of tropical America, Mazatlan to Panama.

Otolithus reticulatus Günther, Proc. Zool. Soc. Lond. 1864, 149, San Jose de Guatemala; Chiapam.

1812. Cynoscion nebulosus (Cuvier & Valenciennes). *Spotted Weakfish; Spotted Squeteague; Spotted Sea Trout.*

South Atlantic and Gulf Coast of the United States; New York to Texas; everywhere common on our southern coast; rare north of Virginia.

Otolithus nebulosus Cuvier & Valenciennes, Hist. Nat. Poiss., v, 79, 1830, locality unknown.

1813. Cynoscion parvipinnis Ayres. *California "Bluefish."*

Coasts of Lower California; Santa Barbara Islands to Guaymas; common along the coasts of southern California, as far north as San Pedro.

Cynoscion parvipinnis Ayres, Proc, Cal. Ac. Sci. 1861, 156, coast of Lower California.

1814. Cynoscion xanthulus Jordan & Gilbert. *Corvina de las Alctas; Amarillas.*
Pacific Coast of Mexico; not rare about Mazatlan.
Cynoscion xanthulum Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 460, Mazatlan.

1815. Cynoscion albus (Günther).
Pacific Coast of tropical America; not rare at Panama.
Otolithus albus Günther, Proc. Zool. Soc. Lond. 1864, 149, Chiapam; Panama.

1816. Cynoscion macdonaldi Gilbert. *Totuava.*
Gulf of California.
Cynoscion macdonaldi Gilbert, Proc. U. S. Nat. Mus. 1890, 64, head of Gulf of California.

1817. Cynoscion stolzmanni (Steindachner).
Pacific Coast of tropical America from Panama to Peru.
Otolithus stolzmanni Steindachner, Neue u. Seltene Fische k. k. Zool. Mus. Wien, 35, 1879, pl. 2, fig. 1, Tumbez, Peru.

Subgenus ATRACTOSCION Gill.
Atractoscion Gill, Proc. Ac. Nat. Sci. Phila. 1862, 18 (*æquidens*).

1818. Cynoscion nobilis (Ayres). *"White Sea-bass" of California.*
Coast of California, north to San Francisco, occasionally straying farther.
Johnius nobilis Ayres, Proc. Cal. Ac. Sci. 1860, 78, San Francisco.

1819. Cynoscion phoxocephalus Jordan & Gilbert.
Pacific Coast of tropical America; Panama.
Cynoscion phoxocephalum Jordan & Gilbert, Bull. U. S. Fish. Com. 1881, 318, Panama.

1820. Cynoscion leiarchus (Cuvier & Valenciennes).
Coasts of Brazil and Guiana.
Otolithus leiarchus Cuvier & Valenciennes, Hist. Nat. Poiss., v, 78, 1830, Brazil; Cayenne.

1821. Cynoscion virescens (Cuvier & Valenciennes).
Coasts of Guiana and Brazil.
Otolithus virescens Cuvier & Valenciennes, Hist. Nat. Poiss., v, 72, 1830, Surinam.

1822. Cynoscion microlepidotus (Cuvier & Valenciennes).
Coast of Brazil and Guiana.
Otolithus microlepidotus Cuvier & Valenciennes, Hist. Nat. Poiss., v, 79, 1830, Surinam.

Genus 575. SAGENICHTHYS Berg.
Sagenichthys Berg, Ann. Mus. Nac. Buenos Aires, 52, 1895 (*ancylodon*).

1823. Sagenichthys ancylodon (Bloch & Schneider). *Pescadillo del Rey.*
Tropical America, on both coasts; Panama; Guiana; Brazil; Uruguay; rather scarce.
Lonchurus ancylodon Bloch & Schneider, Syst. Ich., 102, pl. 25, 1801, Surinam.

Genus 576. NEBRIS Cuvier & Valenciennes.
Nebris Cuvier & Valenciennes, Hist. Nat. Poiss., v, 149, 1830 (*microps*).

1824. Nebris microps Cuvier & Valenciennes.
Atlantic Coast of northern South America; sandy shores.
Nebris microps Cuvier & Valenciennes, Hist. Nat. Poiss., v, 149, pl. 112, 1830, Surinam.

1825. Nebris zestus Jordan & Starks.
Panama.
Nebris zestus Jordan & Starks, in Jordan & Evermann, Fishes North and Middle America, 1896, Panama.

Genus 577. **PLAGIOSCION** Gill.

Plagioscion Gill, Proc. Ac. Nat. Sci. Phila. 1861, 82 (a generic description only, no species or type being indicated).

1826. Plagioscion squamosissimus (Heckel).

Rivers of Guiana and Brazil; generally common southward.
Sciæna squamosissima Heckel, Annalen des Wiener Museum, II, 438, 1840, Amazon River.

1827. Plagioscion surinamensis (Bleeker).

Rivers of Guiana, Venezuela, and Colombia.
Pseudosciæna surinamensis Bleeker, Arch. Néerl. Sci. Exact. et Nat., VIII, 1873, 458, 18, Surinam.

1828. Plagioscion heterolepis (Bleeker).

Surinam.
Johnius heterolepis Bleeker, Arch. Neerl., VIII, 1873, with plate, Surinam.

Genus 578. **LARIMUS** Cuvier & Valenciennes.

Larimus Cuvier & Valenciennes, Hist. Nat. Poiss., V, 145, 1830 (*breviceps*).

1829. Larimus argenteus (Gill).

Panama, locally common.
Amblyscion argenteus Gill, Proc. Ac. Nat. Sci. Phila. 1863, 165, west coast Central America.

1830. Larimus effulgens Gilbert.

Pacific Coast of Mexico, Sonora to Panama.
Larimus effulgens Gilbert MS., 1896, San Juan Lagoon, Sonora.

1831. Larimus acclivis Jordan & Bristol.

West coast of Mexico and Central America, from Sonora to Panama.
Larimus acclivis Jordan & Bristol, Proc. U. S. Nat. Mus. 1896, San Juan Lagoon, Sonora.

1832. Larimus breviceps Cuvier & Valenciennes.

West Indies, south to Brazil.
Larimus breviceps Cuvier & Valenciennes, Hist. Nat. Poiss., V, 146, pl. 140, 1830, Brazil; San Domingo.

1833. Larimus pacificus Jordan & Bollman.

Pacific Ocean, off coast of Colombia.
Larimus pacificus Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 161, Albatross Station 2802, 8° 38′ N., 79° 31′ 30″ W., between Galapagos Islands and Panama.

1834. Larimus fasciatus Holbrook.

South Atlantic Coast of the United States, from Chesapeake Bay to Galveston, Texas; not common.
Larimus fasciatus Holbrook, Ichth. South Carolina, 153, pl. 22, fig. 1, 1860, Charleston, S. C.

Genus 579. **ODONTOSCION** Gill.

Odontoscion Gill, Proc. Ac. Nat. Sci. Phila. 1862, 18 (*dentex*).

1835. Odontoscion dentex (Cuvier & Valenciennes). *Corvina.*

West Indies.
Corvina dentex Cuvier & Valenciennes, Hist. Nat. Poiss., V, 139, pl. 109, 1830, San Domingo.

1836. Odontoscion xanthops Gilbert.

Panama.
Odontoscion xanthops Gilbert MS., 1896, Panama.

Genus 580. **CORVULA** Jordan & Eigenmann.

Corvula Jordan & Eigenmann, Review of Sciænidæ Europe and America, in Report U. S. Fish Com. 1886 (1889), 377 (*batabana*).

1837. Corvula macrops (Steindachner). *Vacuocua.*

Pacific Coast of tropical America, Mazatlan to Panama.
Corvina macrops Steindachner, Ichth. Beitr., III, 24, fig. 2, 1875, Panama.

1838. Corvula sialis Jordan & Eigenmann.

Florida Keys.

Corvula sialis Jordan & Eigenmann, Report U. S. Fish Com. 1886 (1889), 379, Key West.

1839. Corvula subæqualis (Poey).

West Indies.

Corvina subæqualis Poey, Ann. Lyc. Nat. Hist. New York 1875, 58, Cuba.

1840. Corvula sanctæ-luciæ Jordan.

West Indies.

Corvula sanctæ-luciæ Jordan, Proc. U. S. Nat. Mus. 1889, 649, Port Castries, St. Lucia.

1841. Corvula batabana (Poey).

Cuba and Puerto Rico.

Johnius batabanus Poey, Memorias, II, 184, 1860, Batabano, south coast of Cuba.

Genus 581. ELATTARCHUS Jordan & Evermann.

Elattarchus Jordan & Evermann, Fishes N. and M. Am., 1896 (*archidium*).

1842. Elattarchus archidium (Jordan & Gilbert).

Panama.

Odontoscion archidium Jordan & Gilbert, Bull. U. S. F. C. 1881, 317, Panama.

Genus 582. BAIRDIELLA Gill. *Mademoiselles.*

Bairdiella Gill, Cat. Fish. East Coast N. A., 33, 1861 (*argyroleuca* = *chrysura*).

1843. Bairdiella chrysura (Lacépède). *Mademoiselle; Yellow-tail.*

South Atlantic and Gulf coasts of United States, north to New York; very abundant on our sandy shores from Long Island to Texas.

Dipterodon chrysurus Lacépède, Hist. Nat. Poiss., III, 64, 1802, South Carolina; after Linnæus.

1844. Bairdiella ensifera (Jordan & Gilbert).

Panama.

Sciæna ensifera Jordan & Gilbert, Bull. U. S. Fish Com. 1881, 313, Bay of Panama; Punta Arenas.

1845. Bairdiella icistia (Jordan & Gilbert). *Corbineta.*

Pacific Coast of Mexico, rather common about Mazatlan.

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

1846. Bairdiella ronchus (Cuvier & Valenciennes). *Ronco; Corvina.*

Atlantic coasts of tropical America, generally common in the West Indies and along the coast of Brazil.

Corvina ronchus Cuvier & Valenciennes, Hist. Nat. Poiss., V, 107, 1830, Maracaibo; Surinam.

1847. Bairdiella armata Gill.

Both coasts of tropical America; not uncommon on the Pacific Coast about Panama, and equally abundant on the Atlantic Coast.

Bairdiella armata Gill, Proc. Ac. Nat. Sci. Phila. 1863, 164, west coast of Central America.

1848. Bairdiella aluta (Jordan & Gilbert).

Pacific Coast of Central America.

Sciæna aluta Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 232, La Union, San Salvador.

1849. Bairdiella chrysoleuca (Günther).

Panama.

Corvina chrysoleuca Günther, Fish. Central America, 387 and 427, plate 67, fig. 1, 1869, Panama.

Genus 583. **STELLIFERUS** Stark.

Stelliferus Stark, Elements Nat. Hist., I, 459, 1828 (*stellifer*); *fide* Gill.

1850. Stelliferus oscitans (Jordan & Gilbert).

Panama.
Sciæna oscitans Jordan & Gilbert, Bull. U. S. F. C. 1881, 312, Bay of Panama.

1851. Stelliferus furthi (Steindachner).

Panama.
Corvina (*Homoprion*) *furthi* Steindachner, Ichth. Beitr., III, 26, fig. 3, 1875, Panama.

1852. Stelliferus illecebrosus Gilbert.

Panama.
Stelliferus illecebrosus Gilbert, Proc. Cal. Ac. Sci. 1896, Panama.

1853. Stelliferus stellifer (Bloch).

Coasts of Guiana and Brazil.
Bodianus stellifer Bloch, Ichthyologia, pl. 231, 1790, "Cape of Good Hope."

1854. Stelliferus lanceolatus (Holbrook).

South Atlantic and Gulf coasts of United States, Charleston to Texas.
Homoprion lanceolatus Holbrook, Ichth. South Carolina, ed. I, 168, pl. 23, 1856, Port Royal Sound, South Carolina.

1855. Stelliferus ericymba (Jordan & Gilbert).

Panama.
Sciæna ericymba Jordan & Gilbert, Bull. U. S. F. C. 1881, 311, Bay of Panama.

1856. Stelliferus microps (Steindachner).

Coast of Brazil and Guiana.
Corvina microps Steindachner, Ichth. Notizen, I, 6, pl. 2, fig. 1, 1864, Guiana.

1857. Stelliferus zestocarus Gilbert.

Panama.
Stelliferus zestocarus Gilbert, Proc. Cal. Ac. Sci. 1896, Panama.

Genus 584. **OPHIOSCION** Gill.

Ophioscion Gill, Proc. Ac. Nat. Sci. Phila. 1863, 164 (*typicus*).

1858. Ophioscion adustus Jordan & Evermann.

West Indies to coast of Brazil.
Ophioscion adustus Jordan & Evermann, Fishes North and Middle America, 1896, Pernambuco; Jérémie; Hayti; Brazil.

1859. Ophioscion typicus Gill.

Panama.
Ophioscion typicus Gill, Proc. Ac. Nat. Sci. Phila. 1863, 165, west coast Central America.

1860. Ophioscion strabo Gilbert.

Panama.
Ophioscion strabo Gilbert, Proc. Cal. Ac. Sci. 1896, Panama.

1861. Ophioscion simulus Gilbert.

Panama.
Ophioscion simulus Gilbert, Proc. Cal. Ac. Sci. 1896, Panama.

1862. Ophioscion imiceps (Jordan & Gilbert).

Panama.
Sciæna imiceps Jordan & Gilbert, Bull. U. S. F. C. 1881, 309, Bay of Panama.

1863. Ophioscion scierus (Jordan & Gilbert).

Pacific Coast of tropical America, from Mazatlan to Panama.
Sciæna sciera Jordan & Gilbert, Proc. U. S. Nat. Mus. 1884, 480, Panama

1864. Ophioscion vermicularis (Günther).

Panama.
Corvina vermicularis Günther, Fish. Central America, 387 and 427, pl. 67, fig. 2, 1869, Panama.

Genus 585. SCIÆNOPS Gill. *Red Drums.*
Sciænops Gill, Proc. Ac. Nat. Sci. Phila. 1863, 30 (*ocellatus*).

1865. Sciænops ocellatus (Linnæus). *Red Drum; Channel Bass; "Redfish"; Pescado Colorado; Bull Redfish.*
South Atlantic and Gulf coasts of the United States, New York to Texas.
Perca ocellata Linnæus, Syst. Nat., ed. XII, 483, 1766, South Carolina.

Genus 586. SCIÆNA (Artedi) Linnæus. *Black Drums.*
Sciæna, part, Artedi, Genera Piscium, 1738.

Subgenus CALLAUS Jordan.
Callaus Jordan, Review of Sciænidæ, 401, 1889 (*deliciosa*).

1866. Sciæna deliciosa (Tschudi).
Pacific Coast of South America, from Panama to Peru.
Corvina deliciosa Tschudi, Fauna Peruana Ichthyol., 8, 1845, Peru.

Subgenus CHEILOTREMA Tschudi.
Cheilotrema Tschudi, Fauna Peruana, Fische, 13, 1845 (*fasciatum*).

1867. Sciæna saturna (Girard). *Red Roncador; Black Croaker.*
Coast of southern California, from Santa Barbara to Cerros Island.
Amblodon saturnus Girard, U. S. Pac. R. R. Survey, 98, 1858, San Diego, Cal.

Genus 587. RONCADOR Jordan & Gilbert.
Roncador Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 28 (*stearnsi*).

1868. Roncador stearnsi (Steindachner). *Roncador.*
Coast of southern California, north to Santa Barbara.
Corvina stearnsi Steindachner, Ichth. Beitr., III, 22, 1875, San Diego.

Genus 588. LEIOSTOMUS Lacépède. *Goodies.*
Leiostomus Lacépède, Hist. Nat. Poiss., IV, 439, 1802 (*xanthurus*).

1869. Leiostomus xanthurus Lacépède. *Spot; Goody; Post-croaker; Oldwife; Lafayette.*
South Atlantic and Gulf coasts of United States; Cape Cod to Texas; once doubtfully recorded from Martinique.
Leiostomus xanthurus Lacépède, Hist. Nat. Poiss., IV, 439, pl. 10, fig. 1, 1802, Carolina.

Genus 589. PACHYPOPS Gill.
Pachypops Gill, Proc. Ac. Nat. Sci. Phila. 1861, 87 (*trifilis*).

1870. Pachypops furcræus (Lacépède).
Rivers and estuaries of Guiana.
Perca furcræa Lacépède, Hist. Nat. Poiss., IV, 398, 424, 1802, Surinam.

Genus 590. GENYONEMUS Gill.
Genyonemus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 87 (*lineatus*).

1871. Genyonemus lineatus (Ayres). *Little Roncador; Kingfish; Croaker.*
Coast of southern California, San Francisco to Cerros Island.
Leiostomus lineatus Ayres, Proc. Cal. Ac. Sci. 1855, 25, San Francisco.

Genus 591. MICROPOGON Cuvier & Valenciennes. *Croakers.*
Micropogon Cuvier & Valenciennes, Hist. Nat. Poiss., V, 213, 1830 (*lineatus*= *undulatus*).

1872. Micropogon undulatus (Linnæus). *Croaker; Roncadina; Corvina.*
South Atlantic and Gulf coasts of United States; Cape Cod to Texas.
Perca undulata Linnæus, Syst. Nat., ed. XII, 483, 1766, South Carolina.

1873. Micropogon furnieri (Desmarest). *Verrugato.*
West Indies and coasts of South America.
Umbrina furnieri Desmarest, Première Décade Ichthyol., 22, pl. 2, fig. 3, 182, Havana.

1874. Micropogon megalops Gilbert.

Gulf of California.
Micropogon megalops Gilbert, Proc. U. S. Nat. Mus. 1890, 64, Gulf of California, in 14 fathoms, at Albatross Station 3021.

1875. Micropogon ectenes Jordan & Gilbert. *Verrugato.*

Pacific Coast of Mexico; Mazatlan.
Micropogon ectenes Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 355, Mazatlan.

1876. Micropogon altipinnis Günther.

Panama.
Micropogon altipinnis Günther, Proc. Zool. Soc. Lond. 1864, 149, San Jose, Panama; Chiapam.

Genus 592. UMBRINA Cuvier.

Umbrina Cuvier, Règne Animal, ed. I, II, 297, 1817 (*cirrosa; Sciæna* L. being restricted to *Sciæna umbra*, a Linnæan, and to *Sciæna aquila*, a non-Linnæan species).

1877. Umbrina broussonnetii Cuvier & Valenciennes.

West Indies; Florida to Brazil.
Umbrina broussonnetii Cuv. & Val., Hist. Nat. Poiss., v, 187, 1830, Jamaica.

1878. Umbrina coroides Cuvier & Valenciennes.

Coast of Brazil.
Umbrina coroides Cuvier & Valenciennes, Hist. Nat. Poiss, v, 187, 1830, Brazil.

1879. Umbrina roncador Jordan & Gilbert. *Yellow-finned Roncador; Yellow-tail Croaker.*

Coast of southern California, from Point Conception to Guaymas.
Umbrina roncador Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 277, Pequena Bay, west coast Lower California.

1880. Umbrina xanti Gill.

Pacific Coast of tropical America, Cape San Lucas to Panama.
Umbrina xanti Gill, Proc. Ac. Nat. Sci. Phila. 1862, 256, Cape San Lucas.

1881. Umbrina sinaloæ Scofield.

Pacific Coast of Mexico; Mazatlan.
Umbrina sinaloæ Scofield, Proc. Cal. Ac. Sci. 1896, Mazatlan.

1882. Umbrina galapagorum Steindachner.

Galapagos Archipelago.
Umbrina galapagorum Steindachner, Ichth. Beitr., VII, 20, 1878, James Island, Galapagos.

1883. Umbrina dorsalis Gill.

Pacific Coast of Mexico.
Umbrina dorsalis Gill, Proc. Ac. Nat. Sci. Phila. 1862, 257, Cape San Lucas.

Genus 593. MENTICIRRHUS Gill. *Kingfishes.*

Menticirrhus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 86 (*alburnus*).

1884. Menticirrhus simus Jordan & Eigenmann.

Pacific Coast of tropical America; Mazatlan to Panama.
Menticirrhus simus Jordan & Eigenmann, Review Sciænidæ, 427, 1889, Mazatlan and Panama.

1885. Menticirrhus nasus (Günther).

Panama.
Umbrina nasus Günther, Fishes Central America, 387 and 426, 1869, Panama.

1886. Menticirrhus panamensis (Steindachner).

Pacific Coast of tropical America; Mazatlan to Panama.
Umbrina panamensis Steindachner, Ichth. Beitr., IV, 9, 1875, Panama.

1887. Menticirrhus martinicensis (Cuvier & Valenciennes).

West Indies to Patagonia.
Umbrina martinicensis Cuvier & Valenciennes, Hist. Nat. Poiss., v, 186, 1830, Martinique.

1888. Menticirrhus americanus (Linnæus). *Carolina Whiting; Sand Whiting.*
South Atlantic and Gulf coasts of United States; Chesapeake Bay to Texas.
Cyprinus americanus Linnæus, Syst. Nat., ed. x, 321, 1758, Carolina; based on *Whiting* of Catesby; (not *Cyprinus americanus* of 12th edition of Systema Naturæ, which is a cyprinoid, *Abramis bosci* C. & V.).

1889. Menticirrhus saxatilis (Bloch & Schneider). *Kingfish; Sea Mink; Northern Whiting.*
Atlantic and Gulf coasts of the United States; Cape Ann to Key West and Pensacola; most common northward.
Johnius saxatilis Bloch & Schneider, Syst. Ichth., 75, 1801, New York.

1890. Menticirrhus undulatus (Girard). *California Whiting; Sand Sucker.*
Southern California, north to Santa Barbara.
Umbrina undulata Girard, Proc. Ac. Nat. Sci. Phila. 1854, 148, San Diego, Cal.

Subgenus UMBRULA Jordan & Eigenmann.
Umbrula Jordan & Eigenmann, Review Sciænidæ, 424, 1889 (*littoralis*).

1891. Menticirrhus elongatus (Günther). *Verrugato.*
Pacific Coast of tropical America; Mazatlan to Panama.
Umbrina elongata Günther, Proc. Zool. Soc. Lond. 1864, 148, Chiapas.

1892. Menticirrhus littoralis (Holbrook). *Surf Whiting; Silver Whiting.*
South Atlantic and Gulf coasts of United States; North Carolina to Texas.
Umbrina littoralis Holbrook, Ichth. South Carolina, ed. 1, 142, pl. 20, fig. 1, 1856, South Carolina.

Genus 594. PARALONCHURUS Bocourt.
Paralonchurus Bocourt, Nouv. Arch. Mus., IV, 21, 1869 (*petersi*).

Subgenus POLYCLEMUS Berg. *Corvalos.*
Polyclemus Berg, Ann. Mus. Nac. Buenos Aires, 1895, 54 (*dumerili*).

1893. Paralonchurus dumerili (Bocourt).
Panama.
Polycirrhus dumerili Bocourt, Nouv. Arch Mus. d'Hist. Natur., IV, 22, 1868, La Union.

Subgenus ZONOSCION Jordan & Evermann.
Zonoscion Jordan & Evermann, new subgenus (*rathbuni*).

1894. Paralonchurus rathbuni (Jordan & Bollman).
Panama.
Polycirrhus rathbuni Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 162, Panama.

Subgenus ZACLEMUS Gilbert.
Zaclemus Gilbert, Proc. Cal. Ac. Sci. 1896 (*goodei*).

1895. Paralonchurus goodei Gilbert.
Panama.
Paralonchurus goodei Gilbert, Proc. Cal. Ac. Sci. 1896, Panama.

Subgenus PARALONCHURUS Bocourt.

1896. Paralonchurus petersi Bocourt.
Coast of Central America, rare at Panama.
Paralonchurus petersi Bocourt, Nouv. Archives du Muséum, IV, 1869, 22, La Union, San Salvador.

Genus 595. LONCHIURUS Bloch.
Lonchiurus Bloch, Ichthyologiæ, pl. 360, 1793 (*barbatus* = *lanceolatus*).

1897. Lonchiurus lanceolatus (Bloch).
West Indies to Guiana.
Perca lanceolata Bloch, Nov. Act. Sc. Copenh., III, 383, 1788, India.

Genus 596. **POGONIAS** Lacépède. *Sea Drums.*
Pogonias Lacépède, Hist. Nat. Poiss., III, 138, 1802 (*fasciatus* = *cromis*).

1898. Pogonias cromis (Linnæus). *Drum.*
Atlantic coasts of America; Long Island to mouth of Rio Grande.
Labrus cromis Linnæus, Syst. Nat., ed. XII, 479, 1766, Carolina.

1899. Pogonias courbina (Lacépède).
Guiana to Uruguay, rather common in Brazil.
Pogonathus courbina Lacépède, Hist. Nat. Poiss., v, 121, 1803, Rio de la Plata.

Genus 597. **APLODINOTUS** Rafinesque. *River Drums.*
Aplodinotus Rafinesque, Jour. de Phys. 1819, 418 (*grunniens*).

1900. Aplodinotus grunniens Rafinesque. *Fresh-water Drum; Gaspergou; Lake Sheepshead; Thunder-pumper; Croaker; Bubbler; White Perch.*
Great Lakes to Texas; abundant in all lakes and large streams west of the Alleghanies and east of the Great Plains.
Aplodinotus grunniens Rafinesque, Jour. de Phys. 1819, 88, Ohio River.

Genus 598. **EQUES** Bloch. *Ribbon-fishes.*
Eques Bloch, Syst. Ichthyologiæ, 1793 (*americanus* = *lanceolatus*).

Subgenus **PAREQUES** Gill.
Pareques Gill, in Goode, Bull. U. S. Nat. Mus., v, 50, 1875 (*acuminatus*).

1901. Eques viola Gilbert.
Panama.
Eques viola Gilbert, Proc. Cal. Ac. Sci. 1896, Panama.

1902. Eques acuminatus (Bloch & Schneider).
West Indies; South Carolina to Brazil.
Grammistes acuminatus Bloch & Schneider, Syst. Ichth., 184, 1801, no locality; after Seba.

1902a. Eques acuminatus umbrosus Jordan & Eigenmann.
Southeast coast of the United States, Charleston to Pensacola.
Eques acuminatus umbrosus Jordan & Eigenmann, Review Sciænidæ, 440, 1889, Charleston and Pensacola.

1903. Eques punctatus Bloch & Schneider. *Serrana; Hispana.*
West Indies.
Eques punctatus Bloch & Schneider, Syst. Ichth., 106, 1801, Cuba; based on Parra, 2, pl. 2, fig. 2.

1904. Eques pulcher Steindachner.
Barbados.
Eques pulcher Steindachner, Ichth. Notizen, VI, 43, 1867, Barbados.

1905. Eques lanceolatus (Linnæus). *Ribbon-fish; Guapena; Serrana.*
West Indies, ranging northward to Pensacola.
Chætodon lanceolatus Linnæus, Syst. Naturæ, ed. X, 277, 1758, "Caraibes Islands"; based on Edwards, pl. 210.

Group CIRRHITOIDEI. The Cirrhitoid Fishes.

Family CLVIII. CIRRHITIDÆ. The Cirrhitoids.

Genus 599. **CIRRHITES** Lacépède.
Cirrhites Lacépède, Hist. Nat. Poiss., v, 3, 1803 (*maculatus*).

1906. Cirrhites rivulatus Valenciennes.
Cape San Lucas to the Galapagos Islands.
Cirrhites rivulatus Valenciennes, Voyage Vénus, Poiss., 309, pl. 3, fig. 1, 1855, Galapagos Islands.

1907. Cirrhites betaurus Gill.
Cape San Lucas and Mazatlan.
Cirrhites betaurus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 259, Cape San Lucas.

Suborder HOLCONOTI.

Family CLIX. EMBIOTOCIDÆ. The Surf-Fishes.

Genus 600. HYSTEROCARPUS Gibbons.

Hysterocarpus Gibbons, Daily Placer Times and Transcript, May 18, 1854, and in Proc. Ac. Nat. Sci. Phila., 1854, 124 (*traski*).

1908. Hysterocarpus traski Gibbons.

Rivers of central California, chiefly in the Sacramento Valley from Lake County to Santa Clara County.

Hysterocarpus traski Gibbons, Proc. Ac. Nat. Sci. Phila. 1854, 105, lower Sacramento River.

Genus 601. ABEONA Girard.

Abeona Girard, Proc. Ac. Nat. Sci. Phila. 1855, 322 (*trowbridgii*=*minimus*).

1909. Abeona minima (Gibbons).

San Francisco to San Diego.

Cymatogaster minimus Gibbons, Proc. Ac. Nat. Sci. Phila. 1854, 125, San Francisco Bay.

1910. Abeona aurora Jordan & Gilbert.

Monterey Bay, California.

Abeona aurora Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 299, Monterey Bay, California.

Genus 602. CYMATOGASTER Gibbons.

Cymatogaster Gibbons, Daily Placer Times and Transcript, May 18, 1854 (*aggregatus* and *minimus*).

1911. Cymatogaster aggregatus Gibbons. *Sparada.*

Pacific Coast, from Port Wrangel, Alaska, to Todos Santos Bay.

Cymatogaster aggregatus Gibbons, Daily Placer Times and Transcript, May 18, 1854, San Francisco.

Genus 603. BRACHYISTIUS Gill.

Brachyistius Gill, Proc. Ac. Nat. Sci. Phila. 1862, 275 (*frenatus*).

1912. Brachyistius frenatus Gill.

Vancouver Island to San Diego.

Brachyistius frenatus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 275, California coast.

Genus 604. ZALEMBIUS Jordan & Evermann.

Zalembius Jordan & Evermann, Fishes N. and M. Amer., 1896 (*rosaceus*).

1913. Zalembius rosaceus (Jordan & Gilbert).

San Francisco, California.

Cymatogaster rosaceus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 303, off San Francisco.

Genus 605. HYPOCRITICHTHYS Gill.

Hypocritichthys Gill, Proc. Ac. Nat. Sci. Phila. 1862, 14, 275 (*analis*).

1914. Hypocritichthys analis (Alexander Agassiz).

San Francisco to Point Conception.

Hyperprosopon analis Alexander Agassiz, Proc. Bost. Soc. Nat. Hist. 1861, 133, San Francisco.

Genus 606. HYPERPROSOPON Gibbons.

Hyperprosopon Gibbons, Daily Placer Times and Transcript, May 18, 1854 (*argenteus*).

1915. Hyperprosopon argenteus Gibbons. *Walleye Surf-fish; White Perch.*

Coast of California, Cape Disappointment to Todos Santos Bay.

Hyperprosopon argenteum Gibbons, Proc. Ac. Nat. Sci. Phila. 1854, 105, San Francisco.

1916. Hyperprosopon agassizii Gill.
Coast of California, San Francisco to Santa Barbara; most common along San Luis Obispo County.
Hyperprosopon agassizii Gill, Proc. Ac. Nat. Sci. Phila. 1862, 276, California.

Genus 607. HOLCONOTUS Agassiz.
Holconotus Agassiz, Am. Jour. Sci. Arts, XVII, May, 1854, 367 (*rhodoterus*).

1917. Holconotus rhodoterus Agassiz.
Coast of California, San Francisco to San Diego.
Holconotus rhodoterus Agassiz, Am. Jour. Sci. Arts, May, 1854, 368, San Francisco.

Genus 608. AMPHISTICHUS Agassiz.
Amphistichus Agassiz, Am. Jour. Sci. Arts, May, 1854, 367 (*argenteus*).

1918. Amphistichus argenteus Agassiz. *Surf-fish.*
Pacific Coast from Cape Flattery to San Diego.
Amphistichus argenteus Agassiz, Am. Jour. Sci. Arts, May, 1854, 367, San Francisco.

Genus 609. EMBIOTOCA Agassiz.
Embiotoca Agassiz, Am. Jour. Sci. Arts, XVI, November, 1853, 386 (*jacksoni*).

1919. Embiotoca jacksoni Agassiz. *Common Surf-fish; Black Perch.*
Vancouver Island to San Diego.
Embiotoca jacksoni Agassiz, Am. Jour. Sci. Arts, 1853, 387, and 1854, 366, San Francisco.

Genus 610. TÆNIOTOCA Alexander Agassiz.
Tæniotoca A. Agassiz, Proc. Bost. Soc. Nat. Hist., VII, 1861, 133 (*lateralis*).

1920. Tæniotoca lateralis (Agassiz). *Blue Perch; Striped Surf-fish.*
Vancouver Island to San Diego.
Embiotoca lateralis Agassiz, Am. Jour. Sci. Arts, May, 1854, 366, San Francisco.

Genus 611. PHANERODON Girard.
Phanerodon Girard, Proc. Ac. Nat. Sci. Phila. 1854, 153 (*furcatus*).

1921. Phanerodon furcatus Girard. *White Surf-fish.*
Pacific Coast, from Vancouver Island to San Diego.
Phanerodon furcatus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 163, Presidio and Tomales Bay, California.

1922. Phanerodon atripes (Jordan & Gilbert).
Monterey Bay and banks off San Diego.
Ditrema atripes Jordan & Gilbert, Proc. U. S. N. M. 1880, 320, Monterey Bay.

Genus 612. RHACOCHILUS Agassiz.
Rhacochilus Agassiz, Am. Jour. Sci. Arts, May, 1854, 367 (*toxotes*).

1923. Rhacochilus toxotes Agassiz. *Alfione.*
Coast of California, from San Francisco to San Diego.
Rhacochilus toxotes Agassiz, Am. Jour. Sci. Arts, May, 1854, 367, San Francisco.

Genus 613. HYPSURUS Alexander Agassiz.
Hypsurus Alexander Agassiz, Proc. Bost. Soc. Nat. Hist. 1861, 133 (*caryi*).

1924. Hypsurus caryi (Agassiz). *Bugara.*
Coast of California; very common from Cape Mendocino to San Diego.
Embiotoca caryi Agassiz, Am. Jour. Sci. Arts 1853, 389, and 1854, 366, San Francisco.

Genus 614. DAMALICHTHYS Girard.
Damalichthys Girard, Proc. Ac. Nat. Sci. Phila. 1855, 321 (*vacca*).

1925. Damalichthys argyrosomus (Girard). *White Perch; Porgee.*
Pacific Coast from Vancouver Island to San Diego.
Embiotoca argyrosoma Girard, Proc. Ac. Nat. Sci. Phila. 1855, 136, San Francisco.

Suborder CHROMIDES.

Family CLX. CICHLIDÆ. The Cichlids.

Genus 615. PETENIA Günther.

Petenia Günther, Cat., IV, 301, 1862 (*splendida*).

1926. Petenia splendida Günther.

Guatemala.
Petenia splendida Günther, Cat., IV, 301, 1862, Lake Peten, Guatemala.

Genus 616. ÆQUIDENS Eigenmann & Bray.

Æquidens Eigenmann & Bray, Ann. N. Y. Ac. Sci. 1894, 616 (*tetramerus*).

1927. Æquidens cœruleopunctatus (Kner & Steindachner).

East slope of the Isthmus of Panama.
Acara cœruleopunctata Kner & Steindachner, Sitz. Bayer. Akad. 1863, ? Rio Chagres, Panama.

Genus 617. CICHLASOMA Swainson.

Cichlasoma Swainson, Nat. Hist. Class. Fishes, etc., II, 230, 1839 (*punctatus*= *bimaculatus*).

Subgenus CICHLASOMA Swainson.

1928. Cichlasoma rectangulare (Steindachner).

Mexico.
Acara rectangularis Steindachner, Chromiden Mejicos, I, 1864, Mexico.

1929. Cichlasoma bartoni (Bean).

Hauzteca Potosina, in San Luis Potosi, Mexico.
Acara bartoni T. H. Bean, Proc. U. S. Nat. Mus. 1892, 286, Hauzteca Potosina, Mexico.

1930. Cichlasoma godmanni (Günther).

Guatemala.
Heros godmanni Günther, Cat., IV, 296, 1862, River of Cahabon, Guatemala.

1931. Cichlasoma sieboldii (Kner & Steindachner).

New Grenada, and from the west slope of Panama.
Heros sieboldii Kner & Steindachner, Abhandl. Bayer. Akad. Wiss. X, 1864, 13, pl. 2, fig. 2, New Grenada.

1932. Cichlasoma intermedium (Günther).

Guatemala.
Heros intermedius Günther, Cat., IV, 298, 1862, Lake Peten, Guatemala.

1933. Cichlasoma anguliferum (Günther).

Guatemala.
Heros angulifer Günther, Cat., IV, 298, 1862, Rio de Santa Yzabal, Guatemala.

1934. Cichlasoma fenestratum (Günther).

Rivers of southern Mexico.
Chromis fenestrata Günther, Proc. Zool. Soc. Lond. 1860, 318, Rio de la Lana, Mexico.

1935. Cichlasoma montezuma (Heckel).

Mexico.
Heros montezuma Heckel, Brazil. Fluss-Fische, 383, 1840, Mexico.

1936. Cichlasoma macracanthum (Günther).

Chiapam and Huamuchal.
Heros macracanthus Günther, Proc. Zool. Soc. Lond. 1864, 153, Chiapam and Huamuchal.

1937. Cichlasoma parma (Günther).

Mexico and Guatemala.
Heros parma Günther, Cat., IV, 285, 1862, Mexico and Guatemala.

1938. Cichlasoma margaritiferum (Günther).
Guatemala.
Heros margaritifer Günther, Cat., IV, 287, 1862, Lake Peten, Guatemala.

1939. Cichlasoma spilurum (Günther).
Rio Motagua, Guatemala.
Heros spilurus Günther, Cat., IV, 289, 1862, Rio Motagua.

1940. Cichlasoma longimanus (Günther).
Lake Nicaragua.
Heros longimanus Günther, Fish. Centr. Amer., 453, 1869, Lake Nicaragua.

1941. Cichlasoma bifasciatum (Steindachner).
Mexico.
Heros bifasciatus Steindachner, Chromiden Mejicos, 4, 1864, Mexico.

1942. Cichlasoma helleri (Steindachner).
Rio Teapa, Tabasco, Mexico.
Heros helleri Steindachner, Chromiden Mejicos, 8, 1864, Mexico.

1943. Cichlasoma balteatum (Gill & Bransford).
Lake Nicaragua.
Heros balteatus Gill & Bransford, Proc. Ac. Nat. Sci. Phila. 1877, 184, Lake Nicaragua.

1944. Cichlasoma rostratum (Gill & Bransford).
Lake Nicaragua.
Heros rostratus Gill & Bransford, Proc. Ac. Nat. Sci. Phila. 1877, 181, Lake Nicaragua.

1945. Cichlasoma malanopogon (Steindachner).
Central America.
Heros malanopogon Steindachner, Chromiden Mejicos 16, in Denkschr. Akad. Wiss. Wien, XXIII, 1864, 72, pl. 1, fig. 3, Central America.

1946. Cichlasoma melanurum (Günther).
Guatemala.
Heros melanurus Günther, Cat., 288, 1862, Lake Peten, Guatemala.

1947. Cichlasoma nebuliferum (Günther).
Mexico.
Chromis nebulifer Günther, Proc. Zool. Soc. Lond. 1860, 318, Mexico.

1948. Cichlasoma lentiginosum (Steindachner).
Mexico.
Heros lentiginosus Steindachner, Chromiden Mejicos, 6, 1864, Mexico.

1949. Cichlasoma deppii (Heckel).
Mexico..
Heros deppii Heckel, Brasil. Flussfische, 382, 1840, Mexico.

Subgenus **ARCHOCENTRUS** Gill.
Archocentrus Gill, Proc. Ac. Nat. Sci. Phila. 1877, 186 (*centrarchus*).

1950. Cichlasoma nigrofasciatum (Günther).
Lakes Atitlan, Amatitlan, and Nicaragua.
Heros nigrofasciatus Günther, Fish. Centr. Amer., 452, 1869, Lake Atitlan.

1951. Cichlasoma multispinosum (Günther).
Lake Managua, Guatemala.
Heros multispinosus Günther, Fish. Centr. Amer., 453, 1869, Lake Managua.

1952. Cichlasoma centrarchus (Gill & Bransford).
Lake Nicaragua.
Heros centrarchus Gill & Bransford, Proc. Ac. Nat. Sci. Phila. 1877, 185, Lake Nicaragua.

Genus 618. HEROS Heckel.

Heros Heckel, Ann. Wiener Mus. 1840, 362 (*severus*, etc., restricted by Jordan & Gilbert to *severus*).

1953. Heros friedrichsthalii Heckel.

Lake Peten, Lake Nicaragua and its outlet, Rio San Juan.
Heros friedrichsthalii Heckel, Brasil. Flussfische, 381, 1840, Rio San Juan.

1954. Heros salvini Günther.

Guatemala.
Heros salvini Günther, Cat., IV, 294, 1862, Rio de Santa Yzabal.

1955. Heros affinis Günther.

Lake Peten, Guatemala.
Heros affinis Günther, Cat., IV, 292, 1862, Lake Peten, Guatemala.

1956. Heros maculipinnis Steindachner.

Rio Xamapa, near Vera Cruz, Mexico.
Heros maculipinnis Steindachner, Chromiden Mejicos, 15, 1864, Rio Xamapa, near Vera Cruz, Mexico.

1957. Heros trimaculatus Günther.

Chiapam and Huamuchal.
Heros trimaculatus Günther, Fish. Centr. Amer., 461, 1869, Chiapam and Huamuchal.

1958. Heros labiatus Günther.

Lake Managua.
Heros labiatus Günther, Proc. Zool. Soc. Lond. 1864, 27, pl. 4, fig. 1, Lake Managua.

1959. Heros lobochilus Günther.

Lake Managua.
Heros lobochilus Günther, Fish. Centr. Amer., 457, 1869, Lake Managua.

1960. Heros erythræus Günther.

Lake Managua.
Heros erythræus Günther, Fish. Centr. Amer., 457, 1869, Lake Managua.

1961. Heros basilaris Gill & Bransford.

Lake Nicaragua.
Heros basilaris Gill & Bransford, Proc. Ac. Nat. Sci. Phila. 1877, 182, Lake Nicaragua.

1962. Heros nicaraguensis Günther.

Lake Nicaragua.
Heros nicaraguensis Günther, Proc. Zool. Soc. Lond. 1864, 153, Lake Nicaragua.

1963. Heros managuensis Günther.

Lake Managua.
Heros managuensis Günther, Fish. Centr. Amer., 463, 1869, Lake Managua.

1964. Heros citrinellus Günther.

Lake Nicaragua.
Heros citrinellus Günther, Proc. Zool. Soc. Lond. 1864, 153, Lake Nicaragua.

1965. Heros aureus Günther.

Lake Yzabal, Rio Motagua, and Lake Nicaragua.
Heros aureus Günther, Cat., IV, 292, 1862, Yzabal and Rio Motagua.

1966. Heros motaguensis Günther.

Rio Motagua and Lake Nicaragua.
Heros motaguensis Günther, Fish. Centr. Amer., 462, 1869, Rio Motagua.

1967. Heros oblongus Günther.

Rio Motagua.
Heros oblongus Günther, Fish. Centr. Amer., 464, 1869, Rio Motagua.

1968. Heros dovii Günther.

Lake Nicaragua.
Heros dovii Günther, Proc. Zool. Soc. Lond. 1864, 154, Lake Nicaragua.

1969. Heros gibbiceps Steindachner.

Rio Teapa, Tabasco, Mexico.
Heros gibbiceps Steindachner, Chromiden Mejicos, 12, 1864, Rio Teapa, Tabasco, Mexico.

1970. Heros microphthalmus Günther.

Rio Motagua.
Heros microphthalmus Günther, Cat., IV, 295, 1862, Rio Motagua.

1971. Heros urophthalmus Günther.

Lake Peten, Guatemala.
Heros urophthalmus Günther, Cat., IV, 291, 1862, Lake Peten, Guatemala.

1972. Heros troscheli Steindachner.

Mexico.
Heros troscheli Steindachner, Ichthyologische Notizen, IV, 12, 1867, Mexico.

1973. Heros cyanoguttatus (Baird & Girard).

Southwestern rivers of Texas and northeastern Mexico; basin of the Rio Grande; the only species of *Cichlidæ* entering the United States.
Herichthys cyanoguttatus Baird & Girard, Proc. Ac. Nat. Sci. Phila., VII, 1854, 25, Rio Grande, Brownsville, Texas.

1974. Heros pavonaceus Garman.

Spring near Monclova, in Coahuila, Mexico.
Heros pavonaceus Garman, Bull. Mus. Comp. Zool., VIII, 93, 1881, spring near Monclova, in Coahuila.

1975. Heros altifrons Kner & Steindachner.

Isthmus of Panama and southward.
Heros altifrons Kner & Steindachner, Sitzungsber. Bayer. Akad. 1863, 223, New Grenada.

1976. Heros beani Jordan. *Mojarra Verde.*

Rio Presidio, Mazatlan, Mexico.
Heros beani Jordan, Proc. U. S. Nat. Mus. 1888, 332, Rio Presidio, Mazatlan.

1977. Heros tetracanthus (Cuvier & Valenciennes). *Viajaca.*

Rivers of Cuba.
Centrarchus tetracanthus Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 460, 1831, Cuba.

Genus 619. THERAPS Günther.

Theraps Günther, Cat., IV, 284, 1862 (*irregularis*).

1978. Theraps irregularis Günther.

Guatemala.
Theraps irregularis Günther, Cat., IV, 284, 1862, Guatemala.

Genus 620. NEETROPLUS Günther.

Neetroplus Günther, Fish. Centr. Amer., 469, 1869 (*nematropus*).

1979. Neetroplus nematropus Günther.

Lake Managua.
Neetroplus nematropus Günther, Fish. Centr. Amer., 470, 1869, Lake Managua.

1980. Neetroplus nicaraguensis Gill & Bransford.

Lake Nicaragua.
Neetroplus nicaraguensis Günther, Proc. Ac. Nat. Sci. Phila. 1877, 186, Lake Nicaragua.

Genus 621. SATANOPERCA Günther. *Pappatarros.*

Satanoperca Günther, Cat., IV, 312, 1862 (*dæmon*).

1981. Satanoperca crassilabris Steindachner.

Panama.
Geophagus (*Satanoperca*) *crassilabris* Steindachner, Verh. Ak. Wiss. Wien 1876, 65, Panama.

Family CLXI. POMACENTRIDÆ. Demoiselles.

Genus 622. CHROMIS Cuvier. *Chauffe-Soleils.*

Chromis Cuvier, Mémoires du Mus. d'Hist. Nat., I, 353, 1815 (*chromis*).

Subgenus FURCARIA Poey.

Furcaria Poey, Memorias, II, 194, 1860 (*puncta*).

1982. Chromis atrilobata Gill.

Pacific Coast of America, from Cape San Lucas and southward.
Chromis (*Furcaria*) *atrilobata* Gill, Proc. Ac. Nat. Sci. Phila. 1862, 149, Cape San Lucas, Lower California.

1983. Chromis cyaneus (Poey).

Cuba.
Furcaria cyanea Poey, Memorias, II, 196, 1860, Havana.

1984. Chromis multilineatus (Guichenot).

Cuba.
Heliases multilineatus Guichenot, in Ramon de la Sagra, Poiss. Cuba, 76, pl. 2, fig. 2, 1855, Havana.

Subgenus AYRESIA Cooper.

Ayresia Cooper, Proc. Cal. Ac. Sci. 1863, 73 (*punctipinnis*).

1985. Chromis punctipinnis (Cooper). *Blacksmith.*

Coast of California, from Point Conception to Cerros Island.
Ayresia punctipinnis Cooper, Proc. Cal. Ac. Sci. 1863, 73, San Diego Bay, San Pedro, and Santa Barbara.

Subgenus HELIASES Cuvier & Valenciennes.

Heliases Cuvier & Valenciennes, Hist. Nat. Poiss., V, 495, 1830 (*insolatus*).

1986. Chromis insolatus (Cuvier & Valenciennes). *Chauffe-Soleil.*

West Indies, north to Pensacola.
Heliases insolatus Cuvier & Valenciennes, Hist. Nat. Poiss., V, 494, pl. 137, 1830, Martinique.

1987. Chromis enchrysurus Jordan & Gilbert.

Snapper Banks, off Pensacola and Tampa, Florida.
Chromis enchrysurus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 286, Pensacola, Florida.

Genus 623. EUPOMACENTRUS Bleeker. *Pescados Azules.*

Eupomacentrus Bleeker, Nat. Verh. Holl. Maats. Weten., II, 1877, 73 (*lividus*).

Subgenus EUPOMACENTRUS Bleeker.

1988. Eupomacentrus leucorus (Gilbert).

Socorro Island, one of the Revillagigedo group, off west coast of Mexico.
Pomacentrus leucorus Gilbert, Proc. U. S. Nat. Mus. 1891, 554, Socorro Island.

1989. Eupomacentrus adustus (Troschel).

Cuba.
Pomacentrus adustus Troschel, in J. W. von Müller's Reise in Mexico, 633, 1865, Mexico.

1990. Eupomacentrus fuscus (Cuvier & Valenciennes). *Maria Molle.*

West Indies and coast of Brazil north to Key West.
Pomacentrus fuscus Cuvier & Valenciennes, Hist. Nat. Poiss., V, 432, 1830, Brazil.

1991. Eupomacentrus rectifrænum (Gill). *Pescado Azul.*

Pacific Coast of America, from Cape San Lucas to Panama.
Pomacentrus rectifrænum Gill, Proc. Ac. Nat. Sci. Phila. 1862, 148, Cape San Lucas, Lower California.

1992. Eupomacentrus analis (Poey).
Cuba and Key West.
Pomacentrus analis Poey, Synopsis, 327, 1867, Havana.

1993. Eupomacentrus otophorus (Poey).
Cuba.
Pomacentrus otophorus Poey, Memorias, II, 188, 1860, Havana.

1994. Eupomacentrus leucostictus (Müller & Troschel). *Beau Gregory; Black Pilot.*
West Indies to Snapper Banks, west Florida.
Pomacentrus leucostictus Müller & Troschel, in Schomburgk's Hist. Barbados, 674, 1848, Barbados.

1995. Eupomacentrus flaviventer (Troschel).
Atlantic Coast of Mexico.
Pomacentrus flariventer Troschel, in Von Müller's Reise in Mexico, etc., 633, 1865, "Atlantic Ocean."

1996. Eupomacentrus flavilatus (Gill). *Pescado Azul de dos Colores.*
Pacific Coast of America, from Cape San Lucas to Mazatlan and beyond.
Pomacentrus flavilatus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 148, Cape San Lucas, Lower California.

1997. Eupomacentrus partitus (Poey).
Cuba.
Pomacentrus partitus Poey, Synopsis, 327, 1867, Havana.

1998. Eupomacentrus planifrons (Cuvier & Valenciennes). *Petite Jaquette.*
West Indies, from Jamaica to Martinique.
Pomacentrus planifrons Cuvier & Valenciennes, Hist. Nat. Poiss., v, 431, 1830, Martinique.

Genus 624. ABUDEFDUF Forskål. *Pintanos.*
Abudefduf Forskål, Descr. Anim., etc., 59, 1775 (*sordidus*).

Subgenus GLYPHISODON Lacépède.
Glyphisodon Lacépède, Hist. Nat. Poiss., IV, 542, 1803 (*moncharia*).

1999. Abudefduf saxatilis (Linnæus). *Pintano; Cow-pilot; Jaqueta; Mojarra Raiado; Demoiselle.*
Both coasts of tropical America.
Chætodon saxatilis Linnæus, Syst. Nat., ed. X, 276, 1758, "India"; after Mus. Adolph Frederici.

2000. Abudefduf declivifrons (Gill).
Pacific Coast of tropical America, from Cape San Lucas southward.
Euschistodus declivifrons Gill, Proc. Ac. Nat. Sci. Phila. 1862, 145, Cape San Lucas.

2001. Abudefduf analogus (Gill).
Atlantic Coast of Central America.
Euchistodus analogus Gill, Proc. Ac. Nat. Sci. Phila. 1863, 219, Aspinwall.

2002. Abudefduf taurus (Müller & Troschel). *Dovetail-fish.*
Glyphidodon taurus Müller & Troschel, in Schomburgk's History of Barbados, 674, 1848, Barbados.

2003. Abudefduf rudis (Poey).
Cuba.
Glyphidodon rudis Poey, Memorias, II, 191, 1860, Havana.

Genus 625. HYPSYPOPS Gill. *Garibaldis.*
Hypsypops Gill, Proc. Ac. Nat. Sci. Phila. 1861, 165 (*rubicundus*).

2004. Hypsypops rubicundus (Girard). *Garibaldi.*
Coast of California south to Point Conception.
Glyphisodon rubicundus Girard, Proc. Ac. Nat. Sci. Phila. 1864, 148, Monterey, California.

Genus 626. **MICROSPATHODON** Günther.
Microspathodon Günther, Cat., IV, 35, 1862 (*chrysurus*).

2005. **Microspathodon chrysurus** (Cuvier & Valenciennes).
West Indies, Cuba and St. Thomas.
Glyphidodon chrysurus Cuv. & Val., Hist. Nat. Poiss., V, 476, 1830, St. Thomas.

2006. **Microspathodon bairdii** (Gill).
Pacific Coast of tropical America, from Cape San Lucas to Panama.
Pomacentrus bairdii Gill, Proc. Ac. Nat. Sci. Phila. 1862, Cape San Lucas.

2007. **Microspathodon niveatus** (Poey).
Cuba.
Pomacentrus niveatus Poey, Enumeratio, 102, 1875, Havana.

2008. **Microspathodon dorsalis** (Gill).
Pacific Coast of America, from Cape San Lucas to Mazatlan.
Hypsypops dorsalis Gill, Proc. Ac. Nat. Sci. Phila. 1862, 147, Cape San Lucas.

2008a. **Microspathodon dorsalis azurissimus** Jordan & Starks.
Mazatlan, Mexico; Panama.
Microspathodon azurissimus Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 478, pl. 44, Venados Islands, Mazatlan.

2008b. **Microspathodon dorsalis cinereus** Gilbert.
Clarion and Socorro islands and Panama.
Microspathodon cinereus Gilbert, Proc. U. S. Nat. Mus. 1890, 50, Clarion and Socorro islands.

Suborder PHARYNGOGNATHI. The Labroid Fishes.

Family CLXII. LABRIDÆ. The Wrasse-Fishes.

Genus 627. **CENTROLABRUS** Günther. *Rock Cooks.*
Centrolabrus Günther, Cat., IV, 92, 1862 (*exoletus*).

2009. **Centrolabrus exoletus** (Linnæus). *Rock Cook.*
Coasts of northern Europe south to Cornwall; Greenland.
Labrus exoletus Linnæus, Syst. Nat., ed. X, 274, 1758, Atlantic Ocean.

Genus 628. **TAUTOGOLABRUS** Günther. *Cunners.*
Tautogolabrus Günther, Cat., IV, 89, 1862 (*burgall*=*adspersus*).

2010. **Tautogolabrus adspersus** (Walbaum). *Cunner; Chogset; Blue Perch; Bergall* (*Berg-gylt*).
Atlantic coasts of North America, from Labrador to Sandy Hook.
Labrus adspersus Walbaum, Artedi Piscium, 254, 1792; after *Bergall* of Schöpf, no locality.

Genus 629. **TAUTOGA** Mitchill. *Tautogs.*
Tautoga Mitchill, Report Fishes New York, 23, 1814 (*tautoga*).

2011. **Tautoga onitis** (Linnæus). *Tautog; Blackfish; Oyster-fish.*
Atlantic coasts of United States, Cape Ann to Charleston.
Labrus onitis Linnæus, Syst. Nat., ed. X, 286, 1758, locality unknown.

Genus 630. **LACHNOLAIMUS** Cuvier & Valenciennes. *Capitaines.*
Lachnolaimus Cuvier & Valenciennes, Hist. Nat. Poissons, XIII, 274, 1839 (*aigula*=*maximus*).

2012. **Lachnolaimus maximus** (Walbaum). *Hogfish; Capitaine; Perro Perro.*
West Indies, north to Key West and the Bermudas.
Labrus maximus Walbaum, Artedi Piscium, 261, 1792, no locality; after Catesby.

Genus 631. HARPE Lacépède. *Lady-fishes.*
Harpe Lacépède, Hist. Nat. Poiss., IV, 426, 1802 (*cæruleo-aureus* = *rufa*).

2013. Harpe diplotænia Gill.
Pacific Coast of tropical America; Cape San Lucas; Panama; Revillagigedo Islands; Mazatlan.
Harpe diplotænia Gill, Proc. Ac. Nat. Sci. Phila. 1862, 140, Cape San Lucas.

2014. Harpe rufa (Linnæus). *Lady-fish; Spanish Lady-fish; Spanish Hog-fish; Pudiano; Perro Colorado.*
West Indies, north to Key West, south to Rio de Janeiro.
Labrus rufus Linnæus, Syst. Nat., ed. X, 284, 1758, in America; after Catesby.

2015. Harpe eclancheri (Valenciennes).
Galapagos Islands.
Cossyphus eclancheri Valenciennes, Voy. Vénus, Zool., 340, Poiss., pl. 8, fig. 2, plates 1846, text 1855, Galapagos Islands.

2016. Harpe pulchella (Poey).
Cuba.
Cossyphus pulchellus Poey, Memorias, II, 208, 1860, Havana.

Genus 632. DECODON Günther.
Decodon Günther, Cat., IV, 101, 1862 (*puellaris* Poey).

2017. Decodon puellaris (Poey).
West Indies; Cuba; Barbados; Snapper Banks.
Cossyphus puellaris Poey, Memorias, II, 210, 1860, Havana.

Genus 633. PIMELOMETOPON Gill. *Fat-heads.*
Pimelometopon Gill, Proc. Ac. Nat. Sci. Phila. 1864, 58 (*pulcher*).

2018. Pimelometopon pulcher (Ayres). *California Redfish; Fat-head.*
Southern Calffornia, from Point Conception to Ascension Island, Lower California.
Labrus pulcher Ayres, Proc. Cal. Ac. Sci., I, 1854, 3, San Diego.

2019. Pimelometopon darwinii (Jenyns).
Galapagos Islands.
Cossyphus darwinii Jenyns, Voy. Beagle, Fishes, 100, pl. 20, 1842, Chatham Island, Galapagos Archipelago.

Genus 634. CLEPTICUS Cuvier & Valenciennes.
Clepticus Cuvier & Valenciennes, Règne Animal, ed. II, vol. 2, 201, 1829 (*genizara* = *parræ*).

2020. Clepticus parræ (Bloch & Schneider). *Genizara; Janissary.*
West Indies.
Brama parræ Bloch & Schneider, Syst. Ichth., 100, 1801, Havana.

Genus 635. IRIDIO Jordan & Evermann.
Iridio Jordan & Evermann, Fishes North and Middle America, 1896 (*radiatus*).

2021. Iridio radiatus (Linnæus). *Pudding Wife; Doncella; Pudiano Verde.*
West Indies, Brazil north to Florida Keys, Bermuda and St. Paul Rocks.
Labrus radiatus Linnæus, Syst. Nat., ed. X, 288, 1758, Bahamas; based on Catesby.

2022. Iridio nicholsi (Jordan & Gilbert).
Revillagigedo and Galapagos islands.
Platyglossus nicholsi Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 231, Braithwaite Bay, Socorro Island.

2023. Iridio sellifer (Gilbert).
Revillagigedo Archipelago.
Halichœres sellifer Gilbert, Proc. U. S. Nat. Mus. 1890, 67, Clarion Island.

2024. Iridio semicinctus (Ayres). *Kelpfish; Señorita.*
Southern California, Santa Barbara Islands to Cerros Island.
Julis semicinctus Ayres, Proc. Cal. Ac. Sci. 1859, 32, Cerros Island, off coast Lower California.

2025. Iridio garnoti (Cuvier & Valenciennes).
West Indies, Cuba, Martinique, St. Croix.
Julis garnoti Cuv. & Val., Hist. Nat. Poiss., XIII, 390, 1839, Martinique.

2026. Iridio cyanocephalus (Bloch).
West Indies, south to Brazil.
Labrus cyanocephalus Bloch, Ichthyol., pl. 286, 1791, locality unknown, Museum of Link.

2027. Iridio maculipinna (Müller & Troschel).
West Indies to Beaufort, North Carolina.
Julis maculipinna Müller & Troschel, in Schomburgk, Hist. Barbados, 674, 1848, Barbados.

2028. Iridio bivittatus (Bloch). *Slippery Dick; Doncella.*
West Indies, north to Beaufort, North Carolina, and south to Brazil.
Labrus bivittatus Bloch, Ichthyol., pl. 284, fig. 1, 1792; from a painting by Plumier made at Martinique.

2029. Iridio dispilus (Günther).
Pacific Coast of tropical America, Mazatlan to Panama.
Platyglossus dispilus Günther, Proc. Zool. Soc. Lond. 1864, 25, Panama.

2030. Iridio kirschii Jordan & Evermann.
West Indies, south to Bahia; Cuba; Jamaica; St. Croix.
Iridio kirschii Jordan & Evermann, Fishes N. and M. Amer. 1896, Jamaica.

2031. Iridio poeyi (Steindachner).
Surinam.
Platyglossus poeyi Steindachner, Ichth. Notizen, VI, 49, 1867, Surinam.

2032. Iridio caudalis (Poey).
Cuba.
Julis caudalis Poey, Memorias, II, 213, 1860, Havana.

2033. Iridio pictus (Poey).
West Indies, north to the Snapper Banks off Pensacola.
Julis pictus Poey, Memorias, II, 214, 1860, Havana.

Genus 636. OXYJULIS Gill. *Señoritas.*
Oxyjulis Gill, Proc. Ac. Nat. Sci. Phila. 1863, 330 (*modestus*).

2034. Oxyjulis modestus (Girard). *Señorita.*
Coast of southern California; Monterey to Guadalupe Island.
Julis modestus Girard, Proc. Ac. Nat. Sci. Phila., VII, 1854, 151, San Diego, Monterey, and San Miguel.

Genus 637. EMMEEKIA Jordan & Evermann.
Emmeekia Jordan & Evermann, Fishes N. and M. America, 1896 (*venustus*).

2035. Emmeekia venusta (Jenkins & Evermann).
Gulf of California.
Pseudojulis venustus Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 145, Guaymas, Sonora.

Genus 638. JULIDIO Jordan & Evermann.
Julidio Jordan & Evermann, Fishes North and Middle America, 1896 (*adustus*).

2036. Julidio adustus (Gilbert).
Revillagigedo Islands.
Pseudojulis adustus Gilbert, Proc. U. S. Nat. Mus. 1890, 66, Socorro Island.

2037. Julidio notospilus (Günther).
Pacific Coast of Mexico, Mazatlan to Panama.
Pseudojulis notospilus Günther, Proc. Zool. Soc. Lond. 1864, 26, Panama.

Genus 639. PSEUDOJULIS Bleeker.

Pseudojulis Bleeker, Proc. Zool. Soc. Lond. 1861, 412 (*girardi*).

2038. Pseudojulis inornatus Gilbert.

Pacific Coast of Mexico; only the type known.
Pseudojulis inornatus Gilbert, Proc. U. S. N. M. 1890, 67, west coast of Mexico.

2039. Pseudojulis melanotis Gilbert.

Pacific Coast of Mexico; only the type known.
Pseudojulis melanotis Gilbert, Proc. U. S. N. M. 1890, 67, west coast of Mexico.

Genus 640. CHLORICHTHYS Swainson.

Chlorichthys Swainson, Nat. Hist. Class. Fishes, II, 232, 1839 (*bifasciatus*, etc.).

2040. Chlorichthys lucasanus (Gill).

Gulf of California, Cape San Lucas to Mazatlan and Tres Marias.
Julis lucasanus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 142, Cape San Lucas.

2041. Chlorichthys socorroensis (Gilbert).

Revillagigedo Archipelago.
Thalassoma socorroense Gilbert, Proc. U. S. Nat. Mus. 1890, 69, Socorro Island.

2042. Chlorichthys nitidus (Günther).

West Indies, Jamaica.
Julis nitida Günther, Cat., IV, 190, 1862, Jamaica.

2043. Chlorichthys nitidissimus (Goode).

Bermudas.
Julis nitidissima Goode, Am. Jour. Sci. Arts 1877, 293, Bermudas.

2044. Chlorichthys steindachneri (Jordan).

Acapulco, west coast of Mexico.
Thalassoma steindachneri Jordan, Review Labroid Fishes, 654, 1887 (1890), Acapulco; after Steindachner.

2045. Chlorichthys bifasciatus (Bloch).

West Indies, Cuba, Jamaica, San Domingo, and Martinique.
Labrus bifasciatus Bloch, Ichthyol., 131, pl. 283, 1792, West Indies.

2046. Chlorichthys grammaticus (Gilbert).

Revillagigedo Archipelago.
Thalassoma grammaticum Gilbert, Proc. U. S. Nat. Mus. 1890, 68, Socorro Island; Clarion Island.

2047. Chlorichthys virens (Gilbert).

Revillagigedo Archipelago.
Thalassoma virens Gilbert, Proc. U. S. Nat. Mus. 1890, 68, Socorro Island.

Genus 641. DORATONOTUS Günther.

Doratonotus Günther, Cat., IV, 124, 1862 (*megalepis*).

2048. Doratonotus megalepis Günther.

West Indies, north to Key West.
Doratonotus megalepis Günther, Cat., IV, 125, 1862, St. Christopher.

Genus 642. XYRULA Jordan.

Xyrula Jordan, Review Labroid Fishes, 656, 1887 (1890) (*jessiæ*).

2049. Xyrula jessiæ (Jordan).

Snapper Banks, off Tampa, Florida.
Xyrichthys jessiæ Jordan, Proc. U. S. N. M. 1887, 698, off Tampa Bay, Florida.

Genus 643. NOVACULICHTHYS Bleeker.

Novaculichthys Bleeker, Proc. Zool. Soc. Lond. 1861, 414 (*macrolepidotus*).

2050. Novaculichthys rosipes (Jordan & Gilbert).

Key West, Florida.
Xyrichthys rosipes Jordan & Gilbert, Proc. U. S. N. M. 1884, 27, Key West.

2051. Novaculichthys ventralis (Bean).

Cozumel Island, Yucatan.
Xyrichthys ventralis Bean, Bull. U. S. F. C. 1888, 198, pl. 29, fig. 1, Cozumel.

2052. Novaculichthys infirmus (Bean).
Cozumel, Yucatan.
Xyrichthys infirmus Bean, Bull. U. S. F. C. 1888, 199, pl. 29, fig. 2, Cozumel.

2053. Novaculichthys martinicensis (Cuvier & Valenciennes).
Martinique.
Xyrichthys martinicensis Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 49, 1839, Martinique.

Genus 644. XYRICHTHYS Cuvier *Razor-fishes.*
Xyrichthys Cuvier, Mém. Mus. d'Hist. Nat., I, 324, 329, 1815 (*novacula*).

2054. Xyrichthys mundiceps Gill.
Cape San Lucas, Lower California.
Xyrichthys mundiceps Gill, Proc. Ac. Nat. Sci. Phila. 1862, 143, Cape San Lucas.

2055. Xyrichthys psittacus (Linnæus). *Razor-fish.*
West Indies, north to Pensacola and Charleston.
Coryphæna psittacus Linnæus, Syst. Nat., ed. XII, 448, 1766, Charleston, S. C.

2056. Xyrichthys modestus Poey.
Cuba.
Xyrichthys modestus Poey, Repertorio, II, 238, 1867, Havana.

Genus 645. INIISTIUS Gill.
Iniistius Gill, Proc. Ac. Nat. Sci. Phila. 1862, 143 (*pavo*).

2057. Iniistius mundicorpus Gill.
Rocky islands on Pacific Coast of Mexico.
Iniistius mundicorpus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 145, Cape San Lucas.

Family CLXIII. SCARIDÆ. The Parrot-Fishes.

Genus 646. CRYPTOTOMUS Cope.
Cryptotomus Cope, Trans. Amer. Philos. Soc. 1871, 462 (*roseus*).

2058. Cryptotomus dentiens (Poey).
Cuba.
Calliodon dentiens Poey, Memorias, II, 422, 1861, Cuba.

2059. Cryptotomus retractus (Poey).
West Indies, north to Pensacola.
Calliodon retractus Poey, Synopsis, 345, 1868, Havana.

2060. Cryptotomus ustus (Cuvier & Valenciennes).
West Indies, north to Charleston, south to Bahia.
Calliodon ustus Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 286, 1839, Brazil.

2061. Cryptotomus auropunctatus (Cuvier & Valenciennes).
San Domingo.
Callyodon auropunctatus Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 290, 1839, San Domingo.

2062. Cryptotomus beryllinus Jordan & Swain.
Florida Keys, north to New Jersey, south to Rio Janeiro.
Cryptotomus beryllinus Jordan & Swain, Proc. U. S. N. M. 1884, 101, Havana.

2063. Cryptotomus roseus Cope.
West Indies, south to Brazil.
Cryptotomus roseus Cope, Trans. Am. Phil. Soc., XIII, 1869, 462, St. Martins.

Genus 647. CALOTOMUS Gilbert.
Calotomus Gilbert, Proc. U. S. Nat. Mus. 1890, 70 (*xenodon*).

2064. Calotomus xenodon Gilbert.
Socorro Island, Rivillagigedo Archipelago.
Calotomus xenodon Gilbert, Proc. U. S. Nat. Mus. 1890, 70, Socorro Island.

Genus 648. **SPARISOMA** Swainson. *Viejas.*

Sparisoma Swainson, Nat. Hist. Class. Fishes, etc., II, 227, 1839 (*abildgaardi*).

Subgenus SPARISOMA Swainson.

2065. Sparisoma xystrodon Jordan & Swain.

West Indies, north to Key West.

Sparisoma xystrodon Jordan & Swain, Proc. U. S. Nat. Mus. 1884, 99, Key West; Havana.

2066. Sparisoma atomarium (Poey).

Cuba.

Scarus atomarius Poey, Memorias, II, 423, 1861, Havana.

2067. Sparisoma radians (Cuvier & Valenciennes).

West Indies, south to Brazil.

Scarus radians Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 206, 1839, Brazil.

2068. Sparisoma hoplomystax (Cope).

West Indies, from Key West to Bahia.

Scarus hoplomystax Cope, Trans. Amer. Philos. Soc 1869, 462, St. Martins.

2069. Sparisoma niphobles Jordan & Bollman.

Bahamas; only type known.

Sparisoma niphobles Jordan & Bollman, Proc. U. S. Nat. Mus. 1888, 551, Green Turtle Cay, Bahamas.

2070. Sparisoma aurofrenatum (Cuvier & Valenciennes).

West Indies.

Scarus aurofrenatus Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 191, 1839, San Domingo.

2071. Sparisoma oxybrachium (Poey).

Cuba.

Scarus oxybrachius Poey, Synopsis, 342, 1868, Havana.

2072. Sparisoma abildgaardi (Bloch). *Red Parrot-fish.*

West Indies, south to Brazil.

Scarus abildgaardi Bloch, Ichthyol., pl. 259, 1791, "America."

2073. Sparisoma distinctum (Poey).

Cuba.

Scarus distinctus Poey, Memorias, II, 423, 1861, Havana.

2074. Sparisoma chrysopterum (Bloch & Schneider). *Vieja.*

West Indies, south to Bahia.

Scarus chrysopterus Bloch & Schneider, Syst. Ichth., 286, pl. 57, 1801, "American seas."

2075. Sparisoma lorito Jordan & Swain.

West Indies.

Sparisoma lorito Jordan & Swain, Proc. U. S. Nat. Mus. 1884, 95, Havana.

2076. Sparisoma viride (Bonnaterre). *Green Parrot-fish.*

West Indies.

Scarus viridis Bonnaterre, Enc. Meth., X, 96, 193, 1788, Bahamas; after Catesby.

Subgenus EUSCARUS Jordan & Evermann.

Euscarus Jordan & Evermann, Fishes N. and M. Amer., 1896 (*cretenses*).

2077. Sparisoma strigatum (Günther).

Locality unknown; but as the genus *Sparisoma* is chiefly confined to American waters, this species is probably American.

Scarus strigatus Günther, Cat., IV, 212, 1862, locality unknown.

2078. Sparisoma flavescens (Bloch & Schneider). *Vieja Colorado; Vieja Muger.*

West Indies; Key West to Rio Janeiro.

Scarus flavescens Bloch & Schneider, Syst. Ichth., 290, 1801, Cuba; after Parra.

2079. Sparisoma truncatum (Poey)
Cuba.
Scarus truncatus Poey, Synopsis, 339, 1868, Havana.

2080. Sparisoma circumnotatum (Poey).
Cuba.
Scarus circumnotatus Poey, Memorias, II, 423, 1861, Havana.

2081. Sparisoma frondosum (Cuvier).
West Indies, south to Brazil.
Scarus frondosus Cuvier, in Agassiz, Spix, Pisc. Brasil., 98, 1829, Bahia.

2082. Sparisoma brachialis (Poey).
Cuba.
Scarus brachialis Poey, Memorias, II, 345, 1861, Cuba.

2083. Sparisoma maschalespilos (Bleeker).
Surinam.
Scarus maschalespilos Bleeker, Notices Ichthyologiques, I–X, 5, 1862, Surinam.

2084. Sparisoma aracanga (Günther).
Jamaica.
Scarus aracanga Günther, Cat., IV, 209, 1862, Jamaica.

Genus 649. SCARUS Forskål. *Loros; Parrot-fishes.*
Scarus Forskål, Descr. Animal, etc., in Orient. Obs., 25, 1775 (*psittacus*, etc.).

Subgenus SCARUS Forskål.

2085. Scarus punctulatus Cuvier & Valenciennes.
West Indies.
Scarus punctulatus Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 195, 1839, Martinique.

2086. Scarus bollmani Jordan & Evermann.
Gulf of Mexico, in moderately deep water.
Scarus bollmani Jordan & Evermann, Proc. U. S. Nat. Mus. 1886, 470, off Tampa Bay, Florida.

2087. Scarus tæniopterus Desmarest.
West Indies.
Scarus tæniopterus Desmarest, Dict. Classique, XV, 244, pl. 12, 1831, Cuba.

2088. Scarus aracanga (Günther).
West Indies.
Pseudoscarus aracanga Günther, Cat., IV, 227, 1862, Jamaica.

2089. Scarus trispinosus Cuvier & Valenciennes.
Brazil.
Scarus trispinosus Cuv. & Val., Hist. Nat. Poiss., XIV, 182, 1839, Brazil.

2090. Scarus cuzamilæ Bean.
Cozumel Island, Yucatan.
Scarus cuzamilæ Bean, Bull. U. S. Fish Com. 1888, 196, Cozumel.

2091. Scarus vetula (Bloch & Schneider). *Mudfish; Vieja; Old Wife.*
West Indies.
Scarus vetula Bloch & Schneider, Ichthyol., 289, 1801, Cuba.

2092. Scarus gnathodus Poey.
Cuba.
Scarus gnathodus Poey, Repertorio, II, 240, 1867, Havana.

Subgenus CALLIODON Gronow.
Calliodon Gronow, in Bloch & Schneider, Syst. Ichth., 312, 1801 (*lineatus* = *croicensis*).

2093. Scarus croicensis (Bloch). *Bullon.*
West Indies, north to Key West.
Scarus croicensis Bloch, Ichthyol., pl. 221, 1790, St. Croix.

2094. Scarus evermanni Jordan.

Gulf of Mexico, in moderately deep water.
Scarus evermanni Jordan, Proc. U. S. Nat. Mus. 1886, 469, off Tampa Bay, in moderately deep water.

2095. Scarus flavomarginatus Cuvier & Valenciennes.

Martinique.
Scarus flavomarginatus Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 202. 1839. Martinique.

2096. Scarus acutus Poey. *Loro.*

Cuba.
Scarus acutus Poey, Memorias, II, 216, 1861, Havana.

2097. Scarus cœruleus (Bloch). *Blue Parrot-fish; Loro; Clamagore.*

West Indies; Chesapeake Bay.
Coryphæna cærulea Bloch, Ausländische Fische, II, 120, pl. 176, 1786, probably Martinique; in part after Catesby.

Genus 650. PSEUDOSCARUS Bleeker. *Guacamaias.*

Pseudoscarus Bleeker, Versl. Akad. Wet. Amsterdam, Scaroiden, XII, 1861, 3 (*microrhinos*).

Subgenus PSEUDOSCARUS Bleeker.

2098. Pseudoscarus cœlestinus (Cuvier & Valenciennes). *Loro.*

West Indies.
Scarus cœlestinus Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 180, 1839, St. Thomas.

2099. Pseudoscarus simplex Poey.

Cuba.
Pseudoscarus simplex Poey, Repertorio, I, 185, 1867, Havana.

2100. Pseudoscarus pleianus (Poey).

St. Thomas; only the type known.
Scarus pleianus Poey, Memorias, II, 393, 1861, St. Thomas.

Subgenus LORO Jordan & Evermann.

Loro Jordan & Evermann, Fishes N. and M. America, 1896 (*guacamaia*).

2101. Pseudoscarus guacamaia (Cuvier). *Guacamaia; Green Parrot-fish.*

West Indies, north to Florida Keys (straying to St. Augustine), south to Rio de Janeiro.
Scarus guacamaia Cuvier, Règne Animal, éd. II, vol. 2, 265, 1829, Cuba; after Parra.

2102. Pseudoscarus perrico (Jordan & Gilbert).

Pacific Coast of Mexico, from La Paz to Mazatlan.
Scarus perrico Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 357, Mazatlan.

Group ZEOIDEI.

Family CLXIV. ZEIDÆ. The John Dories.

Genus 651. ZENOPSIS Gill.

Zenopsis Gill, Proc. Ac. Nat. Sci. Phila. 1862, 126 (*nebulosus*).

2103. Zenopsis ocellatus (Storer).

Taken off Provincetown, Massachusetts.
Zeus ocellatus Storer, Proc. Bost. Soc. Nat. Hist., VI, 1858, 386, off Provincetown, Massachusetts.

Genus 652. ZENION Jordan & Evermann.

Zenion Jordan & Evermann, Fishes North and Middle America, 1896 (*hololepis*).

2104. Zenion hololepis (Goode & Bean).

Yucatan; Little Bahama Bank.
Cyttus hololepis Goode & Bean, Oceanic Ichthyology, 225, figs. 233, 233*a*, and 233*b*, 1896, off Yucatan and Little Bahama Bank.

Genus 653. OREOSOMA Cuvier & Valenciennes.

Oreosoma Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 515, 1830 (*atlanticum*).

2105. Oreosoma atlanticum Cuvier & Valenciennes.

Open Atlantic; only two specimens known.
Oreosoma atlanticum Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 515, 1829, open Atlantic.

Family CLXV. CAPROIDÆ. The Boar-Fishes.

Genus 654. ANTIGONIA Lowe.

Antigonia Lowe, Proc. Zool. Soc. Lond. 1843, 85 (*capros*).

2106. Antigonia capros Lowe. *Shishidai.*

Atlantic and Pacific; Tokio; Ki Islands and Manado.
Antigonia capros Lowe, Proc. Zool. Soc. Lond. 1843, 85, Madeira.

Suborder SQUAMIPINNES. The Scaly-fins.

Family CLXVI. EPHIPPIDÆ. The Angel-Fishes.

Genus 655. CHÆTODIPTERUS Lacépède.

Chætodipterus Lacépède, Hist. Nat. Poiss., IV, 503, 1803 (*plumieri*=*faber*).

2107. Chætodipterus faber (Broussonet). *Angel-fish; Spade-fish.*

West Indies, Cape Cod to Rio Janeiro; south Atlantic Coast.
Chætodon faber Broussonet, Ichth. Dec. I, V, pl. 4, 1782, Jamaica.

2108. Chætodipterus zonatus (Girard).

Pacific Coast of America, from San Diego to Panama; common southward.
Ephippus zonatus Girard, Pac. R. R. Surv., X, 110, 1858, San Diego, California.

Genus 656. PARAPSETTUS Steindachner.

Parapsettus Steindachner, Ichth. Beitr., III, 50, 1875 (*panamensis*).

2109. Parapsettus panamensis Steindachner.

Panama.
Parapsettus panamensis Steindachner, Ichth. Beitr., III, 51, 1875, Panama.

Family CLXVII. CHÆTODONTIDÆ. The Butterfly-Fishes.

Genus 657. PROGNATHODES Gill.

Prognathodes Gill, Proc. Ac. Nat. Sci. Phila. 1862, 238 (*pelta*).

2110. Prognathodes aculeatus (Poey).

West Indies.
Chelmon aculeatus Poey, Memorias, II, 202, 1860, Havana.

Genus 658. CHÆTODON (Artedi) Linnæus.

Chætodon (Artedi, Genera, 51, 1738), Linnæus, Syst. Nat., ed. X, 272, 1758, includes all species.

Subgenus CHÆTODONTOPS Bleeker.

Chætodontops Bleeker, Rev. Famille Chætodontoides, 53, 1877 (*collaris*).

2111. Chætodon nigrirostris (Gill).

Cape San Lucas, Lower California.
Sarothrodus nigrirostris Gill, Proc. Ac. Nat. Sci. Phila. 1862, 243, Cape San Lucas, Lower California.

2112. Chætodon ocellatus Bloch. *Parche; Isabelita de lo Alto.*

Havana; Gulf Stream; New Jersey and Rhode Island.
Chætodon ocellatus Bloch, Ichthyologia, pl. 211, fig. 2, 1787.

2113. Chætodon humeralis Günther.

Pacific Coast of America, from Guaymas to Panama.
Chætodon humeralis Günther, Cat., II, 19, 1860, "Sandwich Islands" by error.

2114. Chætodon sedentarius Poey.

West Indian fauna.

Chætodon sedentarius Poey, Memorias, II, 203, 1860, Cuba.

2115. Chætodon aya Jordan.

Gulf of Mexico.

Chætodon aya Jordan, Proc. U. S. Nat. Mus. 1886, 225, Snapper Banks, near Pensacola, Florida.

Subgenus TETRAGONOPTRUS (Klein) Bleeker.

Tetragonoptrus Klein, Historia Piscium, 37, 1744 (many species, *striatus*, etc.).

2116. Chætodon striatus Linnæus. *Portuguese Butterfly.*

West Indies.

Chætodon striatus Linnæus, Syst. Nat., ed. X, 275, 1758, "India."

2117. Chætodon atæniatus (Poey).

Havana, Cuba.

Sarothrodus atæniatus Poey, Synopsis, 353, 1868, Havana.

Subgenus CHÆTODON (Artedi) Linnæus.

2118. Chætodon capistratus Linnæus. *Parche.*

West Indies; Havana.

Chætodon capistratus Linnæus, Syst. Nat., ed. X, 275, 1758, India.

Genus 659. POMACANTHUS Lacépède. *Chirivitas.*

Pomacanthus Lacépède, Hist. Nat. Poiss., IV, 517, 1803 (*arcuatus*, as restricted by Cuvier).

Subgenus POMACANTHUS Lacépède.

2119. Pomacanthus arcuatus (Linnæus). *Black Angel*; *Chirivita.*

West Indies; north to New Jersey; south to Bahia.

Chætodon arcuatus Linnæus, Syst. Nat., ed. X, 273, 1758, India.

2120. Pomacanthus paru (Bloch). *Paru; Indian-fish; Flatfish.*

West Indies; south to Bahia.

Chætodon paru Bloch, Ichth., pl. 197, fig. 1, 1787, Brazil; on a drawing.

Subgenus POMACANTHODES Gill.

Pomacanthodes Gill, Proc. Ac. Nat. Sci. Phila. 1862, 244 (*zonipectus*).

2121. Pomacanthus zonipectus (Gill). *Mojarra de las Piedras.*

West coast of tropical America, from Mazatlan to Panama.

Pomacanthodes zonipectus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 244, San Salvador.

Genus 660. HOLACANTHUS Lacépède. *Catalinetas.*

Holacanthus Lacépède, Hist. Nat. Poiss., IV, 525, 1803 (*tricolor*).

2122. Holacanthus passer Valenciennes.

West coast of tropical America; Cape San Lucas to Galapagos Islands.

Holacanthus passer Valenciennes, Voyage Vénus, 327, pl. 6, 1846, Galapagos Archipelago.

2123. Holacanthus clarionensis Gilbert.

Clarion, Socorro, and San Benedicto islands of the Revillagigedo group.

Holacanthus clarionensis Gilbert, Proc. U. S. Nat. Mus. 1890, 72, Revillagigedo Islands; Clarion, Socorro, and San Benedicto.

2124. Holacanthus tricolor (Bloch). *Catalineta; Vaqueta de dos Colores; Rock Beauty.*

West Indies; north to Bermuda; south to Bahia.

Chætodon tricolor Bloch, Ichth., pl. 426, 1795.

Genus 661. ANGELICHTHYS Jordan & Evermann.

Angelichthys Jordan & Evermann, new genus (*ciliaris*).

2125. Angelichthys isabelita (Jordan & Rutter). *Angel-fish.*

West Indies; north to Key West, Florida.

Holacanthus isabelita Jordan & Rutter MS., Key West.

2126. Angelichthys iodocus (Jordan & Rutter).
Galapagos Islands.
Holacanthus iodocus Jordan & Rutter, Proc. U. S. Nat. Mus. 1896, Galapagos Islands.

2127. Angelichthys ciliaris (Linnæus). *Angel-fish; Isabelita; Yellow Angel.*
West Indies north to Key West.
Chætodon ciliaris Linnæus, Syst. Nat., ed. x, 276, 1758, Indies; in part.

Family CLXVIII. ZANCLIDÆ. The Moorish Idols.

Genus 662. ZANCLUS Cuvier & Valenciennes.
Zanclus Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 102, 1831 (*cornutus*).

2128. Zanclus cornutus (Linnæus). *Moorish Idol; Piquier; Porte-Enseigne; Besan.*
East Indies and islands of Polynesia, ranging east to the Revillagigedos.
Chætodon cornutus Linnæus, Syst. Nat., ed. x, 273, 1758, "Indies"; after Artedi.

Family CLXIX. TEUTHIIDIDÆ. The Surgeons.

Genus 663. TEUTHIS Linnæus. *Doctor-fishes.*
Teuthis Linnæus, Syst. Nat., ed. XII, 507, 1766 (*hepatus, javus;* after *Hepatus* Gronow, same species).

2129. Teuthis triostegus (Linnæus).
Pacific Ocean, from New Zealand and Australia to the Hawaiian Islands and the Revillagigedos.
Chætodon triostegus Linnæus, Syst. Nat., ed. x, 274, 1758, India.

2130. Teuthis cœruleus (Bloch & Schneider). *Barbero; Blue Surgeon; Blue Tang.*
West Indies, Key West and Bermuda to Bahia.
Acanthurus cœruleus Bloch & Schneider, Syst. Ichth., 214, 1801, Carolina; Havana; Jamaica; after Catesby, Parra, and Browne.

2131. Teuthis hepatus Linnæus. *Common Surgeon; Doctor-fish; Lancet-fish; Barber; Tang-Barbero.*
West Indian fauna; Florida to Bahia; Key West and Cuba; Charleston, South Carolina.
Teuthis hepatus Linnæus, Syst. Nat., ed. XII, 507, 1766, Carolina.

2132. Teuthis crestonis Jordan & Starks. *Barbero Negro.*
West coast of Mexico and Central America, Mazatlan to Panama.
Teuthis crestonis Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 485, pl. 47, Mazatlan.

2133. Teuthis bahianus (Castelnau). *Barbeiro.*
West Indies and both coasts of tropical America, from Key West and Mazatlan to Bahia and Panama.
Acanthurus bahianus Castelnau, Anim. Nouv. ou Rares de l'Amér. du Sud, 24, pl. 2, fig. 1, 1855, Bahia.

Genus 664. XESURUS Jordan & Evermann.
Xesurus Jordan & Evermann, new genus (*punctatus*).

2134. Xesurus punctatus (Gill). *Cochinito.*
Cape San Lucas; Mazatlan; Creston Island.
Prionurus punctatus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 242, Cape San Lucas.

2135. Xesurus clarionis Gilbert & Starks.
Galapagos Islands.
Xesurus clarionis Gilbert & Starks, Proc. U. S. Nat. Mus. 1896, Clarion Island, Galapagos Archipelago.

2136. Xesurus laticlavius (Valenciennes).
Galapagos Islands; only the type known.
Prionurus laticlavius Valenciennes, Voyage Vénus, 335, pl. 7, fig. 2, 1846, Galapagos Islands.

Suborder SCLERODERMI.

Family CLXX. TRIACANTHIDÆ.

Genus 665. HOLLARDIA Poey.

Hollardia Poey, Memorias, II, 348, 1861 (*hollardi*).

2137. Hollardia hollardi Poey.

Hollardia hollardi Poey, Memorias, II, 348, pl. 18, fig. 11, 1861, Cuba.

Family CLXXI. BALISTIDÆ. The Trigger-Fishes.

Genus 666. BALISTES (Artedi) Linnæus.

Balistes (Artedi) Linnæus, Syst. Nat., ed. X, 327, 1758 (*vetula*).

Subgenus CAPRISCUS Rafinesque.

Capriscus Rafinesque, Indice, 41, 1810 (*capriscus*).

2138. Balistes polylepis Steindachner.

Lower California to Panama.

Balistes polylepis Steindachner, Ichth. Beitr., V, 21, 1876, Magdalena Bay; Mazatlan; Acapulco.

2139. Balistes naufragium Jordan & Starks. *Pez Puerco de las Piedras.*

Mazatlan.

Balistes naufragium Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 488, Mazatlan.

2140. Balistes carolinensis Gmelin. *Leather Jacket; "Turbot"; Cucuyo.*

Tropical parts of the Atlantic; Gulf Stream; Mediterranean.

Balistes carolinensis Gmelin, Syst. Nat., I, 1468, 1788, Carolina.

2141. Balistes forcipatus Gmelin.

West coast of Africa and the neighboring islands.

Balistes forcipatus Gmelin, Syst. Nat., I, 1472, 1788, Brazil; after *Guaperva lata* of Lister.

2142. Balistes powellii Cope.

Newport, Rhode Island; West Indies; in the Gulf Stream.

Balistes powellii Cope, Proc. Ac. Nat. Sci. Phila. 1870, 120, Newport, R. I.

Subgenus BALISTES (Artedi) Linnæus.

2143. Balistes vetula Linnæus. *Bessy Cerka.*

Tropical parts of the Atlantic; West Indies; Gulf Stream to Woods Hole.

Balistes vetula Linnæus, Syst. Nat., ed. X, 329, 1758, Ascension Island; after *Balistes vetula* of Osbeck, Iter Chinensis, 294, 1757.

Genus 667. PACHYNATHUS Swainson.

Pachynathus Swainson, Classn. Fishes, II, 326, 1839 (*triangularis = capistratus*); not *Pachygnatha* nor *Pachygnathus;* both these names earlier used for genera of spiders.

2144. Pachynathus capistratus (Shaw). *Pez Puerco.*

Pacific Ocean; East Indies; China; Pacific Coast of tropical America, from Magdalena Bay to the Galapagos.

Balistes capistratus Shaw, Genl. Zool., V, 417, 1804, after Lacépède.

Genus 668. CANTHIDERMIS Swainson. *Sobacos.*

Canthidermis Swainson, Nat. Hist. Classn. Anim., II, 325, 1839 (*angulosus = maculatus*).

2145. Canthidermis sobaco (Poey). *Sobaco.*

West Indies.

Balistes sobaco Poey, Memorias, II, 324, 1861, Havana.

2146. Canthidermis asperrimus (Cope).

St. Martins, West Indies.

Balistes asperrimus Cope, Trans. Amer. Philos. Soc. 1871, 478, supposed to be from St. Martins.

2147. Canthidermis sufflamen (Mitchill). *Sobaco.*
West Indies; Havana.
Balistes sufflamen Mitchill, Trans. Lit. Phil. Soc. N. Y., I, 1815, locality unknown, said by DeKay to be from the South Atlantic.

2148. Canthidermis maculatus (Bloch).
West Indies.
Balistes maculatus Bloch, Ichthyologia, pl. 151, 1786, West Indies.

2149. Canthidermis willughbeii (Lay & Bennett).
East Indies and Pacific Coast of Mexico.
Balistes willughbeii Lay & Bennett, Zoology, Beechey's Voyage, 68, pl. 21, fig. 2, 1839, Acapulco, Mexico.

Genus 669. XANTHICHTHYS Kaup.
Xanthichthys Kaup, in Richardson, Enc. Brit., ed. XII, 313, 1856 (*curassavicus*).

2150. Xanthichthys ringens (Linnæus). *Cocuyo.*
West Indies and southward, recorded from Mauritius.
Balistes ringens Linnæus, Syst. Nat., ed. X, 329, 1758, no locality.

2151. Xanthichthys mento (Jordan & Gilbert).
West coast of Mexico.
Balistes mento Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 228, Clarion Island, of the Revillagigedo group.

Genus 670. MELICHTHYS Swainson.
Melichthys Swainson, Class. An., II, 325, 1839 (*ringens* Bloch, not of Linnæus).

2152. Melichthys piceus (Poey). *Galafate; Calafate.*
West Indies and southward.
Balistes piceus Poey, Proc. Ac. Nat. Sci. Phila. 1863, 180, Cuba.

2153. Melichthys bispinosus Gilbert.
Clarion and Socorro islands.
Melichthys bispinosus Gilbert, Proc. U. S. Nat. Mus. 1890, 125, Clarion and Socorro islands, of the Revillagigedo group.

Family CLXXII. MONACANTHIDÆ. The File-Fishes.

Genus 671. CANTHERINES Swainson.
Cantherines Swainson, Classn. Fishes, II, 327, 1839 (*nasutus = sandwichensis*).

2154. Cantherines pullus (Ranzani). *Lija Colorada.*
West Indies and coast of Brazil; southern Florida.
Monacanthus pullus Ranzani, Nov. Comm. Act. Sci. Inst. Bonon., V, 4, pl. 1, 1842, Brazil.

Genus 672. MONACANTHUS Cuvier.
Monacanthus Cuvier, Règne Animal, ed. I, 152, 1817 (*chinensis*).

2155. Monacanthus ciliatus (Mitchill). *Leather-fish; Lija; Flap-mingo.*
West Indies and Florida; Florida Keys.
Balistes ciliatus Mitchill, Amer. Monthly Mag. & Crit. Rev., March, 1818, 326, Bahama Straits.

2156. Monacanthus hispidus (Linnæus). *Fool-fish; File-fish; Leather-fish; Lija; Mingo.*
Cape Cod to Cuba; South Atlantic Coast and Florida Keys; West Indies to Brazil.
Balistes hispidus Linnæus, Syst. Nat., ed. XII, 405, 1766, Carolina.

2157. Monacanthus spilonotus Cope.
Gulf of Mexico.
Monacanthus spilonotus Cope, Trans. Amer. Philos. Soc. Phila., XIV, 1870, 476.

2158. Monacanthus oppositus Poey.
Cuba.
Monacanthus oppositus Poey, Memorias, II, 331, 1861, Havana.

Genus 673. PSEUDOMONACANTHUS Bleeker.
Pseudomonacanthus Bleeker, Nederl. Tyd. Dierkunde, III, 1866, 11 (*macrurus*).

2159. Pseudomonacanthus amphioxys (Cope).
St. Martins Island, West Indies.
Monacanthus amphioxys Cope, Trans. Amer. Philos. Soc. 1871, 477, St. Martins.

Genus 674. ALUTERA Cuvier.
Les alutères Cuvier, Règne Animal, ed. 1, II, 153, 1817 (*monoceros*).

Subgenus CERATACANTHUS Gill.
Ceratacanthus Gill, Cat. Fishes East Coast U. S., 57, 1861 (*aurantiacus*).

2160. Alutera schoepfii (Walbaum). *File-fish; Lija; Fool-fish.*
Cape Cod to the Carolinas and Florida.
Balistes schoepfii Walbaum, Artedi Piscium, 461, 1792, Long Island; after Schöpf, Berlin. Ges. Naturf., VIII, 186, 1788.

2161. Alutera punctata Agassiz. *Long Mingo.*
Jamaica to Bahia.
Alutera punctata Agassiz, Pisc. Brasil., 437, pl. 72, 1829, Brazil.

Subgenus OSBECKIA Jordan & Evermann.
Osbeckia Jordan & Evermann, new subgenus (*scripta*).

2162. Alutera scripta (Osbeck). *Unicorn-fish; Lija Trompa.*
Tropical seas; West Indies; North Carolina; off west coast of Mexico; Clarion Island, Revillagigedo Islands.
Balistes scriptus Osbeck, Iter Chinensis, I, 144, 1757, China.

Subgenus ALUTERA Cuvier.

2163. Alutera monoceros (Osbeck). *Lija Barbuda.*
West Indies; East Indies; Japan.
Balistes monoceros Osbeck, Iter Chinensis, 110, 1757, Asia.

Suborder OSTRACODERMI. The Trunk-Fishes.

Family CLXXIII. OSTRACIIDÆ.

Genus 675. LACTOPHRYS Swainson. *Three-angled Trunk-fishes.*
Lactophrys Swainson, Nat. Hist. Classn. Fishes, II, 194, 324, 1839 (*trigonus*, etc.).

Subgenus RHINESOMUS Swainson.
Rhinesomus Swainson, Nat. Hist. Classn. Fishes, II, 194, 324, 1839 (*triqueter*).

2164. Lactophrys triqueter (Linnæus). *Trunk-fish; Rock Shellfish; Drunken-fish; Chapin; Plate-fish.*
West Indies, north to the Bermudas; Key West and Pensacola.
Ostracion triqueter Linnæus, Syst. Nat., ed. X, 330, 1758, India.

Subgenus CHAPINUS Jordan & Evermann.
Chapinus Jordan & Evermann, new subgenus (*bicaudalis*).

2165. Lactophrys bicaudalis (Linnæus). *Chapin; Spotted Trunk-fish.*
West Indies, from Cuba to Ascension Island.
Ostracion bicaudalis Linnæus, Syst. Nat., ed. X, 330, 1758, India; after Artedi.

Subgenus LACTOPHRYS Swainson.

2166. Lactophrys trigonus (Linnæus). *Common Trunk-fish; Chapin; Shell-fish.*
West Indies, north to Bermuda and Key West; occasionally northward in Gulf Stream to Holmes Hole, Massachusetts, and Chesapeake Bay.
Ostracion trigonus Linnæus, Syst. Nat., ed. X, 330, 1758, India.

Subgenus ACANTHOSTRACION Bleeker.

Acanthostracion Bleeker, Atlas Ichth., v, 27, 1865 (*quadricornis*).

2167. Lactophrys tricornis (Linnæus). *Cuckold; Toro; Cowfish.*

Tropical parts of Atlantic, from Carolina to Brazil, ranging north in the Gulf Stream to Charleston and Chesapeake Bay; Gulf of Mexico, at Pensacola and Galveston, eastward to Guinea and Cape of Good Hope.

Ostracion tricornis Linnæus, Syst. Nat., ed. x, 331, 1758, "In India"; after Artedi.

Suborder GYMNODONTES.

Family CLXXIV. TETRAODONTIDÆ. The Puffers.

Genus 676. LAGOCEPHALUS Swainson.

Lagocephalus Swainson, Nat. Hist. and Classn. Fishes, II, 194, 328, 1839 (*pennanti*=*lagocephalus*).

2168. Lagocephalus lævigatus (Linnæus). *Smooth Puffer.*

Cape Cod to Brazil; rare north of Cape Hatteras.

Tetrodon lævigatus Linnæus, Syst. Nat., ed. XII, 411, 1766, Charleston, South Carolina.

2169. Lagocephalus pachycephalus (Ranzani). *Jugfish.*

Jamaica to Brazil.

Tetrodon pachycephalus Ranzani, Nov. Comm. Ac. Sci. Inst. Bonon., IV, 1840, 73, pl. 2, fig. 2, Brazil.

Genus 677. SPHEROIDES Lacépède. *Swellfishes.*

Les spheroides Lacépède, Hist. Nat. Poiss., II, 1, 1798 (French name only, *tubercule*).

Subgenus SPHEROIDES Lacépède.

2170. Spheroides angusticeps (Jenyns).

Pacific Coast, La Paz to the Galapagos Islands.

Tetrodon angusticeps Jenyns, Voyage Beagle, Fishes, 154, 28, 1842, Galapagos Islands.

2171. Spheroides lobatus (Steindachner). *Botete.*

Gulf of California to the Galapagos Islands; Mazatlan; Panama.

Canthogaster? lobatus Steindachner, Ichth. Notizen, X, 1875, 18, pl. 5, fig. 3, Altata.

2172. Spheroides spengleri (Bloch). *Southern Puffer; Swell Toad; Tambor.*

West Indies; coast of Texas and Florida, south to Rio Janeiro and to the Madeiras and Canaries.

Tetrodon spengleri Bloch, Ichth., I, 135, pl. 144, 1782, East Indies.

2173. Spheroides marmoratus (Ranzani). *Spiny-back Blowfish.*

West Indies to Brazil; Jamaica.

Tetrodon marmoratus Ranzani, Nov. Comm. Ac. Sci. Inst. Bonon., IV, 1840, 72, pl. 10, fig. 1, Brazil.

2174. Spheroides maculatus (Bloch & Schneider). *Puffer; Swell Toad; Blower.*

Atlantic Coast of the United States, from Cape Ann to St. Johns River and Biscayne Bay, Florida.

Tetrodon hispidus var. *maculatus* Bloch & Schneider, Syst. Ichth., 504, 1801, Rhode Island; after Schöpf.

Subgenus CHEILICHTHYS Müller.

Cheilichthys Müller, Abhandl. Akad. Wiss. Berl., 252, 1839 (1841) (*testudineus*).

2175. Spheroides testudineus (Linnæus). *Tambor; Globefish; Blowfish.*

West Indies; Gulf Stream as far as Newport, Rhode Island.

Tetraodon testudineus Linnæus, Syst. Nat., ed. X, 332, 1758, in India; based on Balk and Artedi.

2176. Spheroides annulatus (Jenyns).

Pacific Coast of tropical America.

Tetrodon annulatus Jenyns, Zool. Beagle, 153, 1842, Galapagos Islands.

2176a. Spheroides annulatus politus (Girard).
Pacific Coast of tropical America, San Diego to Mazatlan.
Tetrodon politus Girard, Pac. R. R. Surv., x, 340, 1858, San Diego, California.

2177. Spheroides formosus (Günther).
Panama.
Tetrodon formosus Günther, Cat., VIII, 283, 1870, South America.

2178. Spheroides furthii (Steindachner).
Panama.
Tetrodon furthii Steindachner, Ichth. Beitr., V, 22, 1874, Panama.

2179. Spheroides trichocephalus (Cope).
Gulf Stream, off Newport.
Tetrodon trichocephalus Cope, Proc. Ac. Nat. Sci. Phila. 1870, 120, Gulf Stream, off Newport, Rhode Island.

2180. Spheroides pachygaster (Müller & Troschel).
Barbados.
Tetrodon (Cheilichthys) pachygaster Müller & Troschel, in Schomburgk's Hist. Barbados, 677, 1840, Barbados.

Genus 678. OVOIDES Lacépède.
Les ovoides Lacépède, Hist. Nat. Poiss., I, 256, 1797 (*fasce;* French name only; based on front view of *Tetraodon stellatus*).

2181. Ovoides erethizon (Jordan & Gilbert).
Panama and neighboring islands.
Arothron erethizon Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 631, Panama.

2182. Ovoides setosus (Rosa Smith).
West coast of Mexico; Revillagigedo Islands; Gulf of California.
Tetraodon setosus Rosa Smith, Bull. Cal. Ac. Sci., II, November 13, 1886, 6, "Mexico."

Genus 679. COLOMESUS Gill.
Colomesus Gill, Proc. U. S. Nat. Mus. 1884, 422 (*psittacus*).

2183. Colomesus psittacus (Bloch & Schneider).
River mouths, Guiana and northern Brazil; Rio Branco, Essequibo, Marañon, and Capin at Para; "West Indies."
Tetrodon psittacus Bloch & Schneider, Syst. Ichth., 505, 1801, "Malabar."

Family CLXXV. CANTHIGASTERIDÆ. The Sharp-nosed Puffers.

Genus 680. CANTHIGASTER Swainson.
Canthigaster Swainson, Nat. Hist. Fishes, II, 194, 1839 (diagnosis only; no species mentioned; *rostratus* intended).

2184. Canthigaster punctatissimus (Günther).
Pacific Coast of America, Gulf of California to Panama.
Tetrodon punctatissimus Günther, Cat., VIII, 302, 1870, Panama.

2185. Canthigaster rostratus (Bloch).
West Indian fauna; Pensacola; Madeiras and Bermudas.
Tetrodon rostratus Bloch, Ichth., I, pl. 146, 1782, India.

Family CLXXVI. DIODONTIDÆ. The Porcupine-Fishes.

Genus 681. TRICHODIODON Bleeker.
Trichodiodon Bleeker, Atlas Ichth., Gymnodontes, 49, 1867 (*pilosus*).

2186. Trichodiodon pilosus (Mitchill).
New York.
Diodon pilosus Mitchill, Trans. Lit. Philos. Soc. N. Y., I, 1815, 471, supposed to be from New York Harbor.

Genus 682. DIODON Linnæus. *Porcupine-fishes.*
Diodon Linnæus, Syst. Nat., ed. x, 335, 1758 (*hystrix*).

2187. Diodon hystrix Linnæus. *Porcupine-fish; Erizo; Puerco Espino; Soursap.*
Tropical seas, north to Lower California, Hawaiian Islands and to Florida.
Diodon hystrix Linnæus, Syst. Nat., ed. x, 335, 1758, India; after Artedi.

2188. Diodon holacanthus Linnæus.
All warm seas; north to Florida Keys; Lower California and Hawaiian Islands.
Diodon holacanthus Linnæus, Syst. Nat., ed. x, 335, 1758, India; based on Artedi.

2189. Diodon maculifer Kaup.
Cape of Good Hope; Cuba ?.
Diodon maculifer Kaup, Wiegmann's Arch., 229, 1855, Cape of Good Hope.

Genus 683. CHILOMYCTERUS Bibron. *Burrfishes.*
Chilomycterus Bibron, in Barnville, Revue Zoologique, 40, 1846 (*reticulatus* = *tigrinus*).

Subgenus CYCLICHTHYS Kaup.
Cyclichthys Kaup, Wiegm. Archiv, 231, 1855 (*orbicularis*).

2190. Chilomycterus schœpfi (Walbaum). *Common Burrfish; Rabbit-fish; Swell Toad.*
Cape Cod to the West Indies.
Diodon schœpfi Walbaum, Artedi Pisc., 601, 1792, Long Island; after Schöpf.

2191. Chilomycterus spinosus (Linnæus).
West Indies and coast of Brazil.
Diodon spinosus Linnæus, Syst. Nat., ed. x, 335, 1758, India.

2192. Chilomycterus antennatus (Cuvier).
West Indies and southward; St. Croix; Jamaica; Porto Rico; Cape of Good Hope.
Diodon antennatus Cuvier, Mém. Mus., IV, 131, pl. 7, 1818.

Subgenus CHILOMYCTERUS Bibron.

2193. Chilomycterus atinga (Linnæus). *Atinga.*
West Indies to Bermuda and Florida Keys.
Diodon atinga (misprinted *atringa*) Linnæus, Syst. Nat., ed. x, 334, 1758, India.

2194. Chilomycterus californiensis Eigenmann.
San Pedro, California.
Chilomycterus californiensis Eigenmann, Am. Nat., 1891, 1133, San Pedro, California.

Family CLXXVII. MOLIDÆ. The Headfishes.

Genus 684. MOLA Cuvier. *Headfishes.*
Mola Cuvier, Tableau Élém. Hist. Nat. Animaux, 323, 1798 (*rotunda* = *mola*).

2195. Mola mola (Linnæus). *Sunfish; Headfish; Mola; Pez Luna.*
Temperate and tropical seas, northward to England, Cape Cod, and San Francisco; rare in the West Indies.
Tetrodon mola Linnæus, Syst. Nat., ed. x, 334, 412, 1758, Mediterranean.

Genus 685. RANZANIA Nardo. *King of the Mackerels.*
Ranzania Nardo, Ann. Sci. Regn. Lombard. Venet., x, 1840, 105 (*truncatus*).

2196. Ranzania truncata (Retzius).
Pelagic; occasionally on Atlantic Coast; Bermudas.
Tetrodon truncatus Retzius, Vet. Ak. Nya. Handl., VI, 2, 116, 1785.

Suborder LORICATI.

Family CLXXVIII. SCORPÆNIDÆ. The Rockfishes.

Genus 686. SEBASTES Cuvier. *Rosefishes.*

Sebastes Cuvier, Règne Animal, ed. 2, II, 166, 1829 (*norvegicus* = *marinus*).

2197. Sebastes marinus (Linnæus). *Rosefish; Redfish; Snapper; Hemdurgan.*

North Atlantic, both coasts, south to Faroe Islands, Maine, and in deep water off coast of middle New Jersey.

Perca marina Linnæus, Syst. Nat., ed. X, I, 290, 1758, Norway.

Genus 687. SEBASTOLOBUS Gill.

Sebastolobus Gill, Rept. Smithson. Inst. 1880 (1881), 375 (*macrochir*).

2198. Sebastolobus alascanus Bean.

Bering Sea; Pacific Coast of Alaska, Washington, Oregon, and California.

Sebastolobus alascanus Bean, Proc. U. S. Nat. Mus. 1890, 44, off Trinity Islands, Alaska, at Albatross Station 2853, 56° N., 154° W., in 159 fathoms.

2199. Sebastolobus altivelis Gilbert.

Aleutian Islands, Alaska, and in deep water off the coast of California.

Sebastolobus altivelis Gilbert, Rept. U. S. F. C. 1893 (1896), 410, pl. 23, south of Alaska Peninsula, at Albatross Station 3338, in 625 fathoms.

Genus 688. SEBASTODES Gill. *Rockfishes.*

Sebastodes Gill, Proc. Ac. Nat. Sci. Phila. 1861, 165 (*paucispinis*).

Subgenus SEBASTODES Gill.

2200. Sebastodes jordani Gilbert.

Coast of California in deep water.

Sebastodes jordani Gilbert, Rept. U. S. F. C. 1893 (1896), 466, coast of California, at Albatross Stations 2935, 3103, and 3114, in 64 to 124 fathoms.

2201. Sebastodes goodei Eigenmann & Eigenmann.

San Diego to San Francisco.

Sebastodes goodei Eigenmann & Eigenmann, Proc. Cal. Ac. Sci. 1890, 12, San Diego, California.

2202. Sebastodes paucispinis (Ayres). *Boccaccio; Meron; Jack.*

San Diego to San Francisco.

Sebastes paucispinis Ayres, Proc. Cal. Ac. Nat. Sci., I, 1854, 6, San Francisco.

Subgenus SEBASTOSOMUS Gill.

Sebastosomus Gill, Proc. Ac. Nat. Sci. Phila. 1864, 147 (*melanops*).

2203. Sebastodes flavidus (Ayres). *Yellow-tail Rockfish.*

San Diego to San Francisco.

Sebastodes flavidus Ayres, Proc. Cal. Ac. Sci. 1862, 209, fig. 64, San Francisco.

2204. Sebastodes serranoides Eigenmann & Eigenmann.

Cortez Banks, off San Diego.

Sebastodes serranoides Eigenmann & Eigenmann, Proc. Cal. Ac. Sci. 1890, 36, Cortez Banks.

2205. Sebastodes melanops (Girard).

Pacific Coast of America, from Monterey to Sitka.

Sebastes melanops Girard, Proc. Ac. Nat. Sci. Phila., VIII, 1856, 135, Astoria, Oregon.

Subgenus PRIMOSPINA Eigenmann & Beeson.

Primospina Eigenmann & Beeson, Am. Nat. 1893, 669 (*mystinus*).

2206. Sebastodes ciliatus (Tilesius).

Coast of Alaska.

Epinephelus ciliatus Tilesius, Mém. Ac. Sci. St. Petersb., IV, 1810, 474, Aleutian Islands.

2207. Sebastodes mystinus Jordan & Gilbert. *Black Rockfish; Pêche Prêtre; Priest-fish.*
Pacific Coast of America, from Puget Sound to San Diego.
Sebastichthys mystinus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880 (1881), 455, San Francisco.

Subgenus ACUTOMENTUM Eigenmann & Beeson.
Acutomentum Eigenmann & Beeson, Am. Nat. 1893, 669 (*ovalis*).

2208. Sebastodes entomelas (Jordan & Gilbert).
Pacific Coast of America, from Port Harford to Monterey Bay.
Sebastichthys entomelas Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 142, Monterey.

2209. Sebastodes rufus Eigenmann & Eigenmann.
Pacific Coast of America, near San Diego; Cortez Banks.
Sebastodes rufus Eigenmann & Eigenmann, Proc. Cal. Ac. Sci. 1890, 13, Point Loma; Cortez Banks.

2210. Sebastodes macdonaldi (Eigenmann & Beeson).
San Diego, California.
Acutomentum macdonaldi Eigenmann & Beeson, Am. Nat. 1893, 669, San Diego, California.

2211. Sebastodes brevispinis (Bean).
Coast of Alaska.
Sebastichthys proriger var. *brevispinis* Bean, Proc. U. S. Nat. Mus. 1883, 359, Hassler Harbor, Alaska.

2212. Sebastodes ovalis (Ayres). *Viuva; Widow-fish.*
Pacific Coast of United States from San Diego to San Francisco.
Sebastodes ovalis Ayres, Proc. Cal. Ac. Sci. 1862, 209–212, fig. 65, San Francisco.

2213. Sebastodes eigenmanni Cramer.
Coast of California.
Sebastodes eigenmanni Cramer, Proc. Cal. Ac. Sci. 1896, 239, Monterey, California.

2214. Sebastodes hopkinsi Cramer.
Monterey Bay, California.
Sebastodes hopkinsi Cramer, Proc. Cal. Ac. Sci. 1895, with plate, Monterey Bay, California.

2215. Sebastodes alutus (Gilbert).
Pacific Coast of America, from Bering Sea to Santa Barbara.
Sebastichthys alutus Gilbert, Proc. U. S. Nat. Mus. 1890, 76, Santa Barbara Islands, California.

2216. Sebastodes proriger (Jordan & Gilbert).
San Diego to San Francisco.
Sebastichthys proriger Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 327, Monterey, California.

ROSICOLA Jordan & Evermann.
Rosicola Jordan & Evermann, new subgenus (*pinniger*).

2217. Sebastodes pinniger (Gill). *Orange Rockfish.*
Pacific Coast of America, from San Diego to Puget Sound.
Sebastosomus pinniger Gill, Proc. Ac. Nat. Sci. Phila. 1864, 147, San Francisco.

2218. Sebastodes miniatus (Jordan & Gilbert). *Rasciera; Rasher.*
Pacific Coast of America, from San Francisco to San Diego.
Sebastichthys miniatus Jordan & Gilbert, Proc. U. S. N. M. 1880, 70, Monterey, California.

2219. Sebastodes atrorubens Gilbert.
Monterey, California.
Sebastodes atrorubens Gilbert, Proc. Cal. Ac. Sci. 1896, Monterey, California.

2220. Sebastodes atrovirens (Jordan & Gilbert).

Coast of California, from San Diego to San Francisco.
Sebastichthys atrovirens Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 289, Monterey, California.

Subgenus **EOSEBASTES** Jordan & Evermann.

Eosebastes Jordan & Evermann, new subgenus (*aurora*).

2221. Sebastodes saxicola (Gilbert).

Southern California, Santa Barbara Islands.
Sebastichthys saxicola Gilbert, Proc. U. S. Nat. Mus. 1890, 78, Santa Barbara Islands at Albatross Stations 2893, 2907, and others, in 44 to 155 fathoms.

2222. Sebastodes crameri Jordan.

Coast of Oregon.
Sebastodes crameri Jordan, Proc. U. S. Nat. Mus. 1896, coast of Oregon, at Albatross Station 3091.

2223. Sebastodes semicinctus Gilbert.

Coast of California.
Sebastodes semicinctus Gilbert, Proc. U. S. Nat. Mus. 1896, Santa Barbara Channel, California.

2224. Sebastodes diploproa (Gilbert).

Coast of southern California at Coronado Islands.
Sebastichthys diploproa Gilbert, Proc. U. S. Nat. Mus. 1890, 79, Coronado Islands at Albatross Station 2935, in 124 fathoms.

2225. Sebastodes aurora (Gilbert).

Coast of California about the Santa Barbara Islands.
Sebastichthys aurora Gilbert, Proc. U. S. Nat. Mus. 1890, 80, Santa Barbara Islands at Albatross Stations 2948 and 2960, in 266 and 267 fathoms.

2226. Sebastodes melanostomus Eigenmann & Eigenmann.

Coast of California to Alaska.
Sebastodes melanostomus Eigenmann & Eigenmann, Proc. Cal. Ac. Sci. (2), III, 1890, 17, Point Loma, near San Diego, California.

Subgenus **SEBASTOMUS** Gill.

Sebastomus Gill, Proc. Ac. Nat. Sci. Phila. 1864, 147 (*rosaceus*).

2227. Sebastodes ruberrimus Cramer. *Red Rockfish; Tambor.*

Pacific Coast of America, from San Diego to Puget Sound.
Sebastodes ruberrimus Cramer, Proc. Cal. Ac. Sci. 1895, 597, pls. 62, 63, and 69, Monterey, California.

2228. Sebastodes constellatus (Jordan & Gilbert). *Spotted Rockfish.*

Coast of California, from San Diego to San Francisco.
Sebastichthys constellatus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 295, Santa Barbara Channel; San Francisco.

2229. Sebastodes umbrosus (Jordan & Gilbert).

Coast of California, Point Conception to Coronado Islands.
Sebastichthys umbrosus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 410, Santa Barbara.

2230. Sebastodes rosaceus (Girard). *Corsair.*

Pacific Coast of United States, from San Diego to San Francisco.
Sebastes rosaceus Girard, Proc. Ac. Nat. Sci. Phila., VIII, 1854, 146, San Diego, San Francisco.

2231. Sebastodes ayresii Gilbert & Cramer.

Coast of southern California at Cortez Banks, near San Diego.
Sebastodes ayresii Gilbert & Cramer, Proc. U. S. Nat. Mus. 1896, Cortez Banks, near San Diego, California.

2232. Sebastodes rhodochloris (Jordan & Gilbert). *Flyfish.*

Off Monterey and San Francisco.
Sebastichthys rhodochloris Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 144, Monterey.

2233. Sebastodes eos Eigenmann & Eigenmann.

Coast of California at Point Loma, near San Diego.
Sebastodes eos Eigenmann & Eigenmann, Proc. Cal. Ac. Sci., 18, 1890, Point Loma, near San Diego, California.

2234. Sebastodes gillii Eigenmann & Eigenmann.

Coast of California at Point Loma, near San Diego.
Sebastodes gillii Eigenmann & Eigenmann, Am. Nat., February, 1891, 154, Point Loma, near San Diego, California.

2235. Sebastodes chlorostictus (Jordan & Gilbert). *Pesca Vermiglia.*

San Diego; Monterey; San Francisco.
Sebastichthys chlorostictus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 294, Monterey, California.

2236. Sebastodes rupestris (Gilbert).

Coast of California about the Santa Barbara Islands.
Sebastichthys rupestris Gilbert, Proc. U. S. Nat. Mus. 1890, 76, Santa Barbara Islands, at Albatross Station 2946, in 150 fathoms.

Subgenus HISPANISCUS Jordan & Evermann.

Hispaniscus Jordan & Evermann, new subgenus (*rubrivinctus*).

2237. Sebastodes sinensis (Gilbert).

Gulf of California.
Sebastichthys sinensis Gilbert, Proc. U. S. Nat. Mus. 1890, 81, Gulf of California, at Albatross Station 3015, in 145 fathoms.

2238. Sebastodes zacentrus (Gilbert).

Coast of California.
Sebastichthys zacentrus Gilbert, Proc. U. S. Nat. Mus. 1890, 77, Santa Barbara Islands, at Albatross Stations 2893 and 2946, in 145 and 150 fathoms.

2239. Sebastodes elongatus (Ayres). *Reina.*

California coast, from San Diego to San Francisco.
Sebastes elongatus Ayres, Proc. Cal. Ac. Sci., II, 1859, 26, fig. 9, San Francisco.

2240. Sebastodes levis (Eigenmann & Eigenmann).

Coast of California, from San Diego to Monterey.
Sebastichthys levis Eigenmann & Eigenmann, Notes from the San Diego Biol. Lab., I, 6, 1889, San Diego, California.

2241. Sebastodes rubrivinctus (Jordan & Gilbert). *Spanish Flag.*

California coast, from San Diego to Monterey.
Sebastichthys rubrivinctus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 291, Santa Barbara Channel.

Subgenus AUCTOSPINA Eigenmann & Beeson.

Auctospina Eigenmann & Beeson, Am. Nat. 1893, 670 (*auriculatus*).

2242. Sebastodes auriculatus (Girard). *Brown Rockfish.*

Pacific Coast of America, from Cape Mendocino to Cerros Island.
Sebastes auriculatus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 131, 146, San Francisco.

2242a. Sebastodes auriculatus dallii (Eigenmann & Beeson).

Pacific Coast of America, from San Francisco to Puget Sound.
Pteropodus dallii Eigenmann & Beeson, Amer. Nat., January, 1894, 66, San Francisco.

Subgenus PTEROPODUS Eigenmann & Beeson.

Pteropodus Eigenmann & Beeson, Am. Nat. 1893, 670 (*maliger*).

2243. Sebastodes rastrelliger (Jordan & Gilbert). *Grass Rockfish.*

California coast, from San Diego to San Francisco.
Sebastichthys rastrelliger Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 296, Monterey.

2244. Sebastodes caurinus (Richardson).

Pacific Coast of America, from Puget Sound to Sitka.
Sebastes caurinus Richardson, Voy. Sulphur, Ichthyology, 77, pl. 41, fig. 1, 1845, Sitka.

2245. Sebastodes vexillaris (Jordan & Gilbert).

California coast, from San Diego to Mendocino.
Sebastichthys vexillaris Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 292, Santa Barbara Channel; San Francisco.

2246. Sebastodes maliger (Jordan & Gilbert). *Yellow-backed Rockfish.*

Pacific Coast of America, from Monterey to Sitka.
Sebastichthys maliger Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 322, San Francisco.

2247. Sebastodes gilberti Cramer.

Coast of California.
Sebastodes gilberti Cramer, Proc. Cal. Ac. Sci. 1896, 241, with plate, San Francisco.

2248. Sebastodes carnatus (Jordan & Gilbert). *Flesh-colored Rockfish.*

California coast, from San Diego to San Francisco.
Sebastichthys carnatus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 73, Monterey, California.

2249. Sebastodes chrysomelas (Jordan & Gilbert). *Black-and-yellow Rockfish.*

Pacific Coast of America, from Puget Sound to San Diego.
Sebastichthys chrysomelas Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 455, 465, Monterey, California.

2250. Sebastodes nebulosus (Ayres). *Yellow-spotted Rockfish.*

Pacific Coast, Vancouver Island to Point Conception.
Sebastes nebulosus Ayres, Proc. Cal. Ac. Sci. 1, 1854, 5, San Francisco.

Subgenus SEBASTICHTHYS Gill.

Sebastichthys Gill, Proc. Ac. Nat. Sci. Phila. 1862, 329 (*nigrocinctus*).

2251. Sebastodes serriceps (Jordan & Gilbert). *Treefish.*

Coast of California, from Point Reyes to Cerros Island.
Sebastichthys serriceps Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 38, Santa Barbara and Santa Catalina islands, California.

2252. Sebastodes nigrocinctus (Ayres). *Black-banded Rockfish.*

Pacific Coast of America, from Monterey to Vancouver Island.
Sebastes nigrocinctus Ayres, Proc. Cal. Ac. Sci. II, 1859, 25, 217, fig. 6, San Francisco.

Genus 689. SEBASTOPSIS Gill.

Sebastopsis Gill, Proc. Ac. Nat. Sci. Phila. 1862, 278 (*polylepis*).

2253. Sebastopsis xyris Jordan & Gilbert.

West coast of Mexico.
Sebastopsis xyris Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 369, Cape San Lucas, Lower California.

Genus 690. HELICOLENUS Goode & Bean.

Helicolenus Goode & Bean, Oceanic Ichthyology, 248, 1896 (*dactylopterus*).

2254. Helicolenus dactylopterus (De la Roche). *Scran Imperial; Fanegal; Cardonniera; Scorfanudi; Funal; Crabra.*

Deep waters of Atlantic Coast from Narragansett to Chesapeake Bay.
Scorpæna dactyloptera De la Roche, Ann. Mus., XIII, 1809, pl. 22, fig. 2, Ivica, Barcelona.

2255. Helicolenus maderensis Goode & Bean. *Boca Negra; Pai de Gato.*

Eastern coast of United States, from New York to Cape Hatteras.
Helicolenus maderensis Goode & Bean, Oceanic Ichth., 250, 1896, Madeira.

Genus 691. SCORPÆNA (Artedi) Linnæus.

Scorpæna Artedi, in Linnæus, Syst. Nat., ed. x, 266, 1758 (*porcus*).

2256. Scorpæna agassizii Goode & Bean.

Mid-ocean east of Cuba.

Scorpæna agassizii Goode & Bean, Oceanic Ichth., 247, fig. 243, 1896, latitude 32° 13′ N., longitude 39° 10′ W.

2257. Scorpæna cristulata Goode & Bean.

Atlantic Ocean, off coast of Georgia.

Scorpæna cristulata Goode & Bean, Oce. Ichth., 247, fig. 242, 1896, off Georgia.

2258. Scorpæna brasiliensis Cuvier & Valenciennes.

Atlantic Coast, from Charleston to Rio Janeiro.

Scorpæna brasiliensis Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 305, 1829, Brazil.

2259. Scorpæna histrio Jenyns.

Pacific Coast of America, Panama to Juan Fernandez; Galapagos Islands.

Scorpæna histrio Jenyns, Voyage Beagle, Fishes, 35, pl. 8, 1842, Chatham Island, Galapagos Archipelago.

2260. Scorpæna pannosa Cramer.

Panama.

Scorpæna pannosa Cramer, Proc. U. S. Nat. Mus., 1896, with plate, Panama.

2261. Scorpæna guttata Girard. *Scorpene; Scorpion; Sculpin.*

Coast of California, from Monterey to Ascension Island.

Scorpæna guttata Girard, Proc. Ac. Nat. Sci. Phila. 1854, 145, Monterey.

2262. Scorpæna plumieri Bloch. *Rascacio; Poison Grouper.*

West Indies and Brazil, north to Florida.

Scorpæna plumieri Bloch, Nya. Handl. Stockh., x, 234, 1789, Martinique.

2263. Scorpæna mystes Jordan & Starks. *Lapon.*

Coast of Mexico.

Scorpæna mystes Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 491, pl. 52, Mazatlan, Mexico.

2264. Scorpæna grandicornis Cuvier & Valenciennes. *Lion-fish; Poison Grouper.*

Florida Keys to Brazil.

Scorpæna grandicornis Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 309, 1829, Martinique, Porto Rico, Havana, San Domingo.

2265. Scorpæna russula Jordan & Bollman.

Pacific Coast of Colombia.

Scorpæna russula Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 165, Pacific Coast of Colombia.

2266. Scorpæna sonoræ Jenkins & Evermann.

Guaymas, Gulf of California, and Santa Margarita Island.

Scorpæna sonoræ Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 150, Guaymas, Sonora.

2267. Scorpæna inermis Cuvier & Valenciennes.

West Indies, north to Florida.

Scorpæna inermis Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 311, 1829, Martinique.

Genus 692. PONTINUS Poey.

Pontinus Poey, Memorias, II, 172, 1860 (*castor*).

2268. Pontinus macrolepis Goode & Bean.

Yucatan.

Pontinus macrolepis Goode & Bean, Ocean. Ichth., 257, fig. 247, 1896, off Yucatan.

2269. Pontinus castor Poey.

Havana.

Pontinus castor Poey, Memorias, II, 173, 1860, Havana.

2270. Pontinus pollux Poey.

Havana.

Pontinus pollux Poey, Memorias, II, 174, 1860, Havana.

2271. Pontinus rathbuni Goode & Bean.

Coast of North Carolina.

Pontinus rathbuni Goode & Bean, Ocean. Ichth., 255, fig. 245, 1896, off Cape Hatteras.

2272. Pontinus longispinis Goode & Bean.

Coast of western Florida.

Pontinus longispinis Goode & Bean, Ocean. Ichth., 258, fig. 246, 1896, west coast of Florida, lat. 28° 36′ N., long. 85° 33′ 30″ W., in 111 fathoms.

2273. Pontinus sierra (Gilbert).

Gulf of California.

Scorpæna (Sebastoplus) sierra Gilbert, Proc. U. S. Nat. Mus. 1890, 82, Gulf of California, at Albatross Stations 2996 and 3011 in 112 and 71 fathoms.

Genus 693. SETARCHES Johnson.

Setarches Johnson, Proc. Zool. Soc. Lond. 1862, 177 (*guntheri*).

2274. Setarches parmatus Goode.

Coasts of Rhode Island, North Carolina, and western Florida, in deep water.

Setarches parmatus Goode, Proc. U. S. Nat. Mus., III, 1880, 480, off coast of Rhode Island.

Family CLXXIX. HEXAGRAMMIDÆ.

Genus 694. PLEUROGRAMMUS Gill. *Atka Mackerels.*

Pleurogrammus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 166 (*monopterygius*).

2275. Pleurogrammus monopterygius (Pallas). *Atka Mackerel.*

North Pacific about Atka and other of the Aleutian Islands.

Labrax monopterygius Pallas, Mém. Ac. Sci. St. Petersb., II, 1810, 391, Unalaska.

Genus 695. HEXAGRAMMOS Steller.

Hexagrammos Steller, in Tilesius, Act. Ac. Petrop., II, 335, 1810 (*asper*).

2276. Hexagrammos decagrammus (Pallas). *Rock-trout; Boregat; Bodieron.*

North Pacific, from Point Conception to southern Alaska.

Labrax decagrammus Pallas, Mém. Ac. Petersb., II, 1810, 386, pl. 22, fig. 2, Elias Bay.

2277. Hexagrammos scaber Bean.

Coast of Alaska.

Hexagrammus scaber Bean, Proc. U. S. Nat. Mus. 1881, 154, coast of Alaska.

2278. Hexagrammos hexagrammus Pallas. *Starling.*

Pacific Coast of United States, from Unalaska to San Francisco.

Labrax hexagrammus Pallas, Mém. Ac. Petersb., II, 395, pl. 23, fig. 3, 1810, Kamchatka.

2279. Hexagrammos ordinatus (Cope).

Coast of Alaska.

Chirus ordinatus Cope, Proc. Amer. Philos. Soc. Phila. 1873, 28, Unalaska.

2280. Hexagrammos asper Steller. *Red Rock-trout.*

Alaska to Monterey.

Hexagrammos asper Steller, in Tilesius, Act. Ac. Petrop., II, 340, 1810, Port Peter and Paul, Kamchatka.

2281. Hexagrammos octogrammus (Pallas).

About Kamchatka and Aleutian Islands.

Labrax octogrammus Pallas, Zoogr. Rosso-Asiat., III, 283, 1811, Kamchatka and Aleutian Islands; doubtful species.

Genus 696. GRAMMATOPLEURUS Gill.

Grammatopleurus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 166 (*lagocephalus*).

2282. Grammatopleurus lagocephalus (Pallas).

Kuril Islands.
Labrax lagocephalus Pallas, Mém. Ac. Petersb., II, 384, 1810, Kuril Islands; doubtful species.

Genus 697. OPHIODON Girard.

Ophiodon Girard, Proc. Ac. Nat. Sci. Phila. 1854, 133 (*elongatus*).

2283. Ophiodon elongatus Girard. *Cultus-cod; Blue-cod; Buffalo-cod; Ling.*

Pacific Coast from Alaska to Santa Barbara.
Ophiodon elongatus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 133, San Francisco.

Genus 698. ZANIOLEPIS Girard.

Zaniolepis Girard, Proc. Ac. Nat. Sci. Phila. 1857, 202 (*latipinnis*).

2284. Zaniolepis latipinnis Girard.

Coast of California, from San Francisco northward.
Zaniolepis latipinnis Girard, Proc. Ac. Nat. Sci. Phila. 1857, 202, Fort Steilacoom, Puget Sound.

2285. Zaniolepis frenatus Eigenmann.

Shore banks of southern California.
Zaniolepis frenatus Eigenmann, West American Scientist, November 9, 1889, 10, Cortez Banks, off San Diego.

Genus 699. OXYLEBIUS Gill.

Oxylebius Gill, Proc. Ac. Nat. Sci. Phila. 1862, 277 (*pictus*).

2286. Oxylebius pictus Gill.

From Monterey northward to Puget Sound.
Oxylebius pictus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 277, California, no definite locality given.

Genus 700. ERILEPIS Gill.

Erilepis Gill, Science, January 26, 1894, 54 (*zonifer*).

2287. Erilepis zonifer (Lockington).

Monterey Bay, California.
Myriolepis zonifer Lockington, Proc. U. S. Nat. Mus. 1880, 248, Monterey Bay.

Genus 701. ANOPLOPOMA Ayres.

Anoplopoma Ayres, Proc. Cal. Ac. Sci. 1859, 27 (*merlangus*=*fimbria*).

2288. Anoplopoma fimbria (Pallas). *Beshow; Coal-fish.*

Monterey to Alaska.
Gadus fimbria Pallas, Zoogr. Rosso-Asiat., III, 200, 1811, no definite locality, probably the Aleutian Islands.

CLXXX. Family COTTIDÆ. The Sculpins.

Genus 702. JORDANIA Starks.

Jordania Starks, Proc. Ac. Nat. Sci. Phila. 1895, 410 (*zonope*).

2289. Jordania zonope Starks.

Puget Sound.
Jordania zonope Starks, Proc. Ac. Nat. Sci. Phila. 1895, 410, Port Orchard, Puget Sound.

Genus 703. PARICELINUS Eigenmann & Eigenmann.

Paricelinus Eigenmann & Eigenmann, West American Scientist, November 8, 1889, 131 (*hopliticus*).

2290. Paricelinus hopliticus Eigenmann & Eigenmann.

Cortez Banks, off San Diego, California.
Paricelinus hoplitious Eigenmann & Eigenmann, West American Scientist, Nov. 9, 1889, 131, Cortez Banks, California.

2291. Paricelinus thoburni Gilbert.

Coast of Oregon.
Paricelinus thoburni Gilbert, Rept. U. S. Fish Com. 1893 (1896), 432, pl. 30, fig. 2, Albatross Station 3350, on coast of Oregon, in 75 fathoms.

Genus 704. SCORPÆNICHTHYS Girard.

Scorpænichthys Girard, Proc. Ac. Nat. Sci. Phila. 1854, 131 (*marmoratus*).

2292. Scorpænichthys marmoratus (Ayres). *Cabezones.*

Pacific Coast of America from Puget Sound to San Diego.
Hemitripterus marmoratus Ayres, Proc. Cal. Ac. Sci. 1854, 4, San Francisco.

Genus 705. CHITONOTUS Lockington.

Chitonotus Lockington, Proc. U. S. Nat. Mus. 1881, 141 (*megacephalus*).

2293. Chitonotus pugetensis (Steindachner).

Puget Sound.
Artedius pugetensis Steindachner, Ichth. Beitr., v, 133, pl. 14, fig. 2, 1876, Puget Sound.

Genus 706. TARANDICHTHYS Jordan & Evermann.

Tarandichthys Jordan & Evermann, Proc. Cal. Ac. Sci. 1896, 225 (*filamentosus*).

2294. Tarandichthys cavifrons (Gilbert).

Coast of southern California.
Icelinus cavifrons Gilbert, Proc. U. S. Nat. Mus. 1890, 83, off Santa Barbara Islands, at Albatross Stations 2907 and 2945, in 44 and 30 fathoms.

2295. Tarandichthys filamentosus (Gilbert).

Coast of southern California.
Icelinus filamentosus Gilbert, Proc. U. S. Nat. Mus. 1890, 85, off Santa Barbara Islands, at Albatross Stations 2893 and 2959, in 145 and 55 fathoms.

2296. Tarandichthys tenuis (Gilbert).

Coast of southern California.
Icelinus tenuis Gilbert, Proc. U. S. Nat. Mus. 1890, 86, off Santa Barbara Islands, at Albatross Stations 2893, 2946, and others, in 45 to 150 fathoms.

Genus 707. ICELINUS Jordan.

Icelinus Jordan, Cat. Fish. N. A., 110, 1885 (*quadriseriatus*).

2297. Icelinus fimbriatus Gilbert.

Southern California.
Icelinus fimbriatus Gilbert, Proc. U. S. Nat. Mus. 1890, 87, off Santa Barbara Islands, at Albatross Stations 2893 and 2975, in 145 and 36 fathoms.

2298. Icelinus oculatus Gilbert.

Southern California.
Icelinus oculatus Gilbert, Proc. U. S. Nat. Mus. 1890, 87, off Santa Barbara Islands, at Albatross Station 2935, in 124 fathoms.

2299. Icelinus borealis Gilbert.

Coast of Alaska, north and south of Aleutian Islands, and in Bristol Bay.
Icelinus borealis Gilbert, Rept. U. S. Fish Com. 1893 (1896), 415, pl. 25, Aleutian Islands and Bristol Bay, at Albatross Stations 3213, 3214, and others, in 11 to 121 fathoms.

2300. Icelinus quadriseriatus (Lockington).

Off San Francisco, between Point Reyes and Golden Gate.
Artedius quadriseriatus Lockington, Proc. U. S. Nat. Mus. 1879, 330, off San Francisco.

Genus 708. ASTROLYTES Jordan & Starks.

Astrolytes Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 807 (*fenestralis*).

2301. Astrolytes notospilotus (Girard).

Coast of California from Straits of Fuca southward; abundant at Santa Barbara and Puget Sound.
Artedius notospilotus Girard, Proc. Ac. Nat. Sci. Phila. 1856, 134, Tomales Bay, California.

2302. Astrolytes fenestralis (Jordan & Gilbert).

Puget Sound.

Artedius fenestralis Jordan & Gilbert, Proc. U. S. N. M. 1882, 578, Puget Sound.

Genus 709. ARTEDIUS Girard.

Artedius Girard, Proc. Ac. Nat. Sci. Phila. 1856, 134 (*lateralis*).

2303. Artedius lateralis (Girard).

Pacific Coast of North America, from Puget Sound to San Luis Obispo.

Scorpænichthys lateralis Girard, Proc. Ac. Nat. Sci. Phila. 1854, 145, San Luis Obispo, California.

Genus 710. ARTEDIELLUS Jordan.

Artediellus Jordan, Cat. Fish. N. A., 110, 1885 (*uncinatus*).

2304. Artediellus uncinatus (Reinhardt).

Arctic Europe west to Greenland.

Cottus uncinatus Reinhardt, Vid. Selsk. Natur. Math. Afh. 1833, 44.

2305. Artediellus atlanticus Jordan & Evermann.

Labrador to Cape Cod.

Artediellus atlanticus Jordan & Evermann, Fishes North and Middle America, 1896, Massachusetts Bay.

2306. Artediellus pacificus Gilbert.

Coast of Alaska; in Bristol Bay, south of Sannak Island, and north of Unalaska.

Artediellus pacificus Gilbert, Rept. U. S. Fish Com. 1893 (1896), 416, Unalaska, Sannak, Bristol Bay, at Albatross Station 3216, south of Sannak Island, many other stations in Bristol Bay, and station 3323 north of Unalaska, in 8 to 61 fathoms.

Genus 711. RUSCARIUS Jordan & Starks.

Ruscarius Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 805 (*meanyi*).

2307. Ruscarius meanyi Jordan & Starks.

Puget Sound, at Port Orchard, near Seattle.

Ruscarius meanyi Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 805, pl. 80, Port Orchard, Puget Sound.

Genus 712. RASTRINUS Jordan & Evermann.

Rastrinus Jordan & Evermann, new genus (*scutiger*).

2308. Rastrinus scutiger (Bean).

South of the Alaskan Peninsula.

Icelus scutiger Bean, Proc. U. S. Nat. Mus. 1890, 41, Trinity Islands, Alaska, at Albatross Station 2853, in 159 fathoms.

Genus 713. ICELUS Kroyer.

Icelus Kroyer, Natur. Tidsskr., I, 253, 1845 (*hamatus*).

2309. Icelus bicornis (Reinhardt).

Arctic seas, circumpolar; Spitzbergen to northern Russia, Finland, Alaska, Greenland, Labrador, and Cape Cod.

Cottus bicornis Reinhardt, Vid. Selsk. Natur. og Math. Afh., VIII, LXXV, Greenland.

2310. Icelus spiniger Gilbert.

Coast of Alaska, in the vicinity of Unalaska Island and in Bristol Bay.

Icelus spiniger Gilbert, Rept. U. S. Fish Com. 1893 (1896), 406, pl. 24, fig. 1, Bristol Bay and Unalaska, at Albatross Stations 3216, 3223, and many others, in 17 to 121 fathoms.

2311. Icelus euryops Bean.

Bering Sea, off Trinity Islands.

Icelus euryops Bean, Proc. U. S. Nat. Mus. 1890, 41, off Trinity Islands, at Albatross Station 2853, in 159 fathoms.

2312. Icelus vicinalis Gilbert.

Bristol Bay, Alaska.

Icelus vicinalis Gilbert, Rept. U. S. Fish Com. 1893 (1896), 413, Bristol Bay at Albatross Stations 3324, 3330, 3331, and 3332, in 109 to 406 fathoms.

2313. Icelus canaliculatus Gilbert.

Bering Sea, north of Unalaska.
Icelus canaliculatus Gilbert, Rept. U. S. Fish Com. 1893 (1896), 412, pl. 24, fig. 2, off Unalaska, at Albatross Station 3329, in 399 fathoms.

2314. Icelus australis Eigenmann & Eigenmann.

Cortez Banks, off San Diego.
Icelus australis Eigenmann & Eigenmann, West Amer. Sci. 1889, 131, Cortez Banks, California.

Genus 714. RADULINUS Gilbert.

Radulinus Gilbert, Proc. U. S. Nat. Mus. 1890, 88 (*asprellus*).

2315. Radulinus asprellus Gilbert.

Coast of Oregon and Washington, and in Puget Sound.
Radulinus asprellus Gilbert, Proc. U. S. Nat. Mus. 1890, 88, off Oregon and Washington, at Albatross Stations 3046, 3057, and others, in 43 to 77 fathoms.

Genus 715. TRIGLOPS Reinhardt.

Triglops Reinhardt, Vid. Selsk. Natur. Math. Afh., v, LII (*pingeli*).

2316. Triglops xenostethus Gilbert.

Bering Sea, north of Unalaska Island.
Triglops xenostethus Gilbert, Rept. U. S. Fish Com. 1893 (1896), 429, pl. 29, fig. 2, north of Unalaska, at Albatross Station 3220, in 34 fathoms.

2317. Triglops pingeli Reinhardt.

North Atlantic, from Spitzbergen and western Norway to Greenland and south to Cape Cod and Christiansund.
Triglops pingeli Reinhardt, Vid. Selsk. Natur., v, LII.

2318. Triglops beani Gilbert.

Alaska, both north and south of the Aleutian Islands and in Bristol Bay.
Triglops beani Gilbert, Rept. U. S. Fish Com. 1893 (1896), 426, pl. 28, fig. 1, Aleutian Islands and Bristol Bay, at Albatross Stations 3214, 3217, and many others, in 7¼ to 42 fathoms.

2319. Triglops scepticus Gilbert.

Aleutian Islands, south of Sannak and north of Unalaska Island.
Triglops scepticus Gilbert, Rept. U. S. Fish. Com. 1893 (1896), 428, pl. 28, fig. 2, Aleutian Islands, at Albatross Stations 3215, 3222, and others, in 43 to 138 fathoms.

Genus 716. PRIONISTIUS Bean.

Prionistius Bean, Proc. U. S. Nat. Mus. 1883, 355 (*macellus*).

2320. Prionistius macellus Bean.

British Columbia, in Carter Bay.
Prionistius macellus Bean, Proc. U. S. Nat. Mus. 1883, 355, Carter Bay, British Columbia.

Genus 717. ELANURA Gilbert.

Elanura Gilbert, Rept. U. S. Fish Com. 1893 (1896), 429 (*forficata*).

2321. Elanura forficata Gilbert.

Aleutian Islands, south of Sannak and north of Unimak Island.
Elanura forficata Gilbert, Rept. U. S. Fish Com. 1893 (1896), 430, pl. 30, fig. 1, Aleutian Islands, at Albatross Stations 3213, 3214, and 3222, in 38 to 50 fathoms.

Genus 718. MELLETES Bean.

Melletes Bean, Proc. U. S. Nat. Mus. 1879, 354 (*papilio*).

2322. Melletes papilio Bean.

Aleutian Islands.
Melletes papilio Bean, Proc. U. S. Nat. Mus. 1879, 354, St. Paul Island, Alaska.

Genus 719. **HEMILEPIDOTUS** Cuvier.
Hemilepidotus Cuvier, Règne Animal, ed. 2, II, 165, 1829 (*hemilepidotus*).

2323. Hemilepidotus hemilepidotus (Tilesius).
Alaska to San Francisco; abundant in Puget Sound.
Cottus hemilepidotus Tilesius, Mém. Ac. Pétersb., III, 1810, 262, Sea of Okhotsk.

2324. Hemilepidotus jordani Bean.
Alaska; Unalaska.
Hemilepidotus jordani Bean, Proc. U. S. Nat. Mus. 1881, 153, Unalaska.

Genus 720. **CALYCILEPIDOTUS** Ayres.
Calycilepidotus Ayres, Proc. Cal. Ac. Sci., I, 1855, 76 (*spinosus*).

2325. Calycilepidotus spinosus Ayres.
Coast of California; known only from about Monterey and San Francisco.
Calycilepidotus spinosus Ayres, Proc. Cal. Ac. Sci., I, 1855, 76, San Francisco.

Genus 721. **ENOPHRYS** Swainson.
Enophrys Swainson, Classn. Fish., II, 271, 1839 (*claviger*).

Subgenus **ASPICOTTUS** Girard.
Aspicottus Girard, Proc. Ac. Nat. Sci. Phila., 1854, 130 (*bison*).

2326. Enophrys bison (Girard).
San Francisco to Alaska; abundant about Puget Sound.
Aspicottus bison Girard, Proc. Ac Nat. Sci. Phila. 1854, 130, Fort Steilacoom.

Subgenus **ENOPHRYS** Swainson.

2327. Enophrys claviger (Cuvier & Valenciennes).
Bering Sea.
Cottus claviger Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 195, 1829, Kamchatka.

Genus 722. **CERATOCOTTUS** Gill.
Ceratocottus Gill, Proc. Ac. Nat. Sci. Phila. 1859, 165 (*diceraus*).

2328. Ceratocottus diceraus (Pallas).
Alaska and Kamchatka.
Cottus diceraus Pallas, Nov. Act. Petropol., 1783, 354, pl. 10, fig. 7, Petropaulski, Kamchatka.

Genus 723. **COTTUS** (Artedi) Linnæus. *Miller's Thumbs.*
Cottus Linnæus, Syst. Nat., ed. X, 264, 1758 (*gobio*).

Subgenus **PEGEDICTIS** Rafinesque.
Pegediotis Rafinesque, Ichth. Ohiensis, 85, 1820 (*ictalops*).

2329. Cottus asper Richardson. *Prickly Bullhead.*
Streams of the Cascade Range, from Vancouver Island to Oregon.
Cottus asper Richardson, Fauna Bor.-Amer., Fish., 295, 1836, Columbia River at Fort Vancouver.

2330. Cottus gulosus (Girard).
Streams of the Coast Range in California, south to Point Conception.
Cottopsis gulosus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 129, San Mateo Creek and San Joaquin River, California.

2331. Cottus rhotheus (Rosa Smith).
Hangman Creek, Tekoa, Washington, and elsewhere in Columbia River basin.
Uranidea rhothea Rosa Smith, Proc. U. S. Nat. Mus. 1882, 347, Spokane Falls, Washington.

2332. Cottus shasta Jordan & Starks.
Upper Sacramento Basin, about Mount Shasta.
Cottus shasta Jordan & Starks, Proc. Cal. Ac. Sci. 1896, 224, McCloud River, Baird, Shasta County, California.

2333. Cottus semiscaber (Cope). *Rocky Mountain Bullhead.*

Rocky Mountain region in clear streams on both slopes; abundant in Colorado, northern New Mexico, Wyoming, Montana, Idaho, Utah, eastern Washington, and Oregon.

Cottopsis semiscaber Cope, Hayden Surv. Mont., 1871, 476, Fort Hall, Idaho.

2334. Cottus punctulatus (Gill).

Headwaters of Green River, Wyoming.

Potamocottus punctulatus Gill, Proc. Bost. Soc. Nat. Hist., VIII, 1861, 40, Bridger Pass, Wyoming.

2335. Cottus ictalops (Rafinesque). *Miller's Thumb; Blob; Muffle-jaw; Bullhead; Spring-fish.*

Middle and Northern States, east of the Dakotas and Nebraska, southward along the Alleghanies to North Carolina and northern Alabama.

Pegedictis ictalops Rafinesque, Ichth. Ohiensis, 85, 1820, spring near Lexington, Kentucky.

Subgenus TAURIDEA Jordan & Evermann.

Tauridea Jordan & Evermann, Fishes N. and M. Amer., 1896 (*ricei*).

2336. Cottus ricei (Nelson).

Lake Michigan, near Evanston, Illinois.

Cottopsis ricei Nelson, Bull. Ill. Mus. Nat. Hist., 40, 1876, Lake Michigan at Evanston.

Subgenus COTTUS (Artedi) Linnæus.

2337. Cottus onychus Eigenmann & Eigenmann.

Saskatchewan Basin.

Cottus onychus Eigenmann & Eigenmann, Am. Nat., November, 1892, 963, Bow River, at Calgary, a tributary of the South Saskatchewan, Alberta Territory.

2338. Cottus pollicaris (Jordan & Gilbert).

Lake Michigan.

Uranidea pollicaris Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 222, Lake Michigan, off Racine, Wisconsin.

2339. Cottus cognatus Richardson. *Great Bear Lake Bullhead.*

Great Bear Lake, British America.

Cottus cognatus Richardson, Fauna Bor.-Amer., III, 40, 1836, Great Bear Lake.

2340. Cottus perplexus Gilbert & Evermann.

Skookumchuck and Newaukum rivers, near Chehalis, Washington.

Cottus perplexus Gilbert & Evermann, Bull. U. S. Fish Com. 1894, 202, pl. 20, fig. 1, Skookumchuck River, near Chehalis, Washington.

2341. Cottus aleuticus Gilbert.

Unalaska, in small stream passing through the village of Unalaska; Departure Bay, Vancouver Island.

Cottus aleuticus Gilbert, Rept. U. S. Fish Com. 1893 (1896), 418, streams of Unalaska; also in Departure Bay, Vancouver Island.

2342. Cottus minutus Pallas.

Island of Talek, near Tanisk, Sea of Okhotsk.

Cottus minutus Pallas, Zoogr. Rosso-Asiat., III, 145, 1811, Talek Island, Sea of Okhotsk.

2343. Cottus beldingi Eigenmann & Eigenmann.

Streams of Columbia River basin, south to Lake Lahontan; abundant east of the Cascades and in Lake Tahoe.

Cottus beldingi Eigenmann & Eigenmann, Am. Nat., XXV, 1891, 1132, Lake Tahoe.

2344. Cottus philonips Eigenmann & Eigenmann.

Columbia River basin at Field, British Columbia, and in Idaho.

Cottus philonips Eigenmann & Eigenmann, Am. Nat., XXVI, 1892, 963, Kicking Horse River, Field, British Columbia.

2345. Cottus annæ Jordan & Starks.
Eagle River, a tributary of Grand River, Colorado, Colorado River basin.
Cottus annæ Jordan & Starks, Proc. Cal. Ac. Sci. 1896, 223, Eagle River at Gypsum, Colorado.

2346. Cottus spilotus (Cope).
Grand Rapids, on the Grand River, which flows into Lake Michigan.
Uranidea spilota Cope, Proc. Ac. Nat. Sci. Phila. 1865, 182, Grand River at Grand Rapids, Michigan.

2347. Cottus leiopomus Gilbert & Evermann.
Wood River, Shoshone, Idaho.
Cottus leiopomus Gilbert & Evermann, Bull. U. S. Fish Com. 1894, 203, pl. 20, fig. 2, Wood River, Shoshone, Idaho.

Genus 724. URANIDEA DeKay.
Uranidea DeKay, New York Fauna: Fishes, 61, 1842 (*quiescens* = *gracilis*).

2348. Uranidea bendirei (Bean).
Walla Walla, Washington; Rattlesnake Creek near Camp Harney, Oregon, and Goose Creek near Meadows, Idaho.
Potomacottus bendirei Bean, Proc. U. S. Nat. Mus. 1881, 27, Rattlesnake Creek near Camp Harney, Oregon.

2349. Uranidea marginata Bean.
Tributaries of Walla Walla River, Washington.
Uranidea marginata Bean, Proc. U. S. Nat. Mus. 1881, 26, Walla Walla, Washington.

2350. Uranidea franklini (Agassiz).
Lake Superior.
Cottus franklini Agassiz, Lake Superior, 303, 1850, north and east shores of Lake Superior.

2351. Uranidea kumlienii Hoy.
Lake Michigan, in deep water.
Uranidea kumlienii Hoy, in Nelson, Bull. Ill. Mus. Nat. Hist., vol. 1, No. 1, 41, 1876, Lake Michigan, in deep water.

2352. Uranidea gracilis (Heckel).
Streams of New England and New York; recorded from tributaries of the Connecticut, Lake Champlain, Hudson, Delaware, and Susquehanna.
Cottus gracilis Heckel, Ann. Wien. Mus., II, 1840, 148, New England.

2353. Uranidea formosa (Girard).
Lake Ontario, in deep water.
Cottus formosus Girard, Monogr. Cott., 58, 1850, Lake Ontario, off Oswego, in stomach of *Lota maculosa*.

2354. Uranidea hoyi Putnam.
Lake Michigan, in deep water.
Uranidea hoyi Putnam, in Nelson, Bull. Ill. Mus. Nat. Hist., vol. 1, No. 1, 41, 1876, Lake Michigan, in deep water.

Genus 725. ARGYROCOTTUS Herzenstein.
Argyrocottus Herzenstein, Melanges Biol. Ac. Imp. Sci., XIII, 1892, 219, St. Petersburg (*zanderi*).

2355. Argyrocottus zanderi Herzenstein.
Korsakow, Sakhalin.
Argyrocottus zanderi Herzenstein, Melanges Biol. Ac. Imp. Sci., XIII, 1892, 219, Korsakow, Sakhalin.

Genus 726. ACANTHOCOTTUS Girard. *Great Sculpins.*
Acanthocottus Girard, Proc. Bost. Soc. Nat. Hist., III, 1849, 185 (*grœnlandicus*).

2356. Acanthocottus æneus (Mitchill). *Grubby.*
Coast of southern New England and New York.
Cottus aneus Mitchill, Trans. Lit. Phil. Soc. N. Y., I, 1815, 380, New York.

2357. Acanthocottus octodecimspinosus (Mitchill). *Common Sculpin; Eighteen-spined Sculpin.*

Atlantic Coast south to Virginia; common, northward.
Cottus octodecimspinosus Mitchill, Trans. Lit. Phil. Soc. N. Y., I, 1815, 380, New York.

2358. Acanthocottus platycephalus (Pallas).

Kamchatka.
Cottus platycephalus Pallas, Zoogr. Rosso-Asiat., III, 135, 1811, Kamchatka; after Steller.

2359. Acanthocottus scorpioides (Fabricius).

Arctic regions of America, Greenland to Siberia.
Cottus scorpioides Fabricius, Fauna Grœnl., 157, 1780, Greenland.

2360. Acanthocottus scorpius (Linnæus). *European Sculpin.*

Northern Europe and Arctic regions, not common on our coasts; recorded by Dr. Lütken from the Baltic, Finland, Spitzbergen, Nova Zembla, coasts of England and northern Asia; also from Eastport, Maine.
Cottus scorpius Linnæus, Syst. Nat., ed. X, 265, 1758, in Atlantic Ocean off Europe.

2361. Acanthocottus grœnlandicus (Cuvier & Valenciennes). *Daddy Sculpin.*

New York to Greenland; according to Fabricius it is abundant in all the bays and inlets of Greenland.
Cottus grœnlandicus Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 156, 1829, no locality given, probably Greenland; after Fabricius.

2362. Acanthocottus polyacanthocephalus (Pallas).

Puget Sound to Alaska; very abundant northward.
Cottus polyacanthocephalus Pallas, Zoogr. Rosso-Asiat., III, 133, 1811, no locality.

2363. Acanthocottus humilis (Bean).

Chamisso Island, near Bering Straits.
Cottus humilis Bean, Proc. U. S. Nat. Mus., IV, 1881, 149, Chamisso Island, Bering Straits.

2364. Acanthocottus jaok (Cuvier & Valenciennes).

Kamchatka.
Cottus jaok Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 172, 1829, Kamchatka.

Subgenus BOREOCOTTUS Gill.

Boreocottus Gill, Proc. Ac. Nat. Sci. Phila. 1859, 166 (*axillaris*).

2365. Acanthocottus verrucosus (Bean).

Plover Bay, Siberia, near Bering Straits.
Cottus verrucosus Bean, Proc. U. S. Nat. Mus., IV, 1881, 152, Plover Bay, Siberia.

2366. Acanthocottus niger (Bean).

St. Paul Island, Bering Sea.
Cottus niger Bean, Proc. U. S. N. M., IV, 1881, 151, St. Paul Island, Bering Sea.

2367. Acanthocottus axillaris (Gill).

Bering Straits.
Boreocottus axillaris Gill, Proc. Ac. Nat. Sci. Phila. 1859, 166, Bering Straits.

2368. Acanthocottus polaris (Sabine).

East side of the peninsula of Boothia.
Cottus polaris Sabine, Appendix Parry's First Voyage, CCXIII, 1819, north Georgia; not recognized by recent writers, the generic relations uncertain; Lütken compares it with *Icelus bicornis*, but it must be different

2369. Acanthocottus quadrifilis (Gill).

Bering Straits.
Porocottus quadrifilis Gill, Proc. Ac. Nat. Sci. Phila. 1859, 166, Bering Straits.

2370. Acanthocottus sellaris Gilbert.

Bristol Bay, Alaska.
Acanthocottus sellaris Gilbert, Rept. U. S. Fish Com. 1893 (1896), 419, Bristol Bay, at Albatross Stations 3229, 3231, and others, in 5 to 17 fathoms.

Genus 727. ZESTICELUS* Jordan & Evermann.

Zesticelus Jordan & Evermann, new genus (*profundorum*).

2371. Zesticelus profundorum (Gilbert).

Bering Sea, north of Unalaska.

Acanthocottus profundorum Gilbert, Rept. U. S. Fish Com. 1893 (1896), 423, pl. 26, fig. 1, Bering Sea, north of Unalaska, at Albatross Station 3329, in 399 fathoms.

Genus 728. ONCOCOTTUS Gill.

Oncocottus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 13 (*quadricornis*).

2372. Oncocottus labradoricus (Girard).

York Factory, Hudson Bay.

Acanthocottus labradoricus Girard, Bost. Jour. Nat. Hist., VI, 1850, 247, York Factory, Hudson Bay.

2373. Oncocottus quadricornis (Linnæus).

Arctic America to Baltic Sea, chiefly northward; abundant in eastern Baltic and in Lakes Ladoga and Onega; north to White Sea and Nova Zembla; rare in England and eastern Greenland; unknown in western Greenland.

Cottus quadricornis Linnæus, Syst. Nat., ed. X, 264, 1758, Baltic Sea.

2374. Oncocottus laticeps (Gilbert).

Alaska, from Nushagak River near its mouth; one from Herendeen Bay on the northern side of Alaska Peninsula.

Acanthocottus laticeps Gilbert, Rept. U. S. Fish Com. 1893 (1896), 422, pls. 26 and 27, Nushagak River and Herendeen Bay, Alaska.

Genus 729. TRIGLOPSIS Girard.

Triglopsis Girard, Proc. Bost. Soc. Nat. Hist., IV, 1851, 18 (*thompsoni*).

2375. Triglopsis thompsoni Girard.

Deep waters of Great Lakes; known from Lakes Michigan and Ontario.

Triglopsis thompsoni Girard, Proc. Bost. Soc. Nat. Hist., IV, 1851, 19, Lake Ontario, off Oswego, New York.

Genus 730. DASYCOTTUS Bean.

Dasycottus Bean, Proc. U. S. Nat. Mus. 1890, 42 (*setiger*).

2376. Dasycottus setiger Bean.

North Pacific, off Sitkalidak Island; Puget Sound.

Dasycottus setiger Bean, Proc. U. S. Nat. Mus. 1890, 42, off Sitkalidak Island, 57° N., 153° 18′ W., at Albatross Station 2855, in 69 fathoms.

Genus 731. COTTUNCULUS Collett.

Cottunculus Collet, Norges Fiske, 20, 1875 (*microps*).

2377. Cottunculus microps Collett.

Deep water, off coasts of Norway and Rhode Island.

Cottunculus microps Collett, Norges Fiske, 20, pl. I, figs. 1-3, 1875, Hasvig, near Hammerfest, Norway, in 200 fathoms.

2378. Cottunculus thomsonii (Günther).

North Atlantic, in deep water.

Cottus thomsonii Günther, Proc. Royal Soc. Edinburgh, XI, 1882, 679, Faröe Channel, in 535 fathoms.

Genus 732. MALACOCOTTUS Bean.

Malacocottus Bean, Proc. U. S. Nat. Mus. 1890, 42 (*zonurus*).

2379. Malacocottus zonurus Bean.

Coast of Alaska, off Trinity Islands.

Malacocottus zonurus Bean, Proc. U. S. Nat. Mus. 1890, 43, off Trinity Islands, Alaska, 56° N., 154° W., at Albatross Station 2853, in 159 fathoms.

* Distinguished from *Acanthocottus* by its cavernous skeleton; associated with its deep water habitat.

Genus 733. **GYMNOCANTHUS** Swainson.

Gymnocanthus Swainson, Classn. Fishes, etc., 271, 1839 (*ventralis*).

2380. Gymnocanthus pistilliger (Pallas).

Coasts of Alaska; taken abundantly in Bristol Bay.
Cottus pistilliger Pallas, Zoogr. Rosso-Asiat., III, 143, 1811, Unalaska Island.

2381. Gymnocanthus tricuspis (Reinhardt).

Arctic seas, south to Norway and Labrador; not very common on our coasts.
Cottus tricuspis Reinhardt, Vidensk. Selsk. Nat. Math., V, III.

2382. Gymnocanthus galeatus Bean.

Aleutian Islands.
Gymnocanthus galeatus Bean, Proc. U. S. Nat. Mus. 1881, 153, Unalaska.

Genus 734. **LEIOCOTTUS** Girard.

Leiocottus Girard, Proc. Ac. Nat. Sci. Phila. 1856, 133 (*hirundo*).

2383. Leiocottus hirundo Girard.

Santa Barbara Islands; extremely local.
Leiocottus hirundo Girard, Proc. Ac. Nat. Sci. Phila. 1856, 133, San Miguel Island, near Santa Barbara, California.

Genus 735. **LEPTOCOTTUS** Girard.

Leptocottus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 130 (*armatus*).

2384. Leptocottus armatus Girard.

Pacific Coast, from Kodiak to San Diego.
Leptocottus armatus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 131, Cape Flattery, Fort Steilacoom, Shoalwater Bay, Humboldt Bay, San Francisco, Monterey, San Pedro, Fort Point, San Diego, and Tomales Bay.

Genus 736. **CLINOCOTTUS** Gill.

Clinocottus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 166 (*analis*).

2385. Clinocottus analis (Girard).

Coast of California, from Monterey to Lower California.
Oligocottus analis Girard, Proc. Ac. Nat. Sci. Phila. 1857, 201, Monterey.

Genus 737. **OLIGOCOTTUS** Girard.

Oligocottus Girard, Proc. Ac. Nat. Sci. Phila. 1856, 133 (*maculosus*).

2386. Oligocottus maculosus Girard. *Johnny.*

Pacific Coast, from Cape Mendocino to Point Conception.
Oligocottus maculosus Girard, Proc. Ac. Nat. Sci. Phila. 1856, 153, Tomales Bay, San Francisco.

2387. Oligocottus borealis Jordan & Snyder.

Pacific Coast of America from Sitka to Cape Mendocino.
Oligocottus borealis Jordan & Snyder, Proc. Cal. Ac. Sci. 1896, 225, Neah Bay and Seattle, Washington.

2388. Oligocottus acuticeps Gilbert.

Alaska to Cape Flattery; Departure Bay, Vancouver Island.
Oligocottus acuticeps Gilbert, Rept. U. S. Fish Com. 1893 (1896), 432, Unalaska.

Genus 738. **BLENNICOTTUS** Gill.

Blennicottus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 166 (*globiceps*).

2389. Blennicottus embryum Jordan & Starks.

Pacific Coast of America, from Puget Sound to Monterey, California.
Oligocottus embryum Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 808, pl. 82, Neah Bay, Washington.

2390. Blennicottus globiceps (Girard).

Pacific Coast, from Coronados Island northward to Cape Mendocino.
Oligocottus globiceps Girard, U. S. Pac. R. R. Surv., Fish., 58, 1858, South Farallones.

2390a. Blennicottus globiceps bryosus Jordan & Starks.

Puget Sound.

Blennicottus globiceps bryosus Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 808, Neah Bay, Washington.

Genus 739. HISTIOCOTTUS Gill.

Histiocottus Gill, Proc. U. S. Nat. Mus. 1888, 573 (*bilobus*).

2391. Histiocottus bilobus (Cuvier & Valenciennes).

Coast of Alaska and Kamchatka.

Blepsias bilobus Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 379, 1829, no locality; somewhere in Kamchatka.

Genus 740. BLEPSIAS Cuvier.

Blepsias Cuvier, Règne Animal, ed. 2, II, 167, 1829 (*cirrhosus*).

2392. Blepsias cirrhosus (Pallas).

Alaska to San Francisco; common at Unalaska, but not often south of Puget Sound.

Trachinus cirrhosus Pallas, Zoogr. Rosso-Asiat., III, 237, 1811, Bering Sea.

Genus 741. NAUTICHTHYS Girard.

Nautichthys Girard, Pac. R. R. Surv., Fishes, 74, 1858 (*oculofasciatus*).

2393. Nautichthys oculofasciatus (Girard).

Pacific Coast, Alaska to San Francisco, chiefly northward; common in Bristol Bay and about Unalaska.

Blepsias oculofasciatus Girard, Proc. Ac. Nat. Sci. Phila. 1857, 202, Fort Steilacoom, Washington.

Genus 742. ULCA Jordan & Evermann.

Ulca Jordan & Evermann, Proc. Cal. Ac. Sci. 1896, 227 (*marmoratus*).

2394. Ulca marmorata (Bean).

Alaska, off Sitkalidak Island.

Hemitripterus marmoratus Bean, Proc. U. S. Nat. Mus. 1890, 43, off Sitkalidak Island.

Genus 743. HEMITRIPTERUS Cuvier.

Hemitripterus Cuvier, Règne Animal, ed. 2, II, 164, 1829 (*americanus*).

2395. Hemitripterus americanus (Gmelin). *Sea-raven.*

Atlantic Coast of America, chiefly northward, from Cape Cod to Labrador.

Scorpæna americana Gmelin, Syst. Nat., ed. XIV, 1220, 1788, no locality given.

2396. Hemitripterus cavifrons Lockington.

Coast of Alaska.

Hemitripterus cavifrons Lockington, Proc. Ac. Nat. Sci. Phila. 1880, 233, Kodiak Island, Alaska.

Genus 744. SYNCHIRUS Bean.

Synchirus Bean, Proc. U. S. Nat. Mus., XII, 1889, 641 (*gilli*).

2397. Synchirus gilli Bean.

Barclay Sound, British Columbia.

Synchirus gilli Bean, Proc. U. S. Nat. Mus., XII, 1889, 642, Barclay Sound.

Genus 745. ASCELICHTHYS Jordan & Gilbert.

Ascelichthys Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 264 (*rhodorus*).

2398. Ascelichthys rhodorus Jordan & Gilbert.

Pacific Coast from Sitka to Cape Mendocino; abundant in Neah Bay.

Ascelichthys rhodorus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 264, Waadda Island, Neah Bay, near Cape Flattery.

Genus 746. PSYCHROLUTES Günther.

Psychrolutes Günther, Cat., III, 516, 1861 (*paradoxus*).

2399. Psychrolutes paradoxus Günther.

Gulf of Georgia, Vancouver Island.

Psychrolutes paradoxus Günther, Cat., III, 516, 1861, Gulf of Georgia.

Genus 747. GILBERTINA Jordan & Starks.

Gilbertina Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 811 (*sigolutes*).

2400. Gilbertina sigolutes Jordan & Starks.

Puget Sound.

Gilbertina sigolutes Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 811, pl. 84, Port Orchard, near Seattle.

Family CLXXXI. RHAMPHOCOTTIDÆ.

Genus 748. RHAMPHOCOTTUS Günther.

Rhamphocottus Günther, Ann. Mag. Nat. Hist., XIV, 1874, 370 (*richardsoni*).

2401. Rhamphocottus richardsoni Günther.

North Pacific, Alaska to Monterey; not infrequent in Puget Sound.

Rhamphocottus richardsoni Günther, Ann. Mag. Nat. Hist., XIV, 1874, 370, Fort Rupert, British America.

Family CLXXXII. AGONIDÆ.

Genus 749. HIPPOCEPHALUS Swainson.

Hippocephalus Swainson, Nat. Hist. Fishes, etc., II, 272, 1839 (*supercriliosus*).

2402. Hippocephalus japonicus (Pallas).

North Pacific; Kuril Islands; Gulf of Patience; Sakhalin Island; Okhotsk Sea.

Cottus japonicus Pallas, "Spicilegia Zoologia, VII, 30, pl. 5, figs. 1-3, 1772," Kuril Islands.

Genus 750. AGONOMALUS Guichenot.

Agonomalus Guichenot, Mém. Soc. Sci. Nat. de Cherbourg, 252, pl. 9, 1866 (*proboscidalis*).

2403. Agonomalus proboscidalis (Valenciennes).

Port of the Emperor Nicholas, Gulf of Tartary.

Aspidophorus proboscidalis Valenciennes, Comptes Rendus de l'Academie des Sciences, XLVII, 1040, 1858, Gulf of Tartary.

Genus 751. HYPSAGONUS Gill.

Hypsagonus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 259 (*quadricornis*).

2404. Hypsagonus quadricornis (Cuvier & Valenciennes).

North Pacific; Kamchatka; Bering Sea and coasts of Alaska south to Bristol Bay and Puget Sound.

Aspidophorus quadricornis Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 221, 1829, Kamchatka.

Genus 752. BRACHYOPSIS Gill.

Brachyopsis Gill, Proc. Ac. Nat. Sci. Phila. XIII, 1861, 167, 259 (*rostratus*).

2405. Brachyopsis verrucosus Lockington.

Coast of California, south to San Francisco.

Brachyopsis verrucosus Lockington, Proc. U. S. Nat. Mus., III, May 6, 1880, 60, Drake Bay, near San Francisco.

2406. Brachyopsis rostratus (Tilesius).

North Pacific, from Sakhalin, Gulf of Aniva, and the Kuril Islands.

Agonus rostratus Tilesius, Mém. Ac. Petersb., IV, pl. 14, 1810, Sakhalin, Gulf of Aniva.

2407. Brachyopsis dodecædrus (Tilesius).

North Pacific, Kamchatka, Bristol Bay, coast of Alaska.

Agonus dodecædrus Tilesius, Mém. Ac. Petersb., IV, pl. 13, 1810, Kamchatka.

2408. Brachyopsis segaliensis (Tilesius).

Island of Sakhalin.

Syngnathus segaliensis Tilesius, Mém. Soc. Imp. Nat. de Moscow, II, 216, pl. 14, 1810, Bay of Patience, Sakhalin Island.

Genus 753. STELLERINA* Cramer.

Stellerina Cramer, new genus (*xyosternus*).

2409. Stellerina xyosterna (Jordan & Gilbert).

Coast of California and Oregon.

Brachyopsis xyosternus Jordan & Gilbert, Proc. U. S. Nat. Mus., III, July 2, 1888, 152, Santa Cruz, California.

Genus 754. PALLASINA Cramer.

Pallasina Cramer, Proc. Cal. Ac. Sci. 1895, 815 (*barbatus*).

2410. Pallasina barbata (Steindachner).

North Pacific, south to Japan.

Siphagonus barbatus Steindachner, Ichth. Beitr., v, 140, pl. 5, Sitzb. der K. Ac. der Wiss., LXXIV, July, 1876, Hakodate and Nagasaki, Japan.

Genus 755. LEPTAGONUS Gill.

Leptagonus Gill, Proc. Ac. Nat. Sci. Phila., XIII, 1861, 167, 259 (*spinosissimus* = *decagonus*).

2411. Leptagonus decagonus (Bloch & Schneider).

Arctic Ocean, south to Newfoundland and Norway.

Agonus decagonus Bloch & Schneider, Syst. Ichth., I, 105, pl. 27, 1801, erroneously recorded from the East Indies, the type from Greenland.

Genus 756. PODOTHECUS Gill.

Podothecus Gill, Proc. Ac. Nat. Sci. Phila., XIII, 1861, 77, 259 (*peristethus* = *acipenserinus*).

2412. Podothecus accipiter Jordan & Starks.

Robben Island.

Podothecus accipiter Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 816, pl. 88, Robben Island, Okhotsk Sea.

2413. Podothecus gilberti (Collett).

Kamchatka.

Agonus gilberti Collett, Proc. Zool. Soc. Lond. 1894, 670, pl. 45, Kamchatka.

2414. Podothecus acipenserinus (Tilesius). *Common Alligator-fish.*

Kamchatka to Puget Sound.

Agonus acipenserinus Tilesius, Mém. Ac. Petersb., IV, 1811, 422, pl. 11, fig. 163, Unalaska.

2415. Podothecus veternus Jordan & Starks.

Robben Island.

Podothecus veternus Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 819, pl. 89, Robben Island, Okhotsk Sea.

Genus 757. STELGIS Cramer.

Stelgis Cramer, Proc. Cal. Ac. Sci. 1895, 821 (*vulsus*).

2416. Stelgis vulsus (Jordan & Gilbert).

Off San Francisco.

Agonus vulsus Jordan & Gilbert, Proc. U. S. Nat. Mus., III, 1880, 330, Point Reyes, near San Francisco.

Genus 758. AVERRUNCUS Jordan & Starks.

Averruncus Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 824 (*emmelane*).

2417. Averruncus emmelane Jordan & Starks.

Puget Sound, near Port Orchard.

Averruncus emmelane Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 821, pl. 91, Port Orchard, Puget Sound.

* Distinguished by the armature, especially that of the breast, which is reduced to prickles.

Genus 759. SARRITOR Cramer.

Sarritor Cramer, in Jordan & Evermann, Fishes North and Middle America, 1896 (*frenatus*).

2418. Sarritor frenatus (Gilbert).

Coast of Alaska.

Odontopyxis frenatus Gilbert, Rept. U. S. Fish Com. 1893 (1896), 435, pl. 30, fig. 3, Alaska and Aleutian Islands, at Albatross Stations 3219, 3225, and many others, in 16 to 351 fathoms.

2419. Sarritor leptorhynchus (Gilbert).

Coast of Alaska.

Odontopyxis leptorhynchus Gilbert, Rept. U. S. Fish Com. 1893 (1896), 437, north and south of the Alaskan peninsula, at Albatross Stations 3215, 3219, and others, in 32 to 59 fathoms.

Genus 760. XYSTES Jordan & Starks.

Xystes Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 824 (*axinophrys*).

2420. Xystes axinophrys Jordan & Starks.

Puget Sound.

Xystes axinophrys Jordan & Starks, Proc. Cal. Ac. Sci. 1885, 824, pl. 92, Port Orchard, Admiralty Inlet.

Genus 761. BATHYAGONUS Gilbert.

Bathyagonus Gilbert, Proc. U. S. Nat. Mus., XIII, 1890, 89 (*nigripinnis*).

2421. Bathyagonus nigripinnis Gilbert.

North Pacific, known from the Aleutian Islands, Bering Sea, south to the coast of Washington.

Bathyagonus nigripinnis Gilbert, Proc. U. S. Nat. Mus. 1890, 89, coast of Washington, at Albatross Station 3073, in 477 fathoms.

Genus 762. XENOCHIRUS Gilbert.

Xenochirus Gilbert, Proc. U. S. Nat. Mus., XIII, 1890, 90 (*triacanthus*).

2422. Xenochirus pentacanthus Gilbert.

Coast of Washington.

Xenochirus pentacanthus Gilbert, Proc. U. S. Nat. Mus. 1890, 91, coast of Washington, at Albatross Station 3076, in 178 fathoms.

2423. Xenochirus alascanus Gilbert.

Aleutian Islands.

Xenochirus alascanus Gilbert, Rept. U. S. Fish Com. 1893 (1896), 438, Unimak Pass, Aleutian Islands, at Albatross Stations 3216, 3219, and others, in 35 to 138 fathoms.

2424. Xenochirus latifrons Gilbert.

North Pacific Coast, from Oregon to San Diego.

Xenochirus latifrons Gilbert, Proc. U. S. Nat. Mus. 1890, 92, off coast of Oregon and San Diego, at Albatross Stations 2898, 2935, etc., in 61 to 158 fathoms.

2425. Xenochirus triacanthus Gilbert.

Pacific Coast, from Santa Barbara to Washington.

Xenochirus triacanthus Gilbert, Proc. U. S. Nat. Mus. 1890, 91, off coast of California, Oregon, and Washington, at Albatross Stations 2893, 2973, and 3059 in 145, 68, and 77 fathoms.

Genus 763. ODONTOPYXIS Lockington.

Odontopyxis Lockington, Proc. U. S. Nat. Mus., II, 1879, 328 (*trispinosus*).

2426. Odontopyxis trispinosus Lockington.

Pacific Coast of United States, from Puget Sound to Santa Barbara.

Odontopyxis trispinosus Lockington, Proc. U. S. Nat. Mus., II, 1879, 328, San Francisco.

Genus 764. BOTHRAGONUS Gill.

Bothragonus Gill, in Jordan & Gilbert, Synopsis, 728, 1883 (*swanii*).

2427. Bothragonus swanii (Steindachner).

Puget Sound.

Hypsagonus swanii Steindachner, Ichth. Beitr., v, 144, pl. 4, Sitzb. der Akad. Wiss., LXXIV, July, 1876, Port Townsend, Washington.

Genus 765. ASPIDOPHOROIDES Lacépède.

Aspidophoroides Lacépède, Hist. Nat. Poiss., III, 228, 1802 (*tranquebar* = *monopterygius*).

Subgenus ULCINA Cramer.

Ulcina Cramer, new subgenus (*olrikii*).

2428. Aspidophoroides olrikii Lütken.

Arctic Ocean; known from west coast of Greenland, Davis Strait, Kara Sea, Barrants Bay, and Nova Zembla.

Aspidophoroides olrikii Lütken, Forelob. Meddel. om Nord Ulkefische, Vidensk. Meddel. Naturhist., Foren. Kjob. 386, with 3 figures, 1876, Greenland.

Subgenus ASPIDOPHOROIDES Lacépède.

2429. Aspidophoroides guntheri Bean.

Coast of Alaska.

Aspidophoroides güntheri Bean, Proc. U. S. Nat. Mus. 1885, 74, Alaska.

2430. Aspidophoroides monopterygius (Bloch)

Greenland to Cape Cod.

Cottus monopterygius Bloch, Ichth., II, 156, pl. 178, figs. 1, 2, 1786, Tranquebar; an error.

2431. Aspidophoroides bartoni Gilbert.

Aleutian Islands.

Aspidophoroides bartoni Gilbert, Rept. U. S. F. C. 1893 (1896), 434, Aleutian Islands and Bristol Bay, Alaska, at Albatross Stations 3213, 3223, and many others, in 11½ to 121 fathoms.

Subgenus ANOPLAGONUS Gill.

Anoplagonus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 259 (*inermis*).

2432. Aspidophoroides inermis Günther.

Coasts of Alaska, south to Vancouver Island.

Aspidophoroides inermis Günther, Cat., II, 524, 1860, Vancouver Island.

Family CLXXXIII. CYCLOPTERIDÆ. The Lump Suckers.

Genus 766. CYCLOPTERUS (Artedi) Linnæus.

Cyclopterus Linnæus, Syst. Nat., ed. X, I, 260, 1758 (*lumpus*).

2433. Cyclopterus lumpus Linnæus. *Lumpfish; Cock and Hen Paddle; Lump Sucker.*

North Atlantic; rocky shores of both coasts, south to Cape Cod and France.

Cyclopterus lumpus Linnæus, Syst. Nat., ed. XI, I, 260, 1766, Baltic and North Sea.

Genus 767. EUMICROTREMUS Gill.

Eumicrotremus Gill, Proc. Ac. Nat. Sci. Phila. 1864, 190 (*spinosus*).

2434. Eumicrotremus spinosus (Müller).

North Atlantic and Arctic oceans, south to Maine and Denmark; Eastport, Maine.

Cyclopterus spinosus Müller, Prodr. Zool. Dan., IX, 1777, Denmark.

2435. Eumicrotremus orbis (Günther).

Aleutian Islands.

Cyclopterus orbis Günther, Cat., III, 158, 1861, Vancouver Island.

Genus 768. LETHOTREMUS Gilbert.

Lethotremus Gilbert, Rept. U. S. Fish Com. 1893 (1896), 449 (*muticus*).

2436. Lethotremus muticus Gilbert.

Aleutian Islands, near Unimak Pass, Alaska.
Lethotremus muticus Gilbert, Rept. U. S. Fish Com. 1893 (1896), 449, pl. 31, Unimak Pass, Alaska, at Albatross Stations 3223 and 3258, in 56 to 70 fathoms.

2437. Lethotremus vinolentus Jordan & Starks.

Puget Sound, Washington.
Lethotremus vinolentus Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 827, pl. 94, Puget Sound, near Seattle, Washington.

Genus 769. CYCLOPTEROIDES Garman.

Cyclopteroides Garman, Mon. Discoboli, 37, 1892 (*gyrinops*).

2438. Cyclopteroides gyrinops *Garman.*

St. Paul Island, Alaska.
Cyclopteroides gyrinops Garman, Mon. Discoboli, in Memoirs Mus. Comp. Zool., 37, 1892, St. Paul Island.

Genus 770. CYCLOPTERICHTHYS Steindachner.

Cyclopterichthys Steindachner, Ichth. Beitr., x, 14, 1881 (*glaber* = *ventricosus*).

2439. Cyclopterichthys ventricosus (Pallas).

Kamchatka; Sea of Okhotsk.
Cyclopterus ventricosus Pallas, Spicilegia Zoo., VII, 15, t. 2, 1770, no locality given, somewhere about Kamchatka.

Genus 771. LIPAROPS Garman.

Liparops Garman, Discoboli, 42, 1892 (*stelleri*).

2440. Liparops stelleri Pallas.

Peter and Paul Harbor, Kamchatka.
Liparops stelleri Pallas, in Garman, Discoboli, 42, 1892, Peter and Paul Harbor, Kamchatka.

Family CLXXXIV. LIPARIDIDÆ. The Sea Snails.

Genus 772. NEOLIPARIS Steindachner.

Neoliparis Steindachner, Ichth. Beitr., III, 54, 1875 (*mucosus*).

2441. Neoliparis montagui (Donovan).

North Atlantic, on both coasts, south to Connecticut.
Cyclopterus montagui Donovan, Brit. Fishes, III, pl. 68, 1805, England; after *Montague's Sucker.*

2442. Neoliparis callyodon (Pallas).

Coasts of Alaska, north to Kamchatka and Bering Sea; recorded from St. Paul, Kamchatka, Plover Bay, Siberia, Unalaska, and Kadiak.
Cyclopterus callyodon Pallas, Zoogr. Rosso-Asiat., III, 75, 1811, Kamchatka and Aleutian Islands.

2443. Neoliparis mucosus (Ayres).

Coast of California.
Liparis mucosus Ayres, Proc. Cal. Ac. Sci., I, 1855, 24 San Francisco.

2444. Neoliparis floræ *Jordan & Starks.*

Pacific Coast, Puget Sound to Monterey.
Neoliparis floræ Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 830, pl. 96, fig. 1, Waadda Island, Straits of Juan de Fuca.

2445. Neoliparis greeni Jordan & Starks.

Puget Sound, at Victoria, British Columbia.
Liparis greeni Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 829, pl. 96, figs. 2 and 3, Victoria, British Columbia.

Genus 773. LIPARIS (Artedi) Scopoli. *Sea Snails.*

Liparis (Artedi) Scopoli, Introd. Hist. Nat., 453, 1777 (*liparis*).

Subgenus LIPARIS (Artedi) Scopoli.

2446. Liparis liparis (Cuvier). *Sea Snail.*

North Atlantic, on both shores, south to Connecticut and France.

Cyclopterus liparis Linnæus, Syst. Nat., ed. 12, I, 414, 1766, Northern Ocean; after Artedi and Gronow.

2447. Liparis cyclopus Günther.

Aleutian Islands to Puget Sound.

Liparis cyclopus Günther, Cat., III, 162, 1861, Esquimault Harbor, Vancouver Island.

2448. Liparis fucensis Gilbert.

Straits of Fuca.

Liparis fucensis Gilbert, Proc. Cal. Ac. Sci. 1895, 837, and Rept. U. S. Fish Com. 1893 (1896), 447, Port Angeles, Straits of Juan de Fuca.

2449. Liparis tunicata Reinhardt.

Coast of Greenland.

Liparis tunicata Reinhardt, Övers. Kong. Danske Vidensk. Selsk., VI, CXI, 1836, Greenland.

2450. Liparis agassizii Putnam.

Bristol Bay.

Liparis agassizii Putnam, Proc. Amer. Assoc. Adv. Sci. 1874, 339, Sakhalin Channel of Tartary.

2451. Liparis dennyi Jordan & Starks.

North Pacific, from Aleutian Islands south to Puget Sound.

Liparis dennyi Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 835, pl. 98, Admiralty Inlet, near Seattle.

2452. Liparis cyclostigma Gilbert.

Bristol Bay, Alaska.

Liparis cyclostigma Gilbert, Rept. U. S. Fish Com. 1893 (1896), 446, Bristol Bay, Alaska, at Albatross Station 3252, in 29½ fathoms.

Subgenus LYOLIPARIS* Jordan & Evermann.

Lyoliparis Jordan & Evermann, new subgenus (*pulchellus*).

2453. Liparis pulchellus Ayres.

Point Reyes, California; northern Pacific, Alaska to Monterey.

Liparis pulchellus Ayres, Proc. Cal. Ac. Sci., I, 1855, 23, San Francisco.

Subgenus ACTINOCHIR Gill.

Actinochir Gill, Proc. Ac. Nat. Sci. Phila. 1864, 193 (*major*).

2454. Liparis major (Gill).

Coasts of Greenland.

Actinochir major Gill, Proc. Ac. Nat. Sci. Phila. 1864, 193, Greenland.

Genus 774. BATHYPHASMA Gilbert.

Bathyphasma Gilbert, Rept. U. S. Fish Com. 1893 (1896), 448 (*ovigerum*).

2455. Bathyphasma ovigerum Gilbert.

Off Queen Charlotte Island, British Columbia.

Bathyphasma ovigerum Gilbert, Rept. U. S. Fish Com. 1893 (1896), 448, Queen Charlotte Island, at Albatross Station 3342, in 1,588 fathoms.

* Distinguished from *Careliparis* by the greater number of vertebræ, and from *Actinochir* by the depressed cranium.

Genus 775. CAREPROCTUS Kroyer.

Careproctus Kroyer, Naturh. Tidskr., I, 257, 1862 (*reinhardti*).

Subgenus CAREMITRA* Jordan & Evermann.

Caremitra Jordan & Evermann, new subgenus (*simus*).

2456. Careproctus simus Gilbert.

Off Unalaska Island.

Careproctus simus Gilbert, Rept. U. S. Fish Com. 1893 (1896), 444, off Unalaska, at Albatross Station 3331, in 350 fathoms.

Subgenus CAREPROCTUS Kroyer.

2457. Careproctus colletti Gilbert.

South of Alaska Peninsula.

Careproctus colletti Gilbert, Rept. U. S. Fish Com. 1893 (1896), 442, south of Alaska Peninsula, at Albatross Station 3338, in 625 fathoms.

2458. Careproctus phasma Gilbert.

Bristol Bay, Alaska.

Careproctus phasma Gilbert, Rept. U. S. Fish Com. 1893 (1896), 443, Bristol Bay, Alaska, at Albatross Stations 3254 and 3256, in 46 and 49 fathoms.

2459. Careproctus spectrum Bean.

Between Unga and Nagai islands, Alaska.

Careproctus spectrum Bean, Proc. U. S. Nat. Mus. 1890, 40, between Unga and Nagai islands, 160° 18′ W., 55° 10′ N., at Albatross Station 2848, in 110 fathoms.

2460. Careproctus reinhardti (Kroyer).

Greenland, Jan Mayen, and Beeren Island.

Liparis (*Careproctus*) *reinhardti* Kroyer, Naturh. Tidskr., I, 252, 1862, Greenland.

2461. Careproctus ranula (Goode & Bean).

Off Halifax Harbor.

Liparis ranula Goode & Bean, Proc. U. S. Nat. Mus. 1880, 46, Halifax.

2462. Careproctus ostentum Gilbert.

Unalaska Island.

Careproctus ostentum Gilbert, Rept. U. S. Fish Com. 1893 (1896), 444, north of Unalaska Island, at Albatross Stations 3324 and 3331, in 109 and 350 fathoms.

2463. Careproctus gelatinosus (Pallas).

Peter and Paul Harbor, Kamchatka.

Cyclopterus gelatinosus Pallas, Spicilegia, VII, 19, 1769, Peter and Paul Harbor, Kamchatka.

Subgenus ALLOCHIR† Jordan & Evermann.

Allochir Jordan & Evermann, new subgenus (*melanurus*).

2464. Careproctus melanurus Gilbert.

Off coast of California and Oregon.

Careproctus melanurus Gilbert, Proc. U. S. Nat. Mus. 1891, 560, off coasts of California and Oregon, at Albatross Stations 2840, 2891, and others, in 178 to 339 fathoms.

Subgenus ALLURUS‡ Jordan & Evermann.

Allurus Jordan & Evermann, new subgenus (*ectenes*).

2465. Careproctus ectenes Gilbert.

Unalaska Island.

Careproctus ectenes Gilbert, Rept. U. S. Fish Com. 1893 (1896), 442, north of Unalaska, at Albatross Station 3331, in 350 fathoms.

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*Distinguished by the short, deep body and blunt head.
†Distinguished by the entire pectoral fins, without trace of notch.
‡Distinguished by the excessively elongate body and depressed snout.

Genus 776. GYRINICHTHYS Gilbert.

Gyrinichthys Gilbert, Rept. U. S. Fish Com. (1893) 1896, 444 (*minytremus*).

2466. Gyrinichthys minytremus Gilbert.

Off Unalaska Island.

Gyrinichthys minytremus Gilbert, Rept. U. S. Fish Com. 1893 (1896), 444, north of Unalaska, at Albatross Station 3331, in 350 fathoms.

Genus 777. AMITRA Goode.

Amitra Goode, Proc. U. S. Nat. Mus. 1880, 478 (*liparina*).

2467. Amitra liparina Goode.

Atlantic Ocean, off Rhode Island.

Amitra liparina Goode, Proc. U. S. Nat. Mus. 1880, 478, off Rhode Island.

Genus 778. PARALIPARIS Collett.

Paraliparis Collett, Vid. Selsk. Forsk. Christiania, 14, 32. 1878 (*bathybii*).

Subgenus PARALIPARIS Collett.

2468. Paraliparis holomelas Gilbert.

North of Unalaska Island.

Paraliparis holomelas Gilbert, Rept. U. S. Fish Com. 1893 (1896), 441, north of Unalaska, at Albatross Stations 3308 and 3332, in 406 and 1,625 fathoms.

Subgenus AMITRICHTHYS* Jordan & Evermann.

Amitrichthys Jordan & Evermann, new subgenus (*cephalus*).

2469. Paraliparis cephalus Gilbert.

Alaska to California.

Paraliparis cephalus Gilbert, Proc. U. S. Nat. Mus. 1891, 561, off California and Oregon, at Albatross Station 2919, in 984 fathoms.

2470. Paraliparis rosaceus Gilbert.

Coast of Mexico.

Paraliparis rosaceus Gilbert, Proc. U. S. N. M. 1890, 93, west coast of Mexico, at Albatross Stations 2898, 2935, and others, in 61 to 158 fathoms.

2471. Paraliparis mento Gilbert.

Coast of Oregon.

Paraliparis mento Gilbert, Proc. U. S. Nat. Mus. 1891, 562, off coast of Oregon, at Albatross Station 3071, in 685 fathoms.

2472. Paraliparis copei Goode & Bean.

Gulf Stream.

Paraliparis copei Goode & Bean, Ocean. Ichth., 279, fig. 253, 1896, Gulf Stream, at Albatross Station 2232, 39° 12′ 17″ N., 72° 9′ 30″ W., in 520 fathoms.

2473. Paraliparis dactylosus Gilbert.

Off Santa Cruz, California.

Paraliparis dactylosus Gilbert, Rept. U. S. Fish Com. 1893 (1896), 469, pl. 34, fig. 2, off Santa Cruz, California, at Albatross Station 3112, in 296 fathoms.

Subgenus HILGENDORFIA Goode & Bean.

Hilgendorfia Goode & Bean, Oceanic Ichth., 280, 1896 (*membranacea*).

2474. Paraliparis ulochir Gilbert.

Gulf of California and Unalaska.

Paraliparis ulochir Gilbert, Rept. U. S. Fish Com. 1893 (1896), 441, Gulf of California, at Albatross Station 3010, in 1,005 fathoms.

Genus 779. RHINOLIPARIS Gilbert.

Rhinoliparis Gilbert, Rept. U. S. Fish Com. 1893 (1896), 445 (*barbulifer*).

2475. Rhinoliparis barbulifer Gilbert.

Bering Sea.

Rhinoliparis barbulifer Gilbert, Rept. U. S. Fish Com. 1893 (1896), 445, north of Unalaska, Alaska, at Albatross Stations 3227, 3325, and others, in 225 to 576 fathoms.

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* Distinguished by the very small gill-openings, above pectorals.

Group GOBIOIDEI. The Gobies.

Family CLXXXV. CALLIONYMIDÆ. The Dragonets.

Genus 780. CALLIONYMUS Linnæus.

Callionymus Linnæus, Syst. Nat., ed. x, 249, 1758 (*lyra*).

2476. Callionymus bairdi Jordan.

"Snapper Banks," between Pensacola and Tampa, Florida.
Callionymus bairdi Jordan, Proc. U. S. Nat. Mus. 1887, 501, Snapper Banks, off Pensacola, Florida.

2477. Callionymus himantophorus Goode & Bean.

Off Barbados; off Santa Cruz.
Callionymus himantophorus Goode & Bean, Oceanic Ichth., 296, figs. 268 A and B, 1896, off Barbados, in 209 fathoms.

2478. Callionymus calliurus Eigenmann & Eigenmann.

Key West, Florida.
Callionymus calliurus Eigenmann & Eigenmann, Proc. Cal. Ac. Sci. 1888, 76, South Beach, Key West.

2479. Callionymus pauciradiatus Gill.

Mantanzas, Cuba.
Callionymus pauciradiatus Gill, Ann. Lyc. Nat. Hist. N. Y., VIII, 1865, 143, Mantanzas, Cuba.

Family CLXXXVI. GOBIIDÆ. The Gobies.

Genus 781. IOGLOSSUS Bean.

Ioglossus Bean, in Jordan and Gilbert, Proc. U. S. N. M. 1892, 297 (*calliurus*).

2480. Ioglossus calliurus Bean.

Gulf of Mexico; Snapper Banks, off Pensacola, Florida.
Ioglossus calliurus Bean, in Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 297, Pensacola, Florida.

Genus 782. PHILYPNUS Cuvier & Valenciennes.

Philypnus Cuvier & Valenciennes, Hist. Nat. Poiss., XII, 255, 1837 (*dormitor*).

2481. Philypnus dormitor (Lacépède). *Sleeper; Guavina.*

Streams of the West Indies and Atlantic shores of Central America, Mexico and Surinam.
Gobiomorus dormitor Lacépède, Hist. Nat. Poiss., II, 599, 1798, Martinique; from a drawing by Plumier.

2482. Philypnus lateralis Gill. *Aboma de Mar.*

Streams of Pacific Coast of Mexico and Central America, from Sonora to Panama.
Philypnus lateralis Gill, Proc. Ac. Nat. Sci. Phila. 1860, 123, Cape San Lucas.

Genus 783. DORMITATOR Gill.

Dormitator Gill, Proc. Ac. Nat. Sci. Phila. 1862, 240 (*gundlachi*).

2483. Dormitator maculatus (Bloch). *Guavina-Mapo; Paneca.*

Both coasts of America, ranging from South Carolina through the West Indies to Pará, Cape San Lucas, and Panama.
Sciæna maculata Bloch, Ichth., pl. 299, fig. 2, 1790, West Indies.

Genus 784. GUAVINA Bleeker.

Guavina Bleeker, Esquisse d'un Syst. Nat. Gobioid., 302, 1874 (*guavina*).

2484. Guavina guavina (Cuvier & Valenciennes). *Guarubaco; Guarina.*

East coast of tropical America, Cuba to Rio Janeiro.
Eleotris guarina Cuvier & Valenciennes, Hist. Nat. Poiss., XII, 223, 1837, Martinique.

Genus 785. ELEOTRIS Bloch & Schneider.

Eleotris Bloch & Schneider, Syst. Ichth., 65, 1801 (*pisonis*).

2485. Eleotris amblyopsis (Cope).

Atlantic Coast of America, from Charleston, South Carolina, to Surinam; streams of West Indies.

Eleotris amblyopsis Cope, Trans. Amer. Philos. Soc. 1870, 473, Surinam.

2486. Eleotris abacurus Jordan & Gilbert.

Coast of South Carolina.

Eleotris abacurus Jordan & Gilbert, Proc. Cal. Ac. Sci. 1896, 228, Charleston, South Carolina.

2487. Eleotris pisonis (Gmelin). *Guavina; Tetard; Sleeper.*

Rio Almendares, Cuba.

Gobius pisonis Gmelin, Syst. Nat., 106, 1788, Rio Almendares, Cuba (based on *Eleotris* of Gronow).

2488. Eleotris perniger (Cope).

West Indies, south to Rio Janeiro.

Culius perniger Cope, Trans. Amer. Philos. Soc. 1870, 473, St. Martins.

2489. Eleotris pictus Kner & Steindachner. *Guavina.*

Streams about the Gulf of California, from Sonora south to Panama; Rio Presidio.

Eleotris pictus Kner & Steindachner, Abh. Ak. Wiss. Wien, 1864, 18, pl. 3, fig. 1, Rio Bayano, near Panama.

Genus 786. ALEXURUS Jordan.

Alexurus Jordan, Proc. Cal. Ac. Sci. 1895, 511 (*armiger*).

2490. Alexurus armiger Jordan.

La Paz, Baja California.

Alexurus armiger Jordan & Richardson, in Jordan, Proc. Cal. Ac. Sci. 1895, 511, pl. 48, La Paz, Lower California.

Genus 787. EROTELIS Poey. *Esmeraldes de Mar.*

Erotelis Poey, Memorias, II, 273, 1861 (*valenciennesi* = *smaragdus*).

2491. Erotelis smaragdus (Cuvier & Valenciennes). *Esmeralda Negra; Esmeralda de Mar.*

Key West and Cuba; coral shores among algæ.

Eleotris smaragdus Cuv. & Val., Hist. Nat. Poiss., XII, 231, 1837, Cuba.

Genus 788. GYMNELEOTRIS Bleeker.

Gymnelcotris Bleeker, Esqu. d'un Syst. Nat. des Gobi., 304, 1874 (*seminuda*).

2492. Gymneleotris seminuda (Günther).

Panama.

Eleotris seminuda Günther, Proc. Zool. Soc. Lond. 1864, 24, pl. 4, figs. 2, 2*a*, Panama.

Genus 789. CHRIOLEPIS Gilbert.

Chriolepis Gilbert, Proc. U. S. Nat. Mus. 1891, 557 (*minutillus*).

2493. Chriolepis minutillus Gilbert.

Gulf of California.

Chriolepis minutillus Gilbert, Proc. U. S. Nat. Mus. 1891, 558, Gulf of California, at Albatross Station 2825.

Genus 790. SICYDIUM Cuvier & Valenciennes.

Sicydium Cuvier & Valenciennes, Hist. Nat. Poiss., XII, 168, 1837 (*plumieri*).

2494. Sicydium plumieri (Bloch). *Sirago.*

Fresh waters of the West Indies.

Gobius plumieri Bloch, Ichth., 125, pl. 178, fig. 3, 1786, Martinique; on a drawing by Plumier.

2495. Sicydium antillarum Ogilvie-Grant.

Barbados.

Sicydium antillarum Ogilvie-Grant, Proc. Zool. Soc. Lond. 1884, 157, Barbados.

2496. Sicydium vincente Jordan & Evermann.

Kingston, St. Vincent Island; Haiti.

Sicydium vincente Jordan & Evermann, Fishes North and Middle America, 1896, St. Vincent Island.

Genus 791. COTYLOPUS Guichenot.

Cotylopus Guichenot, in Maillard, Notes sur l'Isle de la Réunion, II, Addendum, 9, 1864 (*acutipinnis*).

Subgenus SICYA Jordan & Evermann.

Sicya Jordan & Evermann, Fishes N. and M. Amer., 1896 (*gymnogaster*).

2497. Cotylopus gymnogaster (Ogilvie-Grant).

Streams about Mazatlan, Mexico.

Sicydium gymnogaster Ogilvie-Grant, Proc. Zool. Soc. Lond. 1884, 158, pl. 11, fig. 2, and pl. 12, fig. 6, Mazatlan, Mexico.

2498. Cotylopus salvini (Ogilvie-Grant).

Streams near Panama.

Sicydium salvini Ogilvie-Grant, Proc. Zool. Soc. Lond. 1884, 159, pl. 12, fig. 2, Panama.

Genus 792. EVORTHODUS Gill.

Evorthodus Gill, Proc. Ac. Nat. Sci. Phila. 1859, 195 (*breviceps*).

2499. Evorthodus breviceps Gill.

Trinidad and Surinam.

Evorthodus breviceps Gill, Proc. Ac. Nat. Sci. Phila. 1859, 195, Trinidad.

Genus 793. LOPHOGOBIUS Gill. *Crested Gobies.*

Lophogobius Gill, Proc. Ac. Nat. Sci. Phila. 1862, 240 (*cristagalli* = *cyprinoides*).

2500. Lophogobius cyprinoides (Pallas).

West Indies; Cuba.

Gobius cyprinoides Pallas, Spic., Zool., VIII, 17, pl. 1, fig. 5, 1770, "Amboina."

Genus 794. GOBIUS (Artedi) Linnæus.

Gobius (Artedi) Linnæus, Syst. Nat., ed. X, 262, 1758 (*niger*).

Subgenus GOBIUS (Artedi) Linnæus.

2501. Gobius soporator Cuvier & Valenciennes. *Sleeper; Mapo; Caiman.*

Panama, Barbados, Pará, Itapuana, Cuba, Galapagos, Sambara, Bahamas, Orange Key, Bahia, Pernambuco, St. Thomas, Tortugas, Florida Keys, Martinique, Sao Matheas, Curuca, Rio de Janeiro, Rio Doce.

Gobius soporator Cuv. & Val., Hist. Nat. Poiss., XII, 56, 1837, Martinique.

Subgenus CTENOGOBIUS Gill.

Ctenogobius Gill, Ann. Lyc. Nat. Hist. N. Y., VI, 1858, 374, 430 (*fasciatus*).

2502. Gobius nicholsi Bean.

Coast of British Columbia.

Gobius nicholsi Bean, Proc. U. S. Nat. Mus. 1881, 469, Departure Bay, British Columbia.

2503. Gobius glaucofrænum (Gill).

Florida Keys; Tortugas (?); Washington (?).

Coryphopterus glaucofrænum Gill, Proc. Ac. Nat. Sci. Phila. 1863, 263, coast of Washington; evidently an error.

2504. Gobius manglicola Jordan & Starks.

Pacific Coast of Mexico at Mazatlan.

Gobius manglicola Jordan & Starks, in Jordan, Proc. Cal. Ac. Sci. 1895, 495, Mazatlan, Mexico.

2505. Gobius stigmaturus Goode & Bean.

Florida Keys.

Gobius stigmaturus Goode & Bean, Proc. U. S. Nat. Mus. 1882, 418, no type locality given, but specimens probably from Florida Keys.

2506. Gobius quadriporus Cuvier & Valenciennes.
Surinam.
Gobius quadriporus Cuv. & Val., Hist. Nat. Poiss., XII, 87, 1837, Surinam.

2507. Gobius shufeldti Jordan & Eigenmann.
Gulf Coast of United States,
Gobius shufeldti Jordan & Eigenmann, Proc. U. S. Nat. Mus. 1886, 495, New Orleans.

2508. Gobius boleosoma Jordan & Gilbert.
Gulf of Mexico, Pensacola to Key West.
Gobius boleosoma Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 295, Laguna Grande, Pensacola.

2509. Gobius fasciatus (Gill).
West Indies.
Ctenogobius fasciatus Gill, Ann. Lyc. Nat. Hist. N. Y., VI, 1858, 376, Trinidad.

2510. Gobius encæomus Jordan & Gilbert.
South Carolina to Key West.
Gobius encæomus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 611, Charleston, South Carolina.

2511. Gobius stigmaticus (Poey).
Coast of North Carolina, Florida Keys, West Indies, southward to Rio Janeiro; common at Havana.
Smaragdus stigmaticus Poey, Memorias, II, 281, 1861, Cuba.

2512. Gobius lyricus Girard.
Gulf of Mexico, from Galveston to Cuba and the Lesser Antilles.
Gobius lyricus Girard, Proc. Ac. Nat. Sci. Phila. 1858, 169, Brazos Santiago, Texas.

2513. Gobius garmani Eigenmann & Eigenmann.
Dominica; Fort de France; Martinique; St. Kitts.
Gobius garmani Eigenmann & Eigenmann, Proc. Cal. Ac. Sci. 1888, 61, Dominica, Fort de France, Martinique, and St. Kitts.

2514. Gobius zebra Gilbert.
West coast of Mexico.
Gobius zebra Gilbert, Proc. U. S. Nat. Mus. 1890, 73, west coast of Mexico.

Subgenus EUCTENOGOBIUS Gill.
Euctenogobius Gill, Ann. Lyc. Nat. Hist. N. Y., VII, 1859, 45 (*badius*).

2515. Gobius poeyi Steindachner.
Barbados.
Gobius poeyi Steindachner, Ichth. Notizen, VI, 44, 1867, Barbados.

2516. Gobius badius (Gill).
Mouth of Amazon.
Euctenogobius badius Gill, Ann. Lyc. Nat. Hist. N. Y., VII, 1859, 47, Amazon.

Subgenus GOBIONELLUS Girard.
Gobionellus Girard, Proc. Ac. Nat. Sci. Phila. 1858, 168 (*hastatus*).

2517. Gobius microdon Gilbert.
San Juan Lagoon, west coast of Mexico.
Gobius microdon Gilbert, Proc. U. S. Nat. Mus. 1891, 554, San Juan Lagoon, north of Rio Ahomè, Mexico.

2518. Gobius smaragdus Cuvier & Valenciennes. *Esmeralda.*
West Indies, south to Rio Janeiro, north to St. Augustine, Florida, and to Charleston.
Gobius smaragdus Cuv. & Val., Hist. Nat. Poiss., XII, 120, 1837, Cuba.

2519. Gobius strigatus (O'Shaughnessy).
Coast of Surinam.
Euctenogobius strigatus O'Shaughnessy, Ann. Mag. Nat. Hist., 15, 1875, 145, Nagasaki, Japan.

2520. Gobius sagittula (Günther).

Gulf of California, south to Panama.

Euctenogobius sagittula Günther, Proc. Zool. Soc. Lond. 1861, 3, west coast of Central America.

2521. Gobius hastatus Girard. *Emerald-fish; Sharp-tailed Goby.*

Gulf of Mexico.

Gobioncllus hastatus Girard, Proc. Ac. Nat. Sci. Phila. 1858, 168, St. Joseph Island, Texas.

2522. Gobius oceanicus Pallas. *Esmeralda; Endormi; Emeraude; Bacalhao Sabara.*

Gulf Coast of United States, southward through the West Indies.

Gobius oceanicus Pallas, Spicilegia, VIII, 4, 1769, locality unknown; after Gronow.

Subgenus LYTHRYPNUS Jordan & Evermann.

Lythrypnus Jordan & Evermann, new subgenus (*dalli*).

2523. Gobius dalli Gilbert.

Catalina Harbor, California.

Gobius dalli Gilbert, Proc. U. S. Nat. Mus. 1890, 73, Catalina Harbor, California, in 35 fathoms.

Genus 795. GARMANNIA Jordan & Evermann. *Half-naked Gobies.*

Garmannia Jordan & Evermann, Proc. Cal. Ac. Sci. 1895, 495, pl. 49 (*paradoxus*).

2524. Garmannia paradoxa (Günther).

Pacific Coast of Mexico, Mazatlan to Panama.

Gobius paradoxus Günther, Proc. Zool. Soc. Lond. 1861, 3, west coast of Central America.

2525. Garmannia hemigymna (Eigenmann & Eigenmann).

West Indies.

Gobius hemigymnus Eigenmann & Eigenmann, Proc. Cal. Ac. Sci. 1888, 66, dredged in the West Indies.

2526. Garmannia seminuda (Günther).

West coast of Central America.

Gobius seminudus Günther, Proc. Zool. Soc. Lond. 1861, 3, west Central America.

Genus 796. RHINOGOBIUS Gill.

Rhinogobius Gill, Proc. Acad. Nat. Sc. Phila. 1859, 145 (*similis*).

2527. Rhinogobius flavus (Cuvier & Valenciennes).

Rivers of Surinam and Brazil, south to Bahia.

Gobius flavus Cuvier & Valenciennes, Hist. Nat. Poiss., XII, 60, 1837, Surinam.

2528. Rhinogobius taiasica (Lichtenstein).

West Indies, both coasts of Mexico, south to Brazil; common in Cuba, in Sinaloa, and about La Paz, in Lower California, thence southward to Panama.

Gobius taiasica Lichtenstein, Berl. Abhandl., 273, 1822 (not *Tajasica* Marcgrave), Brazil.

2529. Rhinogobius mexicanus (Günther).

Fresh-water streams of eastern slope of Mexico.

Gobius mexicanus Günther, Cat., III, 61, 1861, Mexico.

Genus 797. BOLLMANNIA Jordan.

Bollmannia Jordan, Proc. U. S. Nat. Mus. 1889, 164 (*chlamydes*).

2530. Bollmannia ocellata Gilbert.

Gulf of California.

Bollmannia ocellata Gilbert, Proc. U. S. Nat. Mus. 1891, 555, northern part of Gulf of California at Albatross Stations 3031 and 3035, in 30 and 33 fathoms.

2531. Bollmannia chlamydes Jordan.

Pacific Ocean, off coast of Colombia.

Bollmannia chlamydes Jordan, Proc. U. S. Nat. Mus. 1889, 164, off coast of Colombia, at Albatross Stations 2800 and 2805, in 51½ fathoms.

2532. Bollmannia macropoma Gilbert.

Gulf of California, just north of La Paz Bay.
Bollmannia macropoma Gilbert, Proc. U. S. Nat. Mus. 1891, 556, near La Paz, Gulf of California, at Albatross Station 2996, in 112 fathoms.

2533. Bollmannia stigmatura Gilbert.

Northern part of the Gulf of California.
Bollmannia stigmatura Gilbert, Proc. U. S. Nat. Mus. 1891, 556, Gulf of California, at Albatross Stations 3016 and 3017, in 76 and 58 fathoms.

Genus 798. ABOMA Jordan & Starks.

Aboma Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 497 (*etheostoma*).

2534. Aboma etheostoma Jordan & Starks.

Pacific Coast of Mexico.
Aboma etheostoma Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 498, pl. 50, Mazatlan, Mexico.

2535. Aboma lucretiæ (Eigenmann & Eigenmann).

Pearl Island, Gulf of Panama.
Gobius lucretiæ Eigenmann & Eigenmann, Proc. Cal. Ac. Sci. 1888, 57, Pearl Island, Gulf of Panama.

2536. Aboma chiquita (Jenkins & Evermann).

Gulf of California.
Gobius chiquita Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 146, Guaymas, Sonora.

Genus 799. MICROGOBIUS Poey.

Microgobius Poey, Enumeratio, 127, 1875 (*signatus*).

2537. Microgobius gulosus (Girard).

Coast of Florida to Texas, common north to Indian River.
Gobius gulosus Girard, Proc. Ac. Nat. Sci. Phila. 1858, 169, Indianola, Texas.

2538. Microgobius eulepis Eigenmann & Eigenmann.

Fortress Monroe, Virginia.
Microgobius eulepis Eigenmann & Eigenmann, Proc. Cal. Ac. Sci. 1888, 69, Fortress Monroe, Virginia.

2539. Microgobius thalassinus Jordan & Gilbert.

Charleston Harbor.
Gobius thalassinus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 612, Charleston Harbor, South Carolina.

2540. Microgobius signatus Poey.

West Indies; common in Cuba.
Microgobius signatus Poey, Enumeratio, 127, pl. 5, fig. 3, 1875, Cuba.

Genus 800. ZALYPNUS* Jordan & Evermann.

Zalypnus Jordan & Evermann, new genus (*emblematicus*).

2541. Zalypnus cyclolepis (Gilbert).

Lower California.
Microgobius cyclolepis Gilbert, Proc. U. S. Nat. Mus. 1891, 74, Lower California.

2542. Zalypnus emblematicus (Jordan & Gilbert).

Panama.
Gobius emblematicus Jordan & Gilbert, Bull. U. S. Fish Com. 1881, 330, Bay of Panama.

Genus 801. EUCYCLOGOBIUS Gill.

Eucyclogobius Gill, Proc. Ac. Nat. Sci. Phila. 1862, 279 (*newberryi*).

2543. Eucyclogobius newberryi (Girard).

Streams of California, in small brooks near the sea; locally common in San Luis Obispo Creek.
Gobius newberryi Girard, Proc. Ac. Nat. Sci. Phila. 1856, 136, Tomales Bay.

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* Distinguished from *Microgobius* by its half-naked body.

Genus 802. LEPIDOGOBIUS Gill.

Lepidogobius Gill, Ann. Lyc. Nat. Hist. N. Y., VII, 1859, 14 (*lepidus*).

2544. Lepidogobius lepidus (Girard).

Pacific Coast of North America, from Vancouver Island to Lower California; rather deep water off San Francisco Bay.
Gobius gracilis Girard, Proc. Ac. Nat. Sci. Phila. 1854, San Francisco.

Genus 803. GILLICHTHYS Cooper.

Gillichthys Cooper, Proc. Cal. Ac. Sci. 1863, 109 (*mirabilis*).

2545. Gillichthys mirabilis Cooper. *Long-jawed Goby.*

Pacific Coast of North America, from San Francisco to Guaymas.
Gillichthys mirabilis Cooper, Proc. Cal. Ac. Sci. 1863, 109, San Diego Bay.

2546. Gillichthys detrusus Gilbert & Scofield.

Horseshoe Bend, near mouth of Colorado River, in Mexico.
Gillichthys detrusus Gilbert & Scofield MS., 1896, near mouth of Colorado River.

Genus 804. QUIETULA Jordan & Evermann.

Quietula Jordan & Evermann, Proc. Cal. Ac. Sci. 1895, 839 (*y-cauda*).

2547. Quietula y-cauda (Jenkins & Evermann).

Pacific Coast of North America, from Guaymas to Vancouver Island.
Gillichthys y-cauda Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 147, Guaymas, Sonora.

Genus 805. ILYPNUS* Jordan & Evermann.

Ilypnus Jordan & Evermann, Fishes N. and M. Amer., 1896 (*gilberti*).

2548. Ilypnus gilberti (Eigenmann & Eigenmann).

San Diego Bay and southward; abundant at Magdalena Bay, Conception Bay, and St. Georges Bay in the Gulf of California.
Lepidogobius gilberti Eigenmann & Eigenmann, Proc. U. S. Nat. Mus. 1888, 464, San Diego Bay, California.

Genus 806. CLEVELANDIA Eigenmann & Eigenmann.

Clevelandia Eigenmann & Eigenmann, Proc. Cal. Ac. Sci. 1888, 73 (*longipinnis* =*rosæ*).

2549. Clevelandia ios (Jordan & Gilbert).

Puget Sound and neighboring waters.
Gobiosoma ios Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 437, Saanich Arm, Vancouver Island.

2550. Clevelandia rosæ Jordan & Evermann.

San Diego Bay.
Clevelandia rosæ Jordan & Evermann, Proc. Cal. Ac. Sci. 1896, 229, San Diego; after *Clevelandia longipinnis* Eigenmann & Eigenmann, not Steindachner.

Genus 807. EVERMANNIA Jordan.

Evermannia Jordan, Proc. Cal. Ac. Sci., IV, series 2, 1895, 592 (*zosterura*).

2551. Evermannia longipinnis (Steindachner).

Gulf of California.
Gobiosoma longipinne Steindachner, Ichth. Beitr., VIII, 27, 1879, Los Animas Island, Gulf of California.

2552. Evermannia zosterura (Jordan & Gilbert).

Pacific Coast of Mexico at Mazatlan, Mexico.
Gobiosoma zosterurum Jordan & Gilbert, Proc. U. S. N. M. 1881, 361, Mazatlan.

Genus 808. GOBIOSOMA Girard.

Gobiosoma Girard, Proc. Ac. Nat. Sci. Phila. 1858, 169 (*alepidotus*).

2553. Gobiosoma histrio Jordan.

Known only from the Gulf of California, at Guaymas.
Gobiosoma histrio Jordan, Proc. U. S. Nat. Mus. 1884, 260, Guaymas, Mexico.

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* Distinguished from *Clevelandia* by the presence of flaps on the shoulder girdle.

2554. Gobiosoma molestum Girard.

Gulf Coast of United States, from Key West to Texas, and south to Bahia.
Gobiosoma molestum Girard, Proc. Ac. Nat. Sci. Phila. 1858, 169, Indianola, Texas.

2555. Gobiosoma bosci (Lacépède).

Atlantic Coast of United States, Cape Cod to Florida.
Gobius bosci Lacépède, Hist. Nat. Poiss., II, 555, pl. 16, fig. 1, 1798, Charleston, South Carolina.

2556. Gobiosoma crescentale Gilbert.

Gulf of California.
Gobiosoma crescentalis Gilbert, Proc. U. S. Nat. Mus. 1891, 557, Gulf of California, at Albatross Station 2825.

2557. Gobiosoma multifasciatum Steindachner.

West Indies; known from Cuba, St. Thomas, and the Lesser Antilles.
Gobiosoma multifasciatum Steindachner, Ichth. Beitr., V, 183, 1870, Lesser Antilles.

Genus 809. BARBULIFER Eigenmann & Eigenmann.

Barbulifer Eigenmann & Eigenmann, Proc. Cal. Ac. Sci. 1888, 70 (*papillosus*).

2558. Barbulifer ceuthœcus (Jordan & Gilbert).

About Key West, Florida.
Gobiosoma ceuthœcum Jordan & Gilbert, Proc. U. S. N. M. 1884, 29, Key West, Florida.

Genus 810. TYPHLOGOBIUS Steindachner.

Typhlogobius Steindachner, Ichth. Beitr., VIII, 24, 1879 (*californiensis*).

2559. Typhlogobius californiensis Steindachner. *Blind Goby of Point Loma; Pinkfish.*

Coast of Lower California, from San Diego southward to Cerros Island; especially common at Point Loma.
Typhlogobius californiensis Steindachner, Ichth. Beitr., VIII, 24, 1879, False Bay, San Diego, California.

Genus 811. TYNTLASTES Günther.

Tyntlastes Günther, Proc. Zool. Soc. Lond. 1862, 193 (*sagitta*).

2560. Tyntlastes brevis (Günther).

Panama.
Amblyopus brevis Günther, Proc. Zool. Soc. Lond. 1864, 151, Panama.

2561. Tyntlastes sagitta (Günther).

Coast of Lower California.
Amblyopus sagitta Günther, Proc. Zool. Soc. Lond. 1862, 193, "California," probably from Lower California.

Genus 812. GOBIOIDES Lacépède.

Gobioides Lacépède, Hist. Nat. Poiss., II, 580, 1800 (*broussonnetii*).

2562. Gobioides broussonnetii Lacépède.

West Indies to Brazil; once taken near New Orleans.
Gobioides broussonnetii Lacépède, Hist. Nat. Poiss., II, 280, 1798, probably from Surinam, "Given by Holland to France."

2563. Gobioides peruanus (Steindachner).

Shores of Ecuador and Peru.
Amblyopus peruanus Steindachner, Fisch-Fauna des Caula und Flusse bei Guayaquil, 42, 1880, Guayaquil.

Genus 813. CAYENNIA Sauvage.

Cayennia Sauvage, Bull. Sci. Philom., series 7, IV, 1880, 57 (*guichenoti*).

2564. Cayennia guichenoti Sauvage.

Cayenne, French Guiana.
Cayennia guichenoti Sauvage, Bull. Soc. Philom., series 7, IV, 1880, 57, Cayenne.

Group TRACHINOIDEI. The Trachinoid Fishes.

Family CLXXXVII. MALACANTHIDÆ. The Blanquillos.

Genus 814. MALACANTHUS Cuvier.

Malacanthus Cuvier, Règne Animal, ed. 2, II, 205, 1829 (*plumieri*).

2565. Malacanthus plumieri (Bloch). *Matajuelo Blanco.*

West Indies.

Coryphæna plumieri Bloch, Ichth., V, 119, pl. 175, 1787, Martinique; from a drawing by Plumier.

Genus 815. CAULOLATILUS Gill.

Caulolatilus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 240 (*chrysops*).

2566. Caulolatilus princeps (Jenyns). *Blanquillo; Whitefish.*

Rocky islands of the Pacific Coast, from Monterey southward to the Galapagos; abundant about Santa Barbara Islands.

Latilus princeps Jenyns, Zool. Beagle, Fishes, 52, 1840, Chatham Island, Galapagos Archipelago.

2567. Caulolatilus microps Goode & Bean.

Gulf of Mexico.

Caulolatilus microps Goode & Bean, Proc. U. S. Nat. Mus. 1878, 43, off Pensacola, Florida.

2568. Caulolatilus cyanops Poey. *Blanquillo.*

Coast of Cuba.

Caulolatilus cyanops Poey, Repertorio, 311, 1867, Cuba.

Genus 816. LOPHOLATILUS Goode & Bean.

Lopholatilus Goode & Bean, Proc. U. S. Nat. Mus. 1879, 205 (*chamæleonticeps*).

2569. Lopholatilus chamæleonticeps Goode & Bean. *Tilefish.*

Deep waters of the western Atlantic.

Lopholatilus chamæleonticeps Goode & Bean, Proc. U. S. Nat. Mus. 1879, 205; 80 miles S. by E. of Noman's Land, 40° N., 70° W., in 84 fathoms.

Family CLXXXVIII. OPISTHOGNATHIDÆ. The Jawfishes.

Genus 817. OPISTHOGNATHUS Cuvier.

Opisthognathus Cuvier, Règne Animal, ed. 2, II, 240, 1829 (*sonneratii*).

2570. Opisthognathus lonchurum Jordan & Gilbert.

Gulf of Mexico, in deep water; two specimens known, taken from the stomach of a red snapper at Pensacola, Florida.

Opisthognathus lonchurus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 290, Snapper Banks, off Pensacola, Florida.

2571. Opisthognathus punctatum Peters.

West Coast of Mexico, Mazatlan.

Opisthognathus punctata Peters, Berliner Monatsberichte, 1869, Mazatlan.

2572. Opisthognathus macrognathum Poey.

Florida Keys to Cuba.

Opisthognathus macrognathus Poey, Memorias, II, 284, 1860, Cuba.

2573. Opisthognathus ommatum Jenkins & Evermann.

Gulf of California at Bay of Guaymas.

Opisthognathus ommata Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 153, Guaymas, Sonora.

Genus 818. GNATHYPOPS Gill.

Gnathypops Gill, Proc. Ac. Nat. Sci. Phila. 1862, 241 (*maxillosus*).

2574. Gnathypops scops Jenkins & Evermann.

Gulf of California at Guaymas.

Gnathypops scops Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 152, Guaymas, Sonora.

2575. Gnathypops maxillosus (Poey).
Cuba, north to Garden Key, Florida.
Opisthognathus maxillosus Poey, Memorias, II, 286, 1860, Cuba.

2576. Gnathypops macrops (Poey).
Coast of Cuba.
Opisthognathus macrops Poey, Memorias, II, 287, 1860, coast of Cuba.

2577. Gnathypops cuvieri (Valenciennes).
Bahia.
Opisthognathus cuvieri Valenciennes, Hist. Nat. Poiss., XI, 504, 1836, Bahia.

2578. Gnathypops rhomaleus (Jordan & Gilbert).
Gulf of California.
Opisthognathus rhomaleus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 276, Santa Maria Cove, Lower California.

2579. Gnathypops mystacinus Jordan.
Gulf of Mexico; known from the Pensacola "Snapper Banks," from stomachs of red snappers (*Neomænis aya*).
Gnathypops mystacinus Jordan, Proc. U. S. Nat. Mus. 1884, 37, Snapper Banks, off Pensacola, Florida.

Genus 819. LONCHOPISTHUS Gill.
Lonchopisthus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 241 (*micrognathus*).

2580. Lonchopisthus micrognathus (Poey).
Cuba.
Opisthognathus micrognathus Poey, Memorias, II, 287, 1860, Cuba.

Family CLXXXIX. BATHYMASTERIDÆ.

Genus 820. BATHYMASTER Cope.
Bathymaster Cope, Proc. Amer. Philos. Soc. 1873, 31 (*signatus*).

2581. Bathymaster signatus Cope.
Shores of Alaska.
Bathymaster signatus Cope, Proc. Amer. Phil. Soc. 1873, 31, near Sitka, Alaska.

Genus 821. RONQUILUS Jordan & Starks.
Ronquilus Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 838 (*jordani*).

2582. Ronquilus jordani (Gilbert).
Alaska to Puget Sound.
Bathymaster jordani Gilbert, Proc. U. S. Nat. Mus. 1888, 554, Elliott Bay at Seattle; Alaska.

Genus 822. RATHBUNELLA Jordan & Evermann.
Rathbunella Jordan & Evermann, Fishes N. and M. Amer., 1896 (*hypoplectus*).

2583. Rathbunella hypoplecta (Gilbert).
Coast of California off the Santa Barbara Islands.
Bathymaster hypoplectus Gilbert, Proc. U. S. Nat. Mus. 1890, 97, coast of California, south of Point Conception, at Albatross Station 2944.

Family CXC. CHIASMODONTIDÆ. The Black Swallowers.

Genus 823. CHIASMODON Johnson.
Chiasmodon Johnson, Proc. Zool. Soc. Lond. 1863, 408 (*niger*).

2584. Chiasmodon niger Johnson.
Deep waters of the Atlantic; taken at Madeira and off Massachusetts coast.
Chiasmodon niger Johnson, Proc. Zool. Soc. Lond. 1863, 408, Madeira.

Genus 824. PSEUDOSCOPELUS Lütken.

Pseudoscopelus Lütken, Spolia Atlantica, Scopelini, 64, 1892 (*scriptus*).

2585. Pseudoscopelus scriptus Lütken.

Old Bahama Straits.

Pseudoscopelus scriptus Lütken, Spolia Atlantica, Scopelini, 64, 1892, Old Bahama Straits.

Family CXCI. CHÆNICHTHYIDÆ.

Genus 825. HYPSICOMETES Goode.

Hypsicometes Goode, Proc. U. S. Nat. Mus. 1880, 347 (*gobioides*).

2586. Hypsicometes gobioides Goode.

Gulf Stream.

Hypsicometes gobioides Goode, Proc. U. S. Nat. Mus. 1880, 348, Gulf Stream, at Albatross Station 871, 40° 2′ 54″ N., 70° 23′ 40″ W., in 115 fathoms.

Family CXCII. TRICHODONTIDÆ. The Sand-Fishes.

Genus 826. TRICHODON Steller.

Trichodon Steller, in Tilesius, Mém. Acad. St. Petersburg, IV, 1813, 468 (*trichodon*).

2587. Trichodon trichodon (Tilesius).

Herendeen Bay and elsewhere in Bering Sea, and south to coast of Oregon.

Trachinus trichodon Tilesius, Mém. Acad. St. Petersb. 1813, 466, Bering Sea.

Genus 827. ARCTOSCOPUS* Jordan & Evermann.

Arctoscopus Jordan & Evermann, new genus (*japonicus*).

2588. Arctoscopus japonicus (Steindachner).

Strietok, in the Sea of Japan, and Sitka, Alaska.

Trichodon japonicus Steindachner, Ichth. Beitr., X, 4, 1881, Strietok and Sitka.

Family CXCIII. DACTYLOSCOPIDÆ. The Sand Star-Gazers.

Genus 828. GILLELLUS Gilbert.

Gillellus Gilbert, Proc. U. S. Nat. Mus. 1890, 98 (*semicinctus*).

2589. Gillellus semicinctus Gilbert.

Gulf of California; also off the Florida coast.

Gillellus semicinctus Gilbert, Proc. U. S. N. M. 1890, 98, near mouth of Gulf of California, at Albatross Stations 2827, 24° 11′ 45″ N., 109° 55′ W., and 2829, 22° 52′ N., 109° 55′ W., in 10 and 31 fathoms.

2590. Gillellus arenicola Gilbert.

Cape San Lucas, Lower California.

Gillellus arenicola Gilbert, Proc. U. S. Nat. Mus. 1890, 99, Cape San Lucas.

2591. Gillellus ornatus Gilbert.

Gulf of California.

Gillellus ornatus Gilbert, Proc. U. S. Nat. Mus. 1891, 558, Gulf of California.

Genus 829. DACTYLOSCOPUS Gill.

Dactyloscopus Gill, Proc. Ac. Nat. Sci. Phila. 1859, 132 (*tridigitatus*).

Subgenus DACTYLOSCOPUS Gill.

2592. Dactyloscopus pectoralis Gill.

Cape San Lucas, Lower California.

Dactyloscopus pectoralis Gill, Proc. Ac. Nat. Sci. Phila. 1861, 267, Cape San Lucas, Lower California.

* Distinguished from *Trichodon* by the short spinous dorsal.

2593. Dactyloscopus tridigitatus Gill.
West Indies, north to Key West.
Dactyloscopus tridigitatus Gill, Proc. Ac. Nat. Sci. Phila. 1859, 132, Barbados.

2594. Dactyloscopus poeyi Gill.
Cuba.
Dactyloscopus poeyi Gill, Proc. Ac. Nat. Sci. Phila. 1861, 266, Cuba.

2595. Dactyloscopus lunaticus Gilbert.
Gulf of California.
Dactyloscopus lunaticus Gilbert, Proc. U. S. N. M. 1890, 99, Gulf of California.

Subgenus ESLOSCOPUS* Jordan & Evermann.
Esloscopus Jordan & Evermann, new subgenus (*zelotes*).

2596. Dactyloscopus zelotes Jordan & Gilbert.
Panama.
Dactyloscopus zelotes Jordan & Gilbert new species, Panama.

Genus 830. DACTYLAGNUS Gill.
Dactylagnus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 505 (*mundus*).

2597. Dactylagnus mundus Gill.
Carmen Island, Gulf of California.
Dactylagnus mundus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 505, Carmen Island, Gulf of California.

Genus 831. MYXODAGNUS Gill.
Myxodagnus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 269 (*opercularis*)

2598. Myxodagnus opercularis Gill.
Cape San Lucas, Lower California.
Myxodagnus opercularis Gill, Proc. Ac. Nat. Sci. Phila. 1861, 270, Cape San Lucas, Lower California.

Family CXCIV. URANOSCOPIDÆ. The Star-Gazers.

Genus 832. ASTROSCOPUS (Brevoort) Gill. *Star-gazers.*
Astroscopus (Brevoort) Gill, Proc. Ac. Nat. Sci. Phila. 1860, 20 (*anoplus*).

2599. Astroscopus y-græcum (Cuvier & Valenciennes).
South Atlantic Coast, from Cape Hatteras to the Caribbean Sea.
Uranoscopus y-græcum Cuvier & Valenciennes, Hist. Nat. Poiss., III, 308, 1829, origin unknown.

2600. Astroscopus zephyrius Gilbert & Starks.
Magdalena Bay, Lower California.
Astroscopus zephyrius Jordan & Starks, Proc. U. S. Nat. Mus. 1896, Magdalena Bay, Lower California.

2601. Astroscopus guttatus Abbott.
Atlantic Coast of the United States, from Long Island to Virginia; not known south of Cape Hatteras.
Astroscopus guttatus Abbott, Proc. Ac. Nat. Sci. Phila. 1860, 365, Cape May, New Jersey.

Genus 833. KATHETOSTOMA Günther.
Kathetostoma Günther, Cat., II, 231, 1860 (*lævæ*).

2602. Kathetostoma averruncus Jordan & Bollman.
Pacific Ocean, off coast of Colombia.
Kathetostoma averruncus Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 163; off coast of Colombia, 8° 57′ N., 79° 31′ 30″ W., at Albatross Station 2800, in 7 fathoms.

*Subgenus and species based on description of *Dactyloscopus* sp. nov., Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 628; not *D. mundus* Gill, Proc. Ac. Nat. Sci. 1862, 505.

2603. Kathetostoma albigutta Bean.

Gulf of Mexico.

Kathetostoma albigutta Bean, Proc. U. S. Nat. Mus. 1892, 121, Gulf of Mexico, at Albatross Station 2103, 28° 42′ 30″ N., 85° 29′ W.

Family CXCV. BATRACHOIDIDÆ The Toadfishes.

Genus 834. BATRACHOIDES Lacépède.

Batrachoides Lacépède, *Hist. Nat. Poiss.*, II, 451, 1800 (*"tau"* Lacépède = *surinamensis*).

2604. Batrachoides surinamensis (Bloch & Schneider).

Coast of Guiana and Brazil.

Batrachus surinamensis Bloch & Schneider, Syst. Ichth., 43, 1801, Surinam, from a specimen in the museum of Paris.

2605. Batrachoides pacifici (Günther).

Panama.

Batrachus pacifici Günther, Cat., III, 173, 1861, Panama.

Genus 835. OPSANUS Rafinesque. *Toadfishes.*

Opsanus Rafinesque, Amer. Monthly Mag. 1817, 203 (*ccrapalus*).

2606. Opsanus tau (Linnæus). *Toadfish.*

Atlantic Coast from Massachusetts to the West Indies.

Gadus tau Linnæus, Syst. Nat., ed. XII, 439, 1766, Charleston, South Carolina.

2607. Opsanus pardus (*Goode & Bean*). *Sarpo.*

Gulf of Mexico.

Batrachus tau pardus Goode & Bean, Proc. U. S. Nat. Mus. 1879, 336, Pensacola Snapper Banks.

Genus 836. PORICHTHYS Girard. *Midshipmen.*

Porichthys Girard, Proc. Ac. Nat. Sci. Phila. 1854, 141 (*notatus*).

2608. Porichthys porosissimus Cuvier & Valenciennes. *Bagre Sapo.*

South Carolina to Montevideo; Pensacola.

Batrachus porosissimus Cuvier & Valenciennes, Hist. Nat. Poiss., XII, 501, 1837, Surinam, Cayenne, Rio Janeiro, and St. Catherine.

2609. Porichthys notatus Girard. *Singing-fish; Midshipman; Cabezon; Sapo.*

Pacific Coast from Puget Sound to Panama.

Porichthys notatus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 141, San Francisco.

2610. Porichthys margaritatus (Richardson).

Pacific Coast of tropical America.

Batrachus margaritatus Richardson, Voyage of the Sulphur, Fishes, 1845-1867, Pacific Coast of Central America.

Genus 837. THALASSOPHRYNE Günther. *Poison Toadfishes.*

Thalassophryne Günther, Cat., III, 174, 1861 (*maculosa*).

2611. Thalassophryne maculosa Günther.

Caribbean Sea.

Thalassophryne maculosa Günther, Cat., III, 175, 1861, Puerto Cabello, near Aspinwall.

2612. Thalassophryne reticulata (Günther).

Panama.

Thalassophryne reticulata Günther, Proc. Zool. Soc. Lond. 1864, 150, 155, Panama.

2613. Thalassophryne dowi Jordan & Gilbert.

Pacific Coast of North America, from Punta Arenas to Panama.

Thallassophryne dowi Jordan & Gilbert, Proc. U. S. Nat. Mus. 1887, 388, Punta Arenas.

Group BLENNIOIDEI. The Blennioid Fishes.

Family CXCVI. BLENNIIDÆ. The Blennies.

Genus 838. ENNEANECTES Jordan & Evermann.

Enneanectes Jordan & Evermann, Proc. Cal. Ac. Sci. 1895, 501 (*carminale*).

2614. Enneanectes carminalis (Jordan & Gilbert).

Mazatlan, Mexico.
Tripterygium carminale Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 362, Mazatlan.

Genus 839. HETEROSTICHUS Girard.

Heterostichus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 143 (*rostratus*).

2615. Heterostichus rostratus Girard.

Coast of California from San Francisco to San Diego.
Heterostichus rostratus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 143, San Diego, California.

Genus 840. GIBBONSIA Cooper.

Gibbonsia Cooper, Proc. Cal. Ac. Sci., III, 1864, 109 (*elegans*).

2616. Gibbonsia evides (Jordan & Gilbert). *Kelpfish; Senorita.*

Coast of California, south to Point Conception.
Clinus evides Jordan & Gilbert, Synopsis, 763, 1883, Monterey, California.

2617. Gibbonsia elegans (Cooper).

Coast of southern California; Point Conception to Todos Santos.
Myxodes elegans Cooper, Proc. Cal. Ac. Sci., III, 1864, 109, San Diego; Santa Barbara.

Genus 841. NEOCLINUS Girard.

Neoclinus Girard, U. S. Pac. R. R. Surv., Fish., X, 114, 1858 (*blanchardi*).

Subgenus NEOCLINUS Girard.

2618. Neoclinus blanchardi Girard.

Coast of California, Monterey to San Diego.
Neoclinus blanchardi Girard, U. S. Pac. R. R. Surv., Fish., 114, 1858, off San Diego, California.

Subgenus PTEROGNATHUS Girard.

Pterognathus Girard, Proc. Ac. Nat. Sci. Phila. 1859, 57 (*satiricus*).

2619. Neoclinus satiricus Girard.

Coast of California, from Monterey to Santa Barbara.
Neoclinus satiricus Girard, Proc. Ac. Nat. Sci. Phila. 1859, 57, Monterey Bay.

Genus 842. MALACOCTENUS Gill.

Malacoctenus Gill, Proc. Ac. Nat. Sci. Phila. 1860, 103 (*delalandi*).

2620. Malacoctenus ocellatus (Steindachner).

Bahama Islands.
Clinus ocellatus Steindachner, Ichth. Beitr., V, 182, 1876, Bahama Islands.

2621. Malacoctenus varius (Poey).

Cuba.
Myxodes varius Poey, Enumeratio, I, 132, 5, fig. 2, 1875, Havana.

2622. Malacoctenus macropus (Poey).

Cuba.
Myxodes macropus Poey, Synopsis, III, 99, 1868, Havana.

2623. Malacoctenus lugubris (Poey).

Cuba.
Myxodes lugubris Poey, Enumeratio, 131, 1875, Cuba.

2624. Malacoctenus gilli (Steindachner).

Barbados.
Clinus gilli Steindachner, Ichth. Notizen, VI, 46, 1867, Barbados.

2625. Malacoctenus bimaculatus (Steindachner).
Small rocky islands north of Cuba.
Clinus bimaculatus Steindachner, Ichth. Beitr., v, 180, 1876, islands off Cuba.

2626. Malacoctenus delalandi (Cuvier & Valenciennes).
Coast of Brazil and the west coast of Mexico.
Clinus delalandi Cuvier & Valenciennes, Hist. Nat. Poiss., 378, 1836, Brazil.

2627. Malacoctenus versicolor (Poey).
Cuba.
Myxodes versicolor Poey, Enumeratio, I, 131, 5, fig. 1, 1875, Cuba.

2628. Malacoctenus biguttatus (Cope).
New Providence, Bahamas.
Labrisomus biguttatus Cope, Trans. Amer. Philos. Soc. Phila. 1873, 473, New Providence, Bahamas.

Genus 843. LABRISOMUS Swainson.
Labrisomus Swainson, Nat. Hist. Classn. Fishes, II, 277, 1839 (*pectinifer*).

2629. Labrisomus herminier (LeSueur).
St. Bartholomew; West Indies.
Blennius herminier LeSueur, Jour. Ac. Nat. Sci. Phila., IV, 1824, 361, St. Bartholomew.

2630. Labrisomus nuchipinnis (Quoy & Gaimard).
West Indies; South Atlantic Coast.
Clinus nuchipinnis Quoy & Gaimard, Voy. Urania, Zool., 1824, Brazil.

2631. Labrisomus xanti Gill.
La Paz, Lower California.
Labrosomus xanti Gill, Proc. Ac. Nat. Sci. Phila. 1860, 107, Cerro Blanco, Cape San Lucas.

2632. Labrisomus bucciferus Poey.
Cuba.
Labrisomus bucciferus Poey, Synopsis, 399, 1868, Cuba.

2633. Labrisomus microlepidotus Poey.
Cuba.
Labrisomus microlepidotus Poey, Anal. Soc. Eps. Hist. Nat., XIX?, 246, 1, 8, fig. 2, 1880, Cuba.

Genus 844. MNIERPES* Jordan & Evermann.
Mnierpes Jordan & Evermann, new genus (*macrocephalus*).

2634. Mnierpes macrocephalus (Günther).
Pacific Coast of Central America; Panama.
Clinus macrocephalus Günther, Cat., III, 267, 1861, Pacific Coast of Central America.

Genus 845. GOBIOCLINUS Gill.
Gobioclinus Gill, Proc. Ac. Nat. Sci. Phila. 1860, 102 (*gobio*).

2635. Gobioclinus gobio (Cuvier & Valenciennes).
Lesser Antilles.
Clinus gobio Cuvier & Valenciennes, Hist. Nat. Poiss., XI, 395, 1836, Lesser Antilles.

Genus 846. STARKSIA Jordan & Evermann.
Starksia Jordan & Evermann, Proc. Cal. Ac. Sci. 1896, 231 (*cremnobates*).

2636. Starksia cremnobates (Gilbert).
Gulf of California.
Labrosomus cremnobates Gilbert, Proc. U. S. N. M. 1890, 100, Gulf of California.

* Distinguished from *Labrisomus* by the elongate form.

Genus 847. CRYPTOTREMA Gilbert.

Cryptotrema Gilbert, Proc. U. S. Nat. Mus. 1890, 101 (*corallinum*).

2637. Cryptotrema corallinum Gilbert.

Coast of California, south of Point Conception.
Cryptotrema corallinum Gilbert, Proc. U. S. Nat. Mus. 1890, 101, coast of California, south of Point Conception.

Genus 848. EXERPES Jordan & Evermann.

Exerpes Jordan & Evermann, Proc. Cal. Ac. Sci. 1896, 232 (*asper*).

2638. Exerpes asper (Jenkins & Evermann).

Guaymas, Mexico.
Auchenopterus asper Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 154, Guaymas, Mexico.

Genus 849. AUCHENOPTERUS Günther.

Auchenopterus Günther, Cat., III, 275, 1861 (*monophthalmus*).

2639. Auchenopterus altivelis (Lockington).

La Paz, Lower California.
Cremnobates altivelis Lockington, Proc. Ac. Nat. Sci. Phila. 1881, 116, La Paz, Lower California.

2640. Auchenopterus marmoratus (Steindachner).

Florida Keys to Cuba; Key West.
Cremnobates marmoratus Steindachner, Ichth. Beitr., V, 174, pl. 12. fig. 6, 1876, near Cuba.

2641. Auchenopterus affinis (Steindachner).

West Indies; Key West; St. Thomas.
Cremnobates affinis Steindachner, Ichth. Beitr., V, 178, 1876, St. Thomas.

2642. Auchenopterus monophthalmus Günther.

Gulf of California to Panama.
Auchenopterus monophthalmus Günther, Cat., III, 275, 1861, Panama.

2643. Auchenopterus integripinnis (Rosa Smith).

Coast of California, and southward to Todos Santos.
Cremnobates integripinnis Rosa Smith, Proc. U. S. Nat. Mus. 1880, 147, La Jolla, near San Diego.

2644. Auchenopterus nigripinnis (Steindachner).

Barbados.
Clinus nigripinnis Steindachner, Ichth. Notizen, VI, 46, 1867, Barbados.

2645. Auchenopterus fasciatus (Steindachner).

Florida Straits; north to Key West.
Cremnobates fasciatus Steindachner, Ichth. Beitr., V, 176, 1876, Florida Straits.

2646. Auchenopterus nox (Jordan & Gilbert).

Key West.
Cremnobates nox Jordan & Gilbert, Proc. U. S. Nat. Mus. 1884, 30, Key West.

Genus 850. PARACLINUS Mocquard.

Paraclinus Mocquard, Bull. Soc. Philom. Paris 1886, 41 (*chaperi*).

2647. Paraclinus chaperi Mocquard.

Bay of Quanta, near Barcelona, in Venezuela.
Paraclinus chaperi Mocquard, Bull. Soc. Philom. Paris 1886, 41, Bay of Quanta, Venezuela.

Genus 851. BLENNIUS (Artedi) Linnæus. *Blennies.*

Blennius (Artedi) Linnæus, Syst. Nat., ed. X, 256, 1758 (*galerita*).

Subgenus LIPOPHRYS Gill.

Lipophrys Gill, Amer. Nat., June, 1896, 498 (*pholis*).

2648. Blennius carolinus (Cuvier & Valenciennes).

South Carolina.
Pholis carolinus Cuv. & Val., Hist. Nat. Poiss., XI, 276, 1836, Carolina.

Subgenus BLENNIUS (Artedi) Linnæus.

2649. Blennius fucorum Cuvier & Valenciennes.
Off the Azores; also off New York.
Blennius fucorum Cuvier & Valenciennes, Hist. Nat. Poiss., XI, 263, 1836, 240 miles south of the Azores.

2650. Blennius stearnsi Jordan & Gilbert.
Gulf of Mexico.
Blennius stearnsi Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 300, Pensacola Snapper Banks.

2651. Blennius favosus Goode & Bean.
Gulf of Mexico; Garden Key, Florida.
Blennius favosus Goode & Bean, Proc. U. S. Nat. Mus. 1882, 416, Garden Key, Florida.

2652. Blennius marmoreus Poey.
Cuba.
Blennius marmoreus Poey, Enumeratio, 130, 1875, Cuba.

2653. Blennius truncatus (Poey).
Cuba.
Blennius truncatus Poey, Memorias, II, 424, 1861, Cuba.

2654. Blennius vinctus Poey.
Cuba.
Blennius vinctus Poey, Repertorio, 243, 1867, Havana.

2655. Blennius cristatus Linnæus.
Tropical parts of the Atlantic.
Blennius cristatus Linnæus, Syst. Nat., ed. x, 256, 1758, Indies; after Gronow.

Genus 852. **SCARTELLA** Jordan.
Scartella Jordan, Proc. U. S. Nat. Mus. 1886, 50 (*microstoma*).

2656. Scartella microstoma (Jordan).
Cuba.
Blennius microstomus Poey, Memorias, II, 288, 1860, Cuba.

Genus 853. **HYPLEUROCHILUS** Gill.
Hypleurochilus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 168 (*geminatus*).

2657. Hypleurochilus geminatus (Wood).
South Atlantic and Gulf coasts of United States.
Blennius geminatus Wood, Jour. Ac. Nat. Sci. Phila., IV, 1824, 278, Charleston, South Carolina.

Genus 854. **HYPSOBLENNIUS** Gill.
Hypsoblennius Gill, Cat. Fishes East Coast U. S., 20, 1861 (*hentzi*).

2658. Hypsoblennius gilberti (Jordan).
California, from Point Conception southward to Todos Santos.
Isesthes gilberti Jordan, Proc. U. S. Nat. Mus. 1882, 349, Santa Barbara, Cal.

2659. Hypsoblennius gentilis (Girard).
Coast of California from Monterey to Cape San Lucas.
Blennius gentilis Girard, Proc. Ac. Nat. Sci. Phila. 1854, 149, Monterey, Cal.

2660. Hypsoblennius striatus (Steindachner).
Panama.
Blennius striatus Steindachner, Ichth. Beitr., V, 15, 1876, Panama.

2661. Hypsoblennius ionthas (Jordan & Gilbert).
Pensacola, Florida.
Isesthes ionthas Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 299, Pensacola.

2662. Hypsoblennius scrutator Jordan & Gilbert.
South Carolina to Texas.
Isesthes scrutator Jordan & Gilbert, Proc. U. S. N. M. 1882, 300, Pensacola, Fla.

2663. Hypsoblennius punctatus (Wood).
Coast of North and South Carolina.
Blennius punctatus Wood, Jour. Ac. Nat. Sci. Phila., IV, 1824, 279, Charleston, South Carolina.

2664. Hypsoblennius brevipinnis (Günther).
Pacific Coast of Mexico, from Mazatlan to Panama.
Blennius brevipinnis Günther, Cat., III, 226, 1861, west coast Central America.

Genus 855. CHASMODES Cuvier & Valenciennes.
Chasmodes Cuv. & Val., Hist. Nat. Poiss., XI, 295, 1836 (*bosquianus*).

2665. Chasmodes jenkinsi Jordan & Evermann.
Gulf of California.
Chasmodes jenkinsi Jordan & Evermann, Proc. Cal. Ac. Sci. 1896, Bay of Guaymas, Sonora.

2666. Chasmodes saburræ Jordan & Gilbert.
Pensacola Bay, Florida.
Chasmodes saburræ Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 298, Pensacola, Florida.

2667. Chasmodes bosquianus (Lacépède).
New York to Florida.
Blennius bosquianus Lacépède, Hist. Nat. Poiss., II, 493, 1800, South Carolina.

2668. Chasmodes quadrifasciatus (Wood).
Probably South Atlantic Coast of United States.
Pholis quadrifasciatus Wood, Jour. Ac. Nat. Sci. Phila., IV, 1824, 282, locality unknown, probably South Carolina.

Genus 856. ATOPOCLINUS Vaillant.
Atopoclinus Vaillant, Bull. Soc. Philom. 1894, 73 (*ringens*).

2669. Atopoclinus ringens Vaillant.
Gulf of California.
Atopoclinus ringens Vaillant, Bull. Soc. Philom. 1894, 74, Gulf of California.

Genus 857. RUNULA Jordan & Bollman.
Runula Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 171 (*azalea*).

2670. Runula azalea Jordan & Bollman.
Galapagos Archipelago.
Runula azalea Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 171, Indefatigable Island, Galapagos Archipelago.

Genus 858. SCARTES* Jordan & Evermann.
Scartes Jordan & Evermann, new genus (*rubropunctatus*).

2671. Scartes rubropunctatus (Cuvier & Valenciennes).
Coast of Peru and Chile, north to Panama.
Salarias rubropunctatus Cuvier & Valenciennes, Hist. Nat. Poiss., XI, 348, 1836, Juan Fernandez.

Genus 859. RUPISCARTES Swainson.
Rupiscartes Swainson, Classn. Fishes, II, 275, 1839 (*atlanticus*).

2672. Rupiscartes atlanticus (Cuvier & Valenciennes).
Tropical America, on both coasts, north to West Indies and to Todos Santos.
Salarias atlanticus Cuvier & Valenciennes, Hist. Nat. Poiss., XI, 321, 1836, Atlantic Ocean.

Genus 860. ENTOMACRODUS Gill.
Entomacrodus Gill, Proc. Ac. Nat. Sci. Phila. 1859, 168 (*nigricans*).

2673. Entomacrodus chiostictus (Jordan & Gilbert).
Pacific Coast of Mexico.
Salarias chiostictus Jordan & Gilbert, Synopsis, 363, 1883, Mazatlan, Mexico.

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* Differs from *Salarias* (*quadripinnis*) in the continuous dorsal; no posterior canines.

2674. Entomacrodus margaritaceus (Poey).
Cuba.
Salarias margaritaceus Poey, Memorias, II, 289, 1861, Cuba.

2675. Entomacrodus decoratus Poey.
Cuba.
Entomacrodus decoratus Poey, Synopsis, 398, 1868, Cuba.

2676. Entomacrodus nigricans Gill.
West Indies.
Entomacrodus nigricans Gill, Proc. Ac. Nat. Sci. Phila. 1859, 168, Barbados.

Genus 861. SALARIICHTHYS Guichenot.
Salariichthys Guichenot, Mém. Soc. Sci. Nat. Cher., XIII, 1867, 96 (*textilis*).

2677. Salariichthys textilis Quoy & Gaimard.
West Indies, from Bermudas to Brazil.
Salarias textilis Quoy & Gaimard, in Cuvier & Valenciennes, Hist. Nat. Poiss., XI, 307, 1836, Ascension Island.

Genus 862. OPHIOBLENNIUS Gill.
Ophioblennius Gill, Proc. Ac. Nat. Sci. Phila. 1860, 103 (*webbii*), substitute for *Blennophis* Valenciennes (*webbii*), not *Blennophis* Swainson, a genus of *Clinidæ*.

2678. Ophioblennius webbii (Valenciennes).
West Indies and Canary Islands.
Blennophis webbii Valenciennes, in Webb & Berthelot, Iles Canaries, 1836, Canary Islands.

2679. Ophioblennius steindachneri Jordan & Evermann.
West coast of Mexico.
Ophioblennius steindachneri Jordan & Evermann, Fishes North and Middle America, 1896, Mazatlan.

Family CXCVII. CHÆNOPSIDÆ.

Genus 863. EMBLEMARIA Jordan & Gilbert.
Emblemaria Jordan & Gilbert, Proc. U. S. Nat. Mus. 1883, 627 (*nivipes*).

2680. Emblemaria atlantica Jordan & Evermann.
Gulf of Mexico; Snapper Banks off Pensacola.
Emblemaria atlantica Jordan & Evermann, Fishes North and Middle America, 1896, Gulf of Mexico.

2681. Emblemaria nivipes Jordan & Gilbert.
Pearl Island, near Panama.
Emblemaria nivipes Jordan & Gilbert, Proc. U. S. Nat. Mus. 1883, 627, Pearl Island, near Panama.

Genus 864. LUCIOBLENNIUS Gilbert.
Lucioblennius Gilbert, Proc. U. S. Nat. Mus. 1890, 103 (*alepidotus*).

2682. Lucioblennius alepidotus Gilbert.
Gulf of California,
Lucioblennius alepidotus Gilbert, Proc. U. S. N. M. 1890, 103, Lower California.

Genus 865. PHOLIDICHTHYS Bleeker.
Pholidichthys Bleeker, Boeroe, 406, 1857 (*leucotænia*).

2683. Pholidichthys anguilliformis Lockington.
Gulf of California.
Pholidichthys anguilliformis Lockington, Proc. Ac. Nat. Sci. Phila. 1881, 118, San Jose Island, Lower California.

Genus 866. PSEDNOBLENNIUS Jenkins & Evermann.
Psednoblennius Jenkins & Evermann, Proc. U. S. N. M. 1888, 156 (*hypacanthus*).

2684. Psednoblennius hypacanthus Jenkins & Evermann.
Guaymas, Sonora.
Psednoblennius hypacanthus Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 156, Guaymas, Mexico.

Genus 867. CHÆNOPSIS Gill.

Chænopsis Gill, Ann. Lyc. Nat. Hist. N. Y., VIII, 1865, 141, pl. 3, fig. 3 (*ocellatus*).

2685. Chænopsis ocellatus Poey.

Matanzas, Cuba.

Chænopsis ocellatus Poey, in Gill, Ann. Lyc. Nat. Hist. N. Y., VIII, 1867, 143, Matanzas, Cuba.

Family CXCVIII. XIPHIDIIDÆ.

Genus 868. STATHMONOTUS Bean.

Stathmonotus Bean, Proc. U. S. Nat. Mus. 1888, 191 (*hemphilli*).

2686. Stathmonotus hemphillii Bean.

Key West, Florida.

Stathmonotus hemphillii Bean, Proc. U. S. Nat. Mus. 1888, 191, pl. 13, Key West, Florida.

Genus 869. BRYOSTEMMA Jordan & Williams.

Bryostemma Jordan & Williams, in Jordan & Evermann, Fishes North and Middle America, 1896 (*nugator*).

2687. Bryostemma polyactocephalum (Pallas).

Kamchatka to Puget Sound.

Blennius polyactocephalus Pallas, Zool. Rosso-Asiat., III, 179, 1811, Kamchatka.

2688. Bryostemma nugator Jordan & Williams.

Near Seattle, Washington.

Bryostemma nugator Jordan & Williams, in Jordan & Evermann, Fishes North and Middle America, 1896, Puget Sound.

Genus 870. BLENNIOPHIDIUM Boulenger.

Blenniophidium Boulenger, Proc. Zool. Soc. Lond. 1892, 583 (*petropauli*).

2689. Blenniophidium petropauli Boulenger.

Kamchatka.

Blenniophidium petropauli Boulenger, Proc. Zool. Soc. Lond. 1892, 584, Petropaulovski Harbor, Kamchatka.

Genus 871. APODICHTHYS Girard.

Apodichthys Girard, Proc. Ac. Nat. Sci. Phila. 1854, 150 (*flavidus*).

2690. Apodichthys flavidus Girard.

Point Conception to Vancouver Island.

Apodichthys flavidus Girard, Proc. Ac. Nat. Sci. 1854, 150, Presidio (San Francisco), California.

2691. Apodichthys univitatus Lockington.

Gulf of California.

Apodichthys univitatus Lockington, Proc. Ac. Nat. Sci. Phila. 1881, 118, Gulf of California.

Genus 872. XERERPES Jordan & Gilbert.

Xererpes Jordan & Gilbert, Proc. Cal. Ac. Sci. 1895, 846 (*fucorum*).

2692. Xererpes fucorum (Jordan & Gilbert).

Coast of California.

Apodichthys fucorum Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 139, Los Pinos Point, near Monterey, California.

Genus 873. ULVICOLA Gilbert & Starks.

Ulvicola Gilbert & Starks, Proc. U. S. Nat. Mus. 1896 (*sanctæ-rosæ*).

2693. Ulvicola sanctæ-rosæ Gilbert & Starks.

Santa Rosa Island, coast of California.

Ulvicola sanctæ-rosæ Gilbert & Starks, Proc. U. S. Nat. Mus. 1896, Santa Rosa Island, California.

Genus 874. **PHOLIS** (Gronow) Scopoli.

Pholis (Gronow) Scopoli, Introductio Hist. Nat. 456, 1777 (*gunnellus*).

2694. Pholis gunnellus (Linnæus). *Gunnel; Butter-fish.*

North Atlantic, south to Cape Cod.

Blennius gunnellus Linnæus, Syst. Nat., ed. XII, I, 443, 1766, Atlantic Ocean.

2695. Pholis fasciatus (Bloch & Schneider).

Greenland to Alaska.

Centronotus fasciatus Bloch & Schneider, 165, pl. 37, fig. 1, 1801.

2696. Pholis ornatus (Girard).

San Francisco to Alaska.

Gunnellus ornatus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 149, Presidio (San Francisco), California.

2697. Pholis maxillaris (Bean).

St. Paul Island, Alaska.

Murænoides maxillaris Bean, Proc. U. S. Nat. Mus. 1881, 147, St. Paul Island, Alaska.

Genus 875. **RHODYMENICHTHYS** Jordan & Evermann.

Rhodymenichthys Jordan & Evermann, new genus (*ruberrimus*).

2698. Rhodymenichthys dolichogaster (Pallas).

Kamchatka and Aleutian Islands.

Blennius dolichogaster Pallas, Zoogr. Rosso-Asiat., III, 175, 1811, Kamchatka.

2699. Rhodymenichthys ruberrimus (Cuvier & Valenciennes).

Bering Sea and neighboring waters; Kuril Islands and Robben Island; also from Copper and Bering islands.

Gunnellus ruberrimus Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 440, Kuril Islands (after Pallas).

2700. Rhodymenichthys tænia (Pallas).

Kuril Islands.

Blennius tænia Pallas, Zoogr. Rosso-Asiat., III, 178, 1811, Kuril Islands.

Genus 876. **GUNNELLOPS** Bleeker.

Gunnellops Bleeker, 1874 (*roscus*).

2701. Gunnellops roseus (Pallas).

Kuril Islands.

Blennius roseus Pallas, Zoogr. Rosso-Asiat., III, 178, 1811, Kuril Islands.

Genus 877. **ASTERNOPTERYX** Ruppell.

Asternopteryx Ruppell, in Günther, Cat., III, 288, 1861 (*gunelliformis*).

2702. Asternopteryx gunelliformis Ruppell.

Greenland.

Asternopteryx gunelliformis Ruppell, in Günther, Cat., III, 288, 1861, probably from Greenland; type in Senckenberg Museum.

2703. Asternopteryx ocellatus (Tilesius).

Kamchatka.

Ophidium ocellatus Tilesius, Mém. Ac. St. Petersb., II, 237, 1811, Kamchatka.

Genus 878. **ANOPLARCHUS** Gill.

Anoplarchus Gill, Proc. Ac. Nat. Sci. Phila. 1861, 261 (*atropurpureus*).

2704. Anoplarchus atropurpureus (Kittlitz).

Alaska to San Francisco.

Ophidium atropurpureum Kittlitz, Denkwürd. einer Reise Russ.-Amer., I, 225, 1858.

2705. Anoplarchus alectrolophus (Pallas).

Island of Talek, Gulf of Penshin.

Blennius alectrolophus Pallas, Zoogr. Rosso-Asiat., III, 174, 1811, island of Talek.

Genus 879. XIPHISTES Jordan & Starks.

Xiphistes Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 846 (*chirus*).

2706. Xiphistes ulvæ Jordan & Starks.

Waadda Island, Neah Bay.

Xiphistes ulvæ Jordan & Starks, Fishes Puget Sound, in Proc. Cal. Ac. Sci. 1895, 847, pl. 102, Waadda Island, Neah Bay.

2707. Xiphistes chirus (Jordan & Gilbert).

Monterey to Alaska.

Xiphistes chirus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 135, Los Pinos Point, near Monterey, California.

Genus 880. XIPHIDION Girard.

Xiphidion Girard, Pac. R. R. Surv., x, 119, 1858 (*mucosum*).

2708. Xiphidion mucosum Girard.

Monterey to Alaska.

Xiphidion mucosum Girard, Pac. R. R. Surv., 119, 1858, South Farallone Island, off California.

2709. Xiphidion rupestre (Jordan & Gilbert).

Pacific Coast, from Alaska to Monterey.

Xiphister rupestris Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 137, Monterey, California.

Genus 881. CEBEDICHTHYS Ayres.

Cebedichthys Ayres, Proc. Cal. Ac. Sci., I, 1855, 59 (*violaceus*).

2710. Cebedichthys violaceus (Girard).

San Francisco to Point Conception.

Apodichthys violaceus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 150, Monterey, California.

Genus 882. PLAGIOGRAMMUS Bean.

Plagiogrammus Bean, Proc. U. S. Nat. Mus. 1893, 699 (*hopkinsi*).

2711. Plagiogrammus hopkinsi Bean.

Monterey, California.

Plagiogrammus hopkinsi Bean, Proc. U. S. Nat. Mus. 1893, 699, plate, Monterey Bay, California.

Family CXCIX. STICHÆIDÆ.

Genus 883. EUMESOGRAMMUS Gill.

Eumesogrammus Gill, Proc. Ac. Nat. Sci. Phila. 1864, 210 (*præcisus*).

2712. Eumesogrammus præcisus (Kröyer).

Greenland.

Clinus præcisus Kröyer, Naturh. Tidsskr., I, 25, 1836, Greenland.

Genus 884. ULVARIA* Jordan & Evermann.

Ulvaria Jordan & Evermann, new genus (*subbifurcata*).

2713. Ulvaria subbifurcata (Storer).

North Atlantic, south to Cape Cod.

Pholis subbifurcatus Storer, Rept. Fish. Mass., 63, 1839 (Massachusetts).

Genus 885. STICHÆUS Reinhardt.

Stichæus Reinhardt, Dansk. Vidensk. Natur. og Math. Afhandl. 1837, 109 (*punctatus*).

2714. Stichæus punctatus (Fabricius).

Polar seas, south to Cape Cod and Alaska.

Blennius punctatus Fabricius, Fauna Græn., 153, 1870, Greenland.

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* Distinguished from *Eumesogrammus* by the lateral line, which forks into two.

Genus 886. LEPTOCLINUS Gill.

Leptoclinus Gill, Proc. Ac. Nat. Sci. Phila. 1864, 209 (*maculatus*).

2715. Leptoclinus maculatus (Fries).

Greenland to Spitzbergen.

Clinus maculatus Fries, Kgl. Vet. Ak. Handl. 1837, 49, Greenland.

Genus 887. POROCLINUS Bean.

Poroclinus Bean, Proc. U. S. Nat. Mus. 1890, 40 (*rothrocki*).

2716. Poroclinus rothrocki Bean.

Between Nagia and Big Koniushi islands, Alaska.

Poroclinus rothrocki Bean, Proc. U. S. Nat. Mus. 1890, 40, Albatross Station 2852, latitude 55° 15′ N., longitude 159° 37′ W., in 58 fathoms.

Genus 888. ANISARCHUS Gill.

Anisarchus Gill, Proc. Ac. Nat. Sci. Phila. 1864, 209 (*medius*).

2717. Anisarchus medius (Reinhardt).

Greenland to Norway and Spitzbergen.

Clinus medius Reinhardt, Dansk. Vidensk. Afh. 1838, 114, Greenland.

Genus 889. LUMPENUS Reinhardt.

Lumpenus Reinhardt, Dansk. Vidensk. Selsk. Natur. 1837, 110 (*lumpenus*).

2718. Lumpenus anguillaris (Pallas).

San Francisco to Alaska.

Blennius anguillaris Pallas, Zoogr. Rosso-Asiat., III, 176, 1811, about Kamchatka; no definite locality.

2719. Lumpenus lumpenus (Fabricius).

Greenland.

Blennius lumpenus Fabricius, Fauna Grœnl., 151, 1870, Greenland.

2720. Lumpenus mackayi (Gilbert).

Nushagak River, Alaska.

Leptoblennius mackayi Gilbert, Rept. U. S. Fish Com. 1893 (1896), 450, pl. 32, Nushagak River, Alaska.

Genus 890. LEPTOBLENNIUS Gill.

Leptoblennius Gill, Proc. Ac. Nat. Sci. Phila. 1860, 21 (*serpentinus*).

Subgenus LEPTOBLENNIUS Gill.

2721. Leptoblennius serpentinus (Storer).

Cape Cod to Greenland.

Blennius serpentinus Storer, Proc. Bost. Soc. Nat. Hist., III, 1848, 30, no locality.

2722. Leptoblennius lampetræformis (Walbaum).

Greenland to Norway and Spitzbergen.

Blennius lampetræformis Walbaum, Artedi Piscium, 184, 1792, no locality.

Subgenus CENTROBLENNIUS Gill.

Centroblennius Gill, Proc. Ac. Nat. Sci. Phila. 1860, 21 (*nubilus*).

2723. Leptoblennius nubilus (Richardson).

Wellington Sound.

Lumpenus nubilus Richardson, Last Arctic Voyage, Fish., 13, pl. 28, 1854, Wellington Sound.

Genus 891. PLECTOBRANCHUS Gilbert.

Plectobranchus Gilbert, Proc. U. S. Nat. Mus. 1890, 102 (*evides*).

2724. Plectobranchus evides Gilbert.

Coast of Oregon and Washington.

Plectobranchus evides Gilbert, Proc. U. S. Nat. Mus. 1890, 102, coast of Oregon and Washington.

Family CC. CRYPTACANTHODIDÆ. The Wry-mouths.

Genus 892. DELOLEPIS Bean.

Delolepis Bean, Proc. U. S. Nat. Mus. 1881, 465 (*virgatus*).

2725. Delolepis virgatus Bean.

Coasts of British Columbia and southern Alaska, south to Puget Sound.
Delolepis virgatus Bean, Proc. U. S. Nat. Mus. 1881, 466, Kingcombe Inlet, British Columbia, and Port Wrangel, Alaska.

Genus 893. CRYPTACANTHODES Storer.

Cryptacanthodes Storer, Rept. Fishes Massachusetts, 28, 1839 (*maculatus*).

2726. Cryptacanthodes maculatus Storer.

North Atlantic, south to Cape Cod.
Cryptacanthodes maculatus Storer, Rept. Fish. Mass., 28, 1839, Massachusetts.

Genus 894. LYCONECTES Gilbert.

Lyconectes Gilbert, Rept. U. S. Fish Com. 1893 (1896), 446 (*aleutensis*).

2727. Lyconectes aleutensis Gilbert.

Aleutian Islands.
Lyconectes aleutensis Gilbert, Rept. U. S. Fish Com. 1893 (1896), 446, pl. 34, near Unalaska.

Family CCI. ANARHICHADIDÆ. The Wolf-Fishes.

Genus 895. ANARHICHAS (Artedi) Linnæus.

Anarhichas (Artedi) Linnæus, Syst. Nat., ed. x, 247, 1758 (*lupus*).

Subgenus ANARHICHAS Linnæus.

2728. Anarhichas lupus Linnæus. *Wolf-fish.*

North Atlantic, south to Cape Cod and France; rather common in America and Europe.
Anarhichas lupus Linnæus, Syst. Nat., ed. x, 247, 1758, no definite locality.

2729. Anarhichas minor Olafsen.

North Atlantic, on both coasts, chiefly north of the Arctic Circle.
Anarrhichas minor Olafsen, Reise in Island, 592, 1772, Iceland.

2730. Anarhichas lepturus Bean.

Alaska.
Anarrhichas lepturus Bean, Proc. U. S. Nat. Mus., II, 1879, 212, St. Michaels, Alaska.

2731. Anarhichas orientalis Pallas.

Alaska.
Anarrhichas orientalis Pallas, Zoogr. Rosso-Asiat., III, 77, 1811, Alaska.

Subgenus LYCICHTHYS Gill.

Lycichthys Gill, Ann. Record Sci. Indus. 1876 (1877), p. clxvii (*latifrons*).

2732. Anarhichas latifrons Steenstrup & Hallgrimsson.

North Atlantic, on both coasts; chiefly north of the Arctic Circle (Europe).
Anarrhichas latifrons Steenstrup & Hallgrimsson, Forh. Skand. Naturf., 3 die Mote, 1842, 647.

Genus 896. ANARRHICHTHYS Ayres.

Anarrhichthys Ayres, Proc. Cal. Ac. Sci., I, 1855, 32 (*ocellatus*).

2733. Anarrhichthys ocellatus Ayres.

Pacific Coast, from Monterey north to Puget Sound.
Anarrhichthys ocellatus Ayres, Proc. Cal. Ac. Sci., I, 1855, 31, San Francisco.

Family CCII. CERDALIDÆ.

Genus 897. CERDALE Jordan & Gilbert.

Cerdale Jordan & Gilbert, Bull. U. S. Fish Com. 1881, 332 (*ionthas*).

2734. Cerdale ionthas Jordan & Gilbert.

Panama.

Cerdale ionthas Jordan & Gilbert, Bull. U. S. Fish Com. 1881, 332, Panama.

Genus 898. MICRODESMUS Günther.

Microdesmus Günther, Proc. Zool. Soc. Lond. 1864, 26 (*dipus*).

2735. Microdesmus dipus Günther.

Pacific Coast of tropical America.

Microdesmus dipus Günther, Proc. Zool. Soc. Lond., January 26, 1864, 4, pl. 3, fig. 2, Central America.

2736. Microdesmus retropinnis Jordan & Gilbert.

Panama.

Microdesmus retropinnis Jordan & Gilbert, Bull. U. S. F. C. 1881, 331, Panama.

Family CCIII. PTILICHTHYIDÆ. The Quill-Fishes.

Genus 899. PTILICHTHYS Bean.

Ptilichthys Bean, Proc. U. S. Nat. Mus., IV, 1881, 157 (*goodei*).

2737. Ptilichthys goodei Bean.

Aleutian Islands.

Ptilichthys goodei Bean, Proc. U. S. Nat. Mus., IV, 1881, 157, Port Levasheff, Unalaska.

Group OPHIDIOIDEI. The Eel-Pouts.

Family CCIV. ZOARCIDAE.

Genus 900. ZOARCES Cuvier.

Zoarces Cuvier, Règne Animal, ed. 2, II, 240, 1829 (*viviparus*).

Subgenus MACROZOARCES.

Macrozoarces Gill, Proc. Ac. Nat. Sc. Phila. 1863, 258 (*anguillaris*).

2738. Zoarces anguillaris (Peck).

Delaware to Labrador; rather common northward.

Blennius anguillaris Peck, Mem. Amer. Ac. Sci., II, 1804, 46, New Hampshire.

Genus 901. LYCODOPSIS Collett.

Lycodopsis Collett, Proc. Zool. Soc. Lond. 1879, 381 (*pacificus*).

2739. Lycodopsis pacificus Collett.

San Francisco to Puget Sound.

Lycodes (*Lycodopsis*) *pacificus* Collett, Proc. Zool. Soc. Lond. 1879, 381, said to be from Japan; doubtless an error.

2740. Lycodopsis crotalinus Gilbert.

Northern Pacific and off Santa Barbara Islands.

Lycodopsis crotalinus Gilbert, Proc. U. S. Nat. Mus. 1890, 105, off Santa Barbara Islands, at Albatross Station 2980, in 603 fathoms.

2741. Lycodopsis crassilabris Gilbert.

Coast of southern California.

Lycodopsis crassilabris Gilbert, Proc. U. S. Nat. Mus. 1890, 106, off southern California, at Albatross Station 2839.

Genus 902. APRODON Gilbert.

Aprodon Gilbert, Proc. U. S. Nat. Mus. 1890, 106 (*cortcziana*).

2742. Aprodon corteziana Gilbert.

Cortez Banks, near San Diego, California.

Aprodon corteziana Gilbert, Proc. U. S. Nat. Mus. 1890, 107, Cortez Banks, off San Diego, at Albatross Stations 2925 and 2948, in 339 and 266 fathoms.

Genus 903. LYCODES Reinhardt.

Lycodes Reinhardt, Köngl. Dansko Vidensk. Selsk. Naturv., Math. Afh., VII, 1838, 153 (*vahli*).

Subgenus LYCODES Reinhardt.

2743. Lycodes vahli Reinhardt.

Coast of Greenland.
Lycodes vahli Reinhardt, Kön. Dan. Vidensk. Selsk. Nat. Math. Afh., VII, 1838, 153, pl. 5, Greenland.

2744. Lycodes esmarki Collett.

North Atlantic; Gulf Stream, in about latitude 40°, to Finmark and Spitzbergen.
Lycodes esmarki Collett, Norges Fiske, 95, 1874, American specimens, from the Gulf Stream in about latitude 40°.

2745. Lycodes zoarchus Goode & Bean.

Atlantic Ocean, off Nova Scotia.
Lycopodes zoarchus Goode & Bean, Ocean. Ichth., 308, 1896, off Nova Scotia, in 130 fathoms.

2746. Lycodes reticulatus Reinhardt.

North Atlantic, from Greenland south to Narragansett Bay; also northern Europe.
Lycodes reticulatus Reinhardt, Kön. Dan. Vid. Selsk., 1838, 153, Greenland.

2747. Lycodes perspicillum Kröyer.

Off southern Newfoundland.
Lycodes perspicillum Kröyer, Dansk. Vidensk. Selsk. Afhandl., XI, 1845.

2748. Lycodes frigidus Collett.

Atlantic, off New England Coast.
Lycodes frigidus Collett, Forh. Vid. Selsk. Christ. 1878, Nos. 14, 45, near Spitzbergen.

2749. Lycodes palearis Gilbert.

Bristol Bay, Alaska.
Lycodes palearis Gilbert, Rept. U. S. Fish Com. 1893 (1896), 454, Bristol Bay, Alaska, at Albatross Stations 3253 and 3254, in 36 and 46 fathoms.

2750. Lycodes brevipes Bean.

Aleutian Islands.
Lycodes brevipes Bean, Proc. U. S. Nat. Mus. 1890, 38, between Unga and Nagai islands, in 110 fathoms.

2751. Lycodes coccineus Bean.

Big Diomede Island, Bering Strait.
Lycodes coccineus Bean, Proc. U. S. Nat. Mus., IV, 1881, 144, Big Diomede Island, Bering Strait.

2752. Lycodes nebulosus Kröyer.

Greenland.
Lycodes nebulosus Kröyer, Kön. Dan. Vidensk. Sel. 1844, 140, Greenland.

2753. Lycodes seminudus Reinhardt.

North Atlantic, from Greenland to Spitzbergen.
Lycodes seminudus Reinhardt, Köng. Dansk. Selsk, etc., 1838, 233, Owenah, Greenland.

Genus 904. LYCENCHELYS Gill.

Lycenchelys Gill, Proc. Ac. Nat. Sci. Phila. 1884, 180 (*muræna*).

Subgenus LYCENCHELYS Gill.

2754. Lycenchelys verrillii (Goode & Bean).

Coast of Massachusetts and northward.
Lycodes verrillii Goode & Bean, Am. Jour. Sci. Arts, XIV, 1878, 474, 27 miles south and west of Chebucto Head, near Halifax.

2755. Lycenchelys paxillus (Goode & Bean).

Gulf Stream.

Lycodes paxillus Goode & Bean, Proc. U. S. Nat. Mus. 1879, 44, between Le Have and Sable Island Banks.

2756. Lycenchelys porifer (Gilbert).

Off Lower California.

Lycodes porifer Gilbert, Proc. U. S. Nat. Mus. 1890, 104, off Lower California, at Albatross Station 3009, in 857 fathoms.

Subgenus FURCELLA Jordan & Evermann.

Furcella Jordan & Evermann, Fishes N. and M. Amer., 1896 (*diapterus*).

2757. Lycenchelys diapterus (Gilbert).

Coasts of California and Oregon.

Lycodes diapterus Gilbert, Proc. U. S. N. M. 1891, 564, off coast of Oregon, at Albatross Stations 2892, 2896, and others, in 82 to 376 fathoms.

Genus 905. LYCODONUS Goode & Bean.

Lycodonus Goode & Bean, Bull. M. C. Z., x, No. 5, 208, 1883 (*mirabilis*).

2758. Lycodonus mirabilis Goode & Bean.

Off the New England Coast.

Lycodonus mirabilis Goode & Bean, Bull. Mus. Comp. Zool., x, No. 5, 208, 1883, latitude 38° 20′ 8″ N., longitude 73° 23′ 20″ W., in 740 fathoms.

Genus 906. LYCODALEPIS Bleeker.

Lycodalepis Bleeker, Verl. Akad. Amst., ed. II, VIII, 369 (*mucosus*).

2759. Lycodalepis mucosus (Richardson).

Arctic seas.

Lycodes mucosus Richardson, Last Arctic Voyage, 362, pl. 26, 1855, Northumberland Sound.

2760. Lycodalepis turneri (Bean).

Northern Alaska.

Lycodes turneri Bean, Proc. U. S. Nat. Mus. 1878, 464, St. Michaels, Alaska.

2761. Lycodalepis polaris (Sabine).

Coast of north Georgia.

Blennius polaris Sabine, Parry's Jour., Voyage 1819-20, Supp., 212, North Georgia.

Genus 907. LYCONEMA Gilbert.

Lyconema Gilbert, Rept. U. S. Fish Com. 1893 (1896), 471 (*barbatum*).

2762. Lyconema barbatum Gilbert.

Coast of Alaska.

Lyconema barbatum Gilbert, Rept. U. S. Fish. Com. 1893 (1896), 471, pl. 35, coast of Alaska, at Albatross Station 3129, in 204 fathoms.

Genus 908. MAYNEA Cunningham.

Maynea Cunningham, Trans. Linn. Soc., XXVII, 471, 1871 (*patagonica*).

2763. Maynea pusilla Bean.

Coast of Alaska, north of Unalaska.

Maynea pusilla Bean, Proc. U. S. Nat. Mus. 1890, 39, Aleutian Islands, latitude 55° 10′ N., longitude 160° 18′ W., in 110 fathoms.

2764. Maynea brunnea Bean.

North Pacific, Unalaska; southern California.

Maynea brunnea Bean, Proc. U. S. Nat. Mus. 1890, 39, latitude 33° 08′ N., longitude 118° 40′ W., off San Clemente Island, southern California, in 414 fathoms.

2765. Maynea stigma (Lay & Bennett).

Kotzebue Sound.

Ophidium stigma Lay & Bennett, Zool. Beechey's Voy., 67, 1839, Kotzebue Sound.

Genus 909. **BOTHROCARA** Bean.

Bothrocara Bean, Proc. U. S. Nat. Mus. 1890, 38 (*mollis*).

2766. **Bothrocara mollis** Bean.

Coast of British Columbia.

Bothrocara mollis Bean, Proc. U. S. Nat. Mus. 1890, 39, off Queen Charlotte Islands, in 876 fathoms.

Genus 910. **GYMNELIS** Reinhardt.

Gymnelis Reinhardt, Dansk. Vidensk. Selsk. Afhandl., VII, 1838, 131 (*viride*).

2767. **Gymnelis viridis** Reinhardt.

Arctic seas, south to Alaska and Nova Scotia.

Gymnelis viridis Reinhardt, Dansk. Vidensk. Selsk. Afh., VII, 1838, 131, Greenland.

Genus 911. **LYCOCARA** Gill.

Lycocara Gill, Proc. Ac. Nat. Sci. Phila. 1884, 180 (*parrii*).

2768. **Lycocara parrii** (Ross).

Baffins Bay.

Ophidium parrii Ross, Parry's Third Voyage, App. 109, 1826, Baffins Bay.

Genus 912. **MELANOSTIGMA** Günther.

Melanostigma Günther, Proc. Zool. Soc. Lond. 1881, 21 (*gelatinosum*).

2769. **Melanostigma gelatinosum** Günther.

Deep waters of the western Atlantic; originally known from the Straits of Magellan, but since obtained in various localities from Cape Cod to the West Indies.

Melanostigma gelatinosum Günther, Proc. Zool. Soc. Lond. 1881, 21, pl. 2, fig. A, Straits of Magellan.

2770. **Melanostigma pammelas** Gilbert.

Coast of Alaska.

Melanostigma pammelas Gilbert, Rept. U. S. Fish Com. 1893 (1896), 472, pl. 35, coast of Alaska, at Albatross Station 3202, latitude 36° 46′ 10″ N., longitude 121° 58′ 45″ W., in 382 fathoms.

Family CCV. SCYTALINIDÆ.

Genus 913. **SCYTALINA** Jordan & Gilbert.

Scytalina Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 266 (*cerdale*).

2771. **Scytalina cerdale** Jordan & Gilbert.

Straits of Juan de Fuca, Waadda Island, near Cape Flattery.

Scytalina cerdale Jordan & Gilbert, Proc. U. S. Nat. Mus., III, 1880, 266, Waadda Island, Neah Bay.

Family CCVI. DEREPODICHTHYIDÆ.

Genus 914. **DEREPODICHTHYS** Gilbert.

Derepodichthys Gilbert, Rept. U. S. Fish Com. 1893 (1896), 456 (*alepidotus*).

2772. **Derepodichthys alepidotus** Gilbert.

Coast of British Columbia, off Queen Charlotte Island.

Derepodichthys alepidotus Gilbert, Rept. U. S. Fish Com. 1893 (1896), 456, Queen Charlotte Island, at Albatross Station 3342, in 1,588 fathoms.

Family CCVII. OPHIDIIDÆ.

Genus 915. **LEPOPHIDIUM** Gill.

Lepophidium Gill. Am. Nat., XXIX, 1895, 167, substitute for *Leptophidium* Gill, Proc. Ac. Nat. Sci. Phila. 1863, 210 (*profundorum*); preoccupied in Serpents by *Leptophidium* Hallowell, 1860.

2773. **Lepophidium marmoratum** (Goode & Bean).

Gulf Stream.

Leptophidium marmoratum Goode & Bean, Proc. U. S. Nat. Mus. 1885, 423, latitude 23° 10′ 39″ N., longitude 82° 20′ 21″ W., in 213 fathoms.

2774. Lepophidium emmelas (Gilbert).

Coast of Lower California.

Leptophidium emmelas Gilbert, Proc. U. S. Nat. Mus. 1890, 110, coast of Lower California, at Albatross Stations 3007 and 3008, in 362 and 306 fathoms.

2775. Lepophidium stigmatistium (Gilbert).

Coast of Lower California.

Leptophidium stigmatistium Gilbert, Proc. U. S. Nat. Mus. 1890, 109, off Lower California, at Albatross Station 2996, in 112 fathoms.

2776. Lepophidium profundorum (Gill).

Gulf Stream, off the coast of Florida.

Leptophidium profundorum Gill, Proc. Ac. Nat. Sci. Phila. 1863, 211, Gulf Stream, off the coast of Florida.

2777. Lepophidium cervinum (Goode & Bean).

Gulf Stream.

Leptophidium cervinum Goode & Bean, Proc. U. S. Nat. Mus. 1885, 422, 40° 01′ N., 69° 56′ W., depth 76 fathoms.

2778. Lepophidium prorates (Jordan & Bollman).

Panama, and south of Panama.

Leptophidium prorates Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 172, Panama, and south of Panama.

2779. Lepophidium brevibarbe (Cuvier).

West Indies and Brazil.

Ophidium brevibarbe Cuvier, Règne Animal, ed. 2, II, 358, 1828 (Brazil).

2780. Lepophidium pardale (Gilbert).

Lower California.

Leptophidium pardale Gilbert, Proc. U. S. N. M. 1890, 108, off Lower California.

2781. Lepophidium microlepis (Gilbert).

Lower California.

Leptophidium microlepis Gilbert, Proc. U. S. Nat. Mus. 1890, 109, off Lower California.

Genus 916. OPHIDION (Artedi) Linnæus. *Cusk-eels.*

Ophidion (Artedi) Linnæus, Syst. Nat., ed. x, 259, 1758 (*barbatum*).

2782. Ophidion beani Jordan & Gilbert.

Gulf of Mexico; Snapper Banks off Pensacola, Florida.

Ophidion beani Jordan & Gilbert, Proc. U. S. Nat. Mus. 1883, 43, Snapper Banks off Pensacola.

2783. Ophidion holbrooki (Putnam).

Key West, Florida; Gulf of Mexico.

Ophidium holbrooki Putnam, Proc. Bost. Soc. Nat. Hist. 1874, 342, Key West, Florida.

2784. Ophidion grællsi Poey.

Cuba.

Ophidion grœllsi Poey, Memorias, II, 425, 1861, Havana.

Genus 917. CHILARA * **Jordan & Evermann.**

Chilara Jordan & Evermann, new genus (*taylori*).

2785. Chilara taylori (Girard).

Coast of California, from Monterey to San Diego.

Ophidium taylori Girard, Pac. R. R. Surv., x, 138, 1858, Monterey, California.

* Distinguished from *Ophidion* by the spine on the opercle. The air bladder is ovate, not contracted, and without foramen, as in *Ophidion*.

Genus 918. RISSOLA* Jordan & Evermann.

Rissola Jordan & Evermann, new genus (*marginatum*).

2786. Rissola marginata (DeKay).

South Atlantic Coast of United States, from New York south to Pensacola.
Ophidium marginatum DeKay, New York Fauna: Fishes, 315, 1842, New York Harbor.

Genus 919 OTOPHIDIUM Gill.

Otophidium Gill, in Jordan, Cat. Fish. N. A., 126, 1885 (*omostigma*).

2787. Otophidium omostigma (Jordan & Gilbert).

Gulf of Mexico, Pensacola Snapper Banks.
Genypterus omostigma Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 301, Pensacola Snapper Banks.

2788. Otophidium indefatigabile Jordan & Bollman.

Indefatigable Island, Galapagos Archipelago.
Otophidium indefatigabile Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 172, Indefatigable Island in the Galapagos Archipelago.

2789. Otophidium galeoides Gilbert.

Coast of Lower California.
Ophidion galeoides Gilbert, Proc. U.S.N.M. 1890, 110, off Lower California.

Family CCVIII. LYCODAPODIDÆ.

Genus 920. LYCODAPUS Gilbert.

Lycodapus Gilbert, Proc. U. S. Nat. Mus. 1890, 107 (*fierasfer*).

2790. Lycodapus dermatinus Gilbert.

Coast of California, in deep water.
Lycodapus dermatinus Gilbert, Rept. U. S. Fish Com. 1893 (1896), 471, pl. 35, coast of California, at Albatross Station 3162, 37° 54′ 10″ N., 123° 30′ W., in 552 fathoms.

2791. Lycodapus fierasfer Gilbert.

Pacific Coast of America, Lower California to Washington, in deep water.
Lycodapus fierasfer Gilbert, Proc. U. S. Nat. Mus. 1890, 108, off Lower California and Washington, at Albatross Stations 2980, 3010, and 3072, in 610 to 1,005 fathoms.

2792. Lycodapus parviceps Gilbert.

Bering Sea, north of Unalaska Island.
Lycodapus parviceps Gilbert, Rept. U. S. Fish Com. 1893 (1896), 455, Bering Sea, north of Unalaska Island, at Albatross Station 3324 in 109 fathoms.

2793. Lycodapus extensus Gilbert.

Bering Sea, north of Unalaska Island.
Lycodapus extensus Gilbert, Rept. U. S. Fish Com. 1893 (1896), 455, Bering Sea, north of Unalaska Island, at Albatross Station 3324, in 109 fathoms.

Family CCIX. FIERASFERIDÆ.

Genus 921. FIERASFER Cuvier.

Fierasfer Cuvier, Règne Animal, ed. 1, II, 239, 1817 (*imberbis*).

2794. Fierasfer dubius Putnam. *Pearl-fish.*

Lower California to Panama; especially common about the Pearl Islands, off Panama.
Fierasfer dubius Putnam, Proc. Bost. Soc. Nat. Hist. 1874, 344, Pearl Islands.

2795. Fierasfer arenicola Jordan & Gilbert.

Pacific Coast of Mexico.
Fierasfer arenicola Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 363, Mazatlan, Mexico.

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* Distinguished from *Otophidium* by the absence of the opercular spine, and from *Ophidion* by the broad air bladder with a foramen behind.

2796. Fierasfer bermudensis (Jones).

West Indies, recorded from Bermuda, Havana, Key West, and St. Thomas.
Lefroyia bermudensis Jones, Zoologist, January, 1874, 3838, Bermuda.

Family CCX. BROTULIDÆ.

Genus 922. BROTULA Cuvier.

Brotula Cuvier, Règne Animal, ed. 2, II, 335, 1829 (*barbatus*).

2797. Brotula barbata (Bloch & Schneider).

West Indies.
Enchelyopus barbatus Bloch & Schneider, Syst. Ichth., 52, 1801, Havana; after Parra.

Genus 923. DINEMATICHTHYS Bleeker.

Dinematichthys Bleeker, Bataë, 318, 1855 (*iluocœtoides*).

2798. Dinematichthys ventralis (Gill).

Lower California, about Cape San Lucas.
Brosmophycis ventralis Gill, Proc. Ac. Nat. Sci. Phila. 1863, 253, Cape San Lucas.

Genus 924. BROSMOPHYCIS Gill.

Brosmophycis Gill, Proc. Ac. Nat. Sci. Phila. 1863, 253 (*marginatus*).

2799. Brosmophycis marginatus (Ayres).

San Francisco, California.
Brosmius marginatus Ayres, Proc. Cal. Ac. Sci., I, 1854, 13, Bay of San Francisco.

Genus 925. BYTHITES Reinhardt.

Bythites Reinhardt, Dansk. Vidensk. Selsk. Afhandl., VII, 1838, 178 (*fuscus*).

2800. Bythites fuscus Reinhardt.

The only specimen known, now in the museum at Copenhagen, was obtained in Greenland half a century ago.
Bythites fuscus Reinhardt, Dansk. Vidensk. Selsk. Afh. 1838, 178, Greenland

Genus 926. CATÆTYX Günther.

Catætyx Günther, Challenger Report, XXII, 104, 1887 (*messieri*).

2801. Catætyx rubrirostris Gilbert.

Coast of California south of Point Conception, in deep water.
Catætyx rubrirostris Gilbert, Proc. U. S. Nat. Mus. 1890, 111, coast of California, at Albatross Stations 2909, 2925, and 2936, in 205 to 356 fathoms.

Genus 927. BARATHRODEMUS Goode & Bean.

Barathrodemus Goode & Bean, Bull. M. C. Z., X, No. 5, 200, 1883 (*manatinus*).

2802. Barathrodemus manatinus Goode & Bean.

Gulf Stream, north of Bermudas.
Barathrodemus manatinus Goode & Bean, Bull. Mus. Comp. Zool., X, No. 5, 200, 1883, 33° 51′ 20″ N., 76° W., in 647 fathoms.

Genus 928. DICROLENE Goode & Bean.

Dicrolene Goode & Bean, Bull. Mus. Comp. Zool., X, No. 5, 202, 1883 (*intronigra*).

2803. Dicrolene intronigra Goode & Bean.

Gulf Stream, from latitude 15° to 40° north.
Dicrolene intronigra Goode & Bean, Bull. Mus. Comp. Zool., X, No. 5, 202, 1883, Gulf Stream, latitude 34°.

Genus 929. DICROMITA Goode & Bean.

Dicromita Goode & Bean, Ocean. Ichth., 319, 1896 (*agassizii*).

2804. Dicromita agassizii Goode & Bean.

Off Granada.
Dicromita agassizii Goode & Bean, Ocean. Ichth., 319, 1896, off Granada, in 291 fathoms.

Genus 930. **BARATHRONUS** Goode & Bean.

Barathronus Goode & Bean, Bull. Mus. Comp. Zool., XII, 164, 1883 (*bicolor*).

2805. **Barathronus bicolor** Goode & Bean.

Off Guadaloupe Island, in deep water.

Barathronus bicolor Goode & Bean, Bull. Mus. Comp. Zool., XII, 164, 1883, off Guadaloupe, at Blake Station 71, in 769 fathoms.

Genus 931. **MIXONUS** Günther.

Mixonus Günther, Challenger Report, XXII, 108, 1887 (*laticeps*).

2806. **Mixonus laticeps** (Günther).

Mid-Atlantic, in deep water.

Bathynectes laticeps Günther, Ann. Mag. Nat. Hist., II, 1878, 20, mid-Atlantic, at Challenger Station 104, in 2,500 fathoms.

Genus 932. **BATHYONUS** Goode & Bean.

Bathyonus Goode & Bean, Proc. U. S. Nat. Mus., VIII, 1885, 603 (*catena*).

2807. **Bathyonus compressus** (Günther).

Challenger Stations 184, off Raine Island; 205 off Philippine Islands, and 107 in mid-Atlantic.

Bathynectes compressus Günther, Ann. Mag. Nat. Hist., II, 1878, 20, mid-Atlantic, at Challenger Station 107, in 1,500 fathoms.

2808. **Bathyonus catena** Goode & Bean.

Gulf Stream, at Albatross Station 2379, latitude 28° 00′ 15″ N., longitude, 87° 42′ W., in 1,467 fathoms.

Bathyonus catena Proc. U. S. Nat. Mus., VIII, 1885, 603, Gulf Stream.

Genus 933. **PENOPUS** Goode & Bean.

Penopus Goode & Bean, Ocean. Ichth., 335, 1896 (*macdonaldi*).

2809. **Penopus macdonaldi** Goode & Bean.

Gulf Stream.

Penopus macdonaldi Goode & Bean, Oceanic Ichth., 336, fig. 293, 1896, Gulf Stream, at Albatross Station 2716, 38° 29′ 30″ N., 70° 57′ W., in 1,631 fathoms.

Genus 934. **BASSOGIGAS** Gill.

Bassogigas Gill, in Goode & Bean, Ocean. Ichth., 328, 1896 (*gillii*).

2810. **Bassogigas gillii** Goode & Bean.

Off Cape Henlopen, Delaware.

Bassogigas gillii Goode & Bean, Ocean. Ichth., 328, fig. 291, 1896, off Cape Henlopen, Delaware, at Albatross Station 2684, in 1,106 fathoms.

Genus 935. **NEOBYTHITES** Goode & Bean.

Neobythites Goode & Bean, Proc. U. S. Nat. Mus. 1885, 600 (*gillii*).

2811. **Neobythites stelliferoides** Gilbert.

Gulf of California.

Neobythites stelliferoides Gilbert, Proc. U. S. Nat. Mus. 1890, 112, Gulf of California, at Albatross Station 2996, 24° 30′ 15″ N., 110° 29′ W., in 112 fathoms.

2812. **Neobythites gillii** Goode & Bean.

Gulf of Mexico.

Neobythites gillii Goode & Bean, Proc. U. S. Nat. Mus. 1885, 601, Gulf of Mexico, at Albatross Station 2402, 28° 36′ N., 85° 33′ W., in 111 fathoms.

2813. **Neobythites marginatus** Goode & Bean.

Off Barbados.

Neobythites marginatus Goode & Bean, Bull. Mus. Comp. Zool., XII, 162, 1883, off Barbados, in 209 fathoms.

Genus 936. BENTHOCOMETES Goode & Bean.

Benthocometes Goode & Bean, Ocean. Ichth., 327, 1896 (*robustus*).

2814. Benthocometes robustus (Goode & Bean).

West Indies, to latitude 39° N., in Gulf Stream.

Neobythites robustus Goode & Bean, Bull. Mus. Comp. Zool., XII, 161, 1883, off Moro Castle, Cuba.

Genus 937. POROGADUS Goode & Bean.

Porogadus Goode & Bean, Proc. U. S. Nat. Mus. 1885, 602 (*miles*).

2815. Porogadus miles Goode & Bean.

Atlantic Coast off Delaware Bay, in deep water.

Porogadus miles Goode & Bean, Proc. U. S. Nat. Mus. 1885, 602, at Albatross Station 2230, 38° 27′ N., 73° 2′ W., in 1,168 fathoms.

Genus 938. BASSOZETUS Gill.

Bassozetus Gill, Proc. U. S. Nat. Mus. 1883, 259 (*normalis*).

2816. Bassozetus catena Goode & Bean.

Gulf of Mexico, in deep water.

Bassozetus catena Goode & Bean, Proc. U. S. Nat. Mus. 1885, 603, at Albatross Station 2379, 28° 00′ 15″ N., 87° 42′ W., in 1,467 fathoms.

2817. Bassozetus normalis Gill.

West Indies, off Dominica to 40° north latitude, in region of Gulf Stream.

Bassozetus normalis Gill, Proc. U. S. Nat. Mus. 1883, 259, Gulf Stream, at Albatross Station 2042, 39° 33′ N., 68° 26′ 45″ W., in 1,555 fathoms.

2818. Bassozetus compressus Goode & Bean.

Gulf of Mexico, in deep water.

Bassozetus compressus Goode & Bean, Ocean. Ichth., 322, 1896, 28° 00′ 15″ N., 87° 42′ W., in 1,467 fathoms. (Günther, Ann. and Mag. Nat. Hist., II, 1878, 20, seems to be the original description.)

Genus 939. NEMATONUS Günther.

Nematonus Günther, Challenger Report, XXII, 114, 1887 (*pectoralis*).

2819. Nematonus pectoralis (Goode & Bean).

Gulf of Mexico, and off Dominica.

Bathyonus pectoralis Goode & Bean, Proc. U. S. Nat. Mus. 1885, 604, Albatross Station 2380, 28° 02′ 30″ N., 87° 43′ 45″ W., in 1,430 fathoms.

Genus 940. APHYONUS Günther.

Aphyonus Günther, Ann. Mag. Nat. Hist., II, 1878, 22 (*gelatinosus*).

2820. Aphyonus mollis Goode & Bean.

Gulf of Mexico, in deep water.

Aphyonus mollis Goode & Bean, Bull. Mus. Comp. Zool., XII, 163, 1883, Gulf of Mexico, at Blake Station 221, 24° 36′ N., 84° 5′ W., in 955 fathoms.

Genus 941. LUCIFUGA Poey.

Lucifuga Poey, Memorias, II, 95, 1860 (*subterraneus*).

2821. Lucifuga subterranea Poey. *Pez Ciego.*

Cuba.

Lucifuga subterraneus Poey, Memorias, II, 96, 1860, Caves of San Antonio in southern Cuba.

Genus 942. STYGICOLA Gill.

Stygicola Gill, Proc. Ac. Nat. Sci. Phila. 1863, 252 (*dentata*).

2822. Stygicola dentata Poey.

Caves in southern Cuba.

Lucifuga dentatus Poey, Memorias, II, 102, 1860, cave of Cajio, Cuba.

Suborder CRANIOMI.

Family CCXI. TRIGLIDÆ. The Gurnards.

Genus 943. PRIONOTUS Lacépède. *Gurnards.*

Prionotus Lacépède, Hist. Nat. Poiss., III, 37, 1802 (*evolans*).

2823. Prionotus birostratus Richardson.

Gulf of Fonseca, west coast of Central America.

Prionotus birostratus Richardson, Voy. Sulphur, Ichthyology, pt. II, 81, April, 1845, Gulf of Fonseca, west coast of Central America.

2824. Prionotus gymnostethus Gilbert.

Gulf of California.

Prionotus gymnostethus Gilbert, Proc. U. S. Nat. Mus. 1891, 559, Gulf of California, in shallow water.

2825. Prionotus xenisma Jordan & Bollman.

Pacific Ocean, off coast of Colombia.

Prionotus xenisma Jordan & Bollman, Proc. U. S. N. M. 1889, 169, Pacific Coast of Colombia.

2826. Prionotus loxias Jordan.

Pacific Coast of Central America.

Prionotus loxias Jordan, Proc. U. S. Nat. Mus. 1895, Pacific Ocean, south of Panama.

2827. Prionotus egretta Goode & Bean.

Barbados.

Prionotus egretta Goode & Bean, Oceanic Ichth., 465, 1896, off Barbados.

2828. Prionotus carolinus (Linnæus). *Common Gurnard.*

Cape Ann to South Carolina, chiefly northward.

Trigla carolina Linnæus, "Mantissa 176 ? 528" Carolina.

2829. Prionotus scitulus Jordan.

South Atlantic coast of United States, Beaufort to St. Augustine.

Prionotus scitulus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 288, Beaufort.

2830. Prionotus roseus Jordan & Evermann.

Gulf of Mexico; Tampa Bay; Pensacola.

Prionotus roseus Jordan & Evermann, Proc. U. S. Nat. Mus. 1886, 470, off Tampa Bay, Florida.

2831. Prionotus alatus Goode & Bean.

Off Charleston, South Carolina.

Prionotus alatus Goode & Bean, Bull. Mus. Comp. Zool., X, 210, 1883, deep sea off Charleston, South Carolina.

2832. Prionotus miles Jenyns.

Galapagos Islands.

Prionotus miles Jenyns, Zool. Beagle, Fishes, 29, pl. 6, 1842, Chatham Island, of the Galapagos Archipelago.

2833. Prionotus stephanophrys Lockington,

Deep water, off San Francisco, Point Reyes, and Monterey.

Prionotus stephanophrys Lockington, Proc. U. S. Nat. Mus. 1880, 529, Point Reyes, near San Francisco.

2834. Prionotus quiescens Jordan & Bollman.

Pacific Ocean, off the coast of Colombia; Gulf of California.

Prionotus quiescens Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 166, off Pacific Coast of Colombia.

2835. Prionotus albirostris Jordan & Bollman.

Pacific Ocean, off the coast of tropical America.

Prionotus albirostris Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 168, Pacific Ocean, off the coast of Colombia.

2836. Prionotus rubio Jordan. *Rubio Volador.*
West Indies.
Prionotus rubio Jordan, Proc. U. S. Nat. Mus. 1886, 50, Havana.

2837. Prionotus ophryas Jordan & Swain.
Gulf of Mexico, Snapper Banks, near Pensacola, Florida.
Prionotus ophryas Jordan & Swain, Proc. U. S. Nat. Mus. 1884, 542, Snapper Banks, off Pensacola, Florida.

2838. Prionotus stearnsi Jordan & Swain.
Gulf of Mexico.
Prionotus stearnsi Jordan & Swain, Proc. U. S. Nat. Mus. 1884, 541, Pensacola

2839. Prionotus strigatus Cuvier & Valenciennes. *Red-winged Gurnard.*
Atlantic Coast of the Northern States, Cape Cod to Virginia.
Prionotus strigatus Cuv. & Val., Hist. Nat. Poiss., IV, 86, 1829, New York.

2840. Prionotus evolans Linnæus. *Striped Gurnard.*
South Atlantic Coast of United States.
Prionotus evolans Gill, Cat. Fish. East Coast N. Am., 21, 1861, name only.

2841. Prionotus punctatus Bloch.
West Indies and coast of South America.
Prionotus punctatus Bloch, Ichth., pl. 353, 1793, Martinique; on a drawing by Plumier.

2842. Prionotus beanii Goode.
Off Trinidad.
Prionotus beanii Goode, in Goode & Bean, Oceanic Ichth., 468, 1896, off Trinidad.

2843. Prionotus tribulus Cuvier & Valenciennes. *Big-headed Gurnard.*
South Atlantic Coast, from Long Island to Brazos.
Prionotus tribulus Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 98, pl. 74, 1829, New York; Carolina.

2844. Prionotus horrens Richardson.
Pacific Coast of tropical America.
Prionotus horrens Richardson, Voy. Sulph., Ichth., 79, pl. 42, figs. 1-3, 1843, Gulf of Fonseca.

Genus 944. BELLATOR* Jordan & Evermann.
Bellator Jordan & Evermann, new genus (*militaris*).

2845. Bellator militaris (Goode & Bean).
Off Cape Catoche, Yucatan; Gulf of Mexico.
Prionotus militaris Goode & Bean, Ocean. Ichth., 464, figs. 380 and 384, 1896, off Cape Catoche, Yucatan.

Genus 945. CHELIDONICHTHYS Kaup.
Kaup, Archiv f. Naturgeschichte 1873, 87 (*hirundo*).

2846. Chelidonichthys pictipinnis (Kaup).
Barbados.
Chelidonichthys pictipinnis Kaup,† Archiv f. Naturg. 1873, 87, Barbados (?).

Genus 946. TRIGLA (Artedi) Linnæus. *Plated Gurnards.*
Trigla (Artedi) Linnæus, Syst. Nat., ed. x, 300, 1758 (*cuculus*).

2847. Trigla cuculus Linnæus. *Red Gurnard.*
Southern Europe. Said by Cuvier to have been brought once from New York by Milbert; record probably erroneous.
Trigla cuculus Linnæus, Syst. Nat., ed. x, 301, 1758, Mediterranean, in the open sea.

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* Distinguished by its greatly elongate dorsal spines.
† The type of this species examined by us seems to be inseparable from *Chelidonichthys kumu* of the South Pacific. It probably is *not* American.

Family CCXII. PERISTEDIIDÆ. The Deep-water Gurnards.

Genus 947. PERISTEDION Lacépède.
Peristidion Lacépède, Hist. Nat. Poiss., III, 368, 1802 (*malarmat=cataphracta*).

2848. Peristedion miniatum Goode.
Gulf Stream.
Peristedion miniatum Goode, Proc. U. S. Nat. Mus. 1880, 349, Gulf Stream, off Rhode Island.

2849. Peristedion longispatha Goode & Bean.
West Indies, off Cuba and Barbados.
Peristedium longispatha Goode & Bean, Bull. Mus. Comp. Zool., XII, No. 5, 166, 1886, off Havana.

2850. Peristedion gracile Goode & Bean.
Gulf of Mexico.
Peristedion gracile Goode & Bean, Ocean. Ichth., 473, 1896, Gulf of Mexico.

2851. Peristedion platycephalum Goode & Bean.
West Indies; Barbados.
Peristedion platycephalum Goode & Bean, Bull. Mus. Comp. Zool., XII, No. 5, 167, 1886, off Barbados.

Genus 948. VULSICULUS* Jordan & Evermann.
Vulsioulus Jordan & Evermann, new genus (*imberbis*).

2852. Vulsiculus imberbis (Poey).
Gulf of Mexico.
Prionotus imberbe Poey, Memorias, II, 367, 1861, Cuba.

Family CCXIII. CEPHALACANTHIDÆ. The Flying-Fish.

Genus 949. CEPHALACANTHUS Lacépède.
Cephalacanthus Lacépède, Hist. Nat. Poiss., III, 223, 1802 (*spinarella*).

2853. Cephalacanthus volitans (Linnæus). *Flying-robin; Muciclago; Volador; Batfish.*
Atlantic Ocean, on both coasts; also Gulf coasts.
Trigla volitans Linnæus, Syst. Nat., ed. X, I, 302, 1758; after Artedi.

Suborder DISCOCEPHALI.

Family CCXIV. ECHENEIDIDÆ. The Remoras.

Genus 950. PHTHEIRICHTHYS Gill.
Phtheirichthys Gill, Proc. Ac. Nat. Sci. Phila. 1862, 239 (*lineata*).

2854. Phtheirichthys lineatus (Menzies).
Tropical seas, ranging north to South Carolina and Pensacola.
Echeneis lineata Menzies, Trans. Linn. Soc. Lond. 1791, I, 187, pl. 17, fig. 1, Pacific Ocean, between the Tropics.

Genus 951. ECHENEIS (Artedi) Linnæus.
Echeneis (Artedi) Linnæus, Syst. Nat., ed. X, 260, 1758 (*naucrates*).

2855. Echeneis naucrates Linnæus. *Shark-sucker; Pega; Pegador; Sucking-fish.*
Warm seas, universally distributed; common north to Cape Cod and San Francisco.
Echeneis neucrates (misprint for *naucrates*) Linnæus, Syst. Nat., ed. X, 261, 1758, Pelago Indico.

2856. Echeneis naucrateoides Zuieuw.
Cape Cod to West Indies; common on our South Atlantic Coast.
Echeneis naucrateoides Zuieuw, Nova Acta Ac. Sci. Imp. Petropol., IV, 279.

* Distinguished by its very minute barbel, easily overlooked.

Genus 952. REMILEGIA Gill.

Remilegia Gill, Proc. Ac. Nat. Sci. Phila. 1864, 61 (*australis*).

2857. Remilegia australis (Bennett).

Tropical seas; recorded by Dr. Lütken, from 10° N., 39° W.
Echeneis australis Bennett, Nar. Whaling Voyage, II, 273, pls. 24–26, 1840.

Genus 953. REMORA Gill.

Remora Gill, Proc. Ac. Nat. Sci. Phila. 1862, 239 (*remora*).

Subgenus REMORA Gill.

2858. Remora remora (Linnæus). *Remora.*

Warm seas, north to New York and San Francisco.
Echeneis remora Linnæus, Syst. Nat., ed. X, 260, 1758, Pelago Indico.

Subgenus REMORINA* Jordan & Evermann.

Remorina, Jordan & Evermann, new subgenus (*albescens*).

2859. Remora albescens (Temminck & Schlegel).

Tropical Pacific, straying to America; a specimen taken at La Paz, Gulf of California.
Echeneis albescens Temminck & Schlegel, Fauna Japonica, Poiss., 272, pl. 120, fig. 3, 1842, Japan, no definite locality.

Subgenus REMOROPSIS Gill.

Remoropsis Gill, Proc. Ac. Nat. Sci. Phila. 1864, 60 (*brachyptera*).

2860. Remora brachyptera (Lowe).

Warm seas, occasionally north to Cape Cod.
Echeneis brachyptera Lowe, Proc. Zool. Soc. Lond. 1839, 89, Madeira.

Genus 954. RHOMBOCHIRUS Gill.

Rhombochirus Gill, Proc. Ac. Nat. Sci. Phila. 1863, 88 (*osteochir*).

2861. Rhombochirus osteochir (Cuvier).

West Indies, north to Cape Cod.
Echeneis osteochir Cuvier, Règne Animal, ed. 2, II, 348, 1829, no locality given.

Suborder TÆNIOSOMI. The Ribbon-Fishes.

Family CCXV. TRACHYPTERIDÆ. The King of the Herrings.

Genus 955. TRACHYPTERUS Gouan.

Trachypterus Gouan, Hist. Nat. Poiss., 104, 1770 (*trachyrhynchus*).

2862. Trachypterus rex-salmonorum Jordan & Gilbert.

Off coast of California.
Trachypterus rex-salmonorum Jordan & Gilbert, Proc. Cal. Ac. Sci. 1894, 145, pl. 9, open sea, outside Bay of San Francisco.

Family CCXVI. REGALECIDÆ.

Genus 956. REGALECUS Ascanius.

Regalecus Ascanius, Icones Rerum Naturalium, pl. 11, 1772 (*glesne*).

2863. Regalecus glesne Ascanius.

Sea off Bergen, Norway.
Regalecus glesne Ascanius, Icones Rerum Nat., 2d Cayer, pl. 11, 1772, sea off Bergen, Norway.

Family CCXVII. STYLEPHORIDÆ.

Genus 957. STYLEPHORUS Shaw.

Stylephorus Shaw, Trans. Linn. Soc. Lond., I, 1791, 90 (*chordatus*).

2864. Stylephorus chordatus Shaw.

Atlantic, between Cuba and Martinique.
Stylephorus chordatus Shaw, Trans. Linnæan Soc., I, 1791, 92, pl. 6, Atlantic, between Cuba and Martinique.

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* Distinguished by the fin rays.

Suborder XENOPTERYGII. The Cling-Fishes.

Family CCXVIII. GOBIESOCIDÆ. Cling-Fishes.

Genus 958. CAULARCHUS Gill.

Caularchus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 330 (*mæandricus*).

2865. Caularchus mæandricus (Girard). *Suckfish.*

Pacific Coast of United States, from Vancouver Island to Monterey.
Lepidogaster mæandricus Girard, Pac. R. R. Surv., x, 130, 1858, San Luis Obispo, California, and the Farallones.

Genus 959. BRYSSETÆRES Jordan & Evermann.

Bryssetæres Jordan & Evermann, Proc. Cal. Ac. Sci. 1896, 230 (*pinniger*).

2866. Bryssetæres pinniger (Gilbert).

Gulf of California; known from Puerto Refugio (Angel Island), San Luis Gonzales Bay, and La Paz.
Gobiesox pinniger Gilbert, Proc. U. S. Nat. Mus. 1890, 94, Puerto Refugio, Gulf of California.

Genus 960. GOBIESOX Lacépède. *Clingfishes.*

Gobiesox Lacépède, Hist. Nat. Poiss., II, 595, 1799 (*cephalus*).

Subgenus CAULISTIUS Jordan & Evermann.

Caulistius Jordan & Evermann, new subgenus (*papillifer*).

2867. Gobiesox papillifer Gilbert.

Magdalena Bay, Lower California.
Gobiesox papillifer Gilbert, Proc. U. S. Nat. Mus. 1890, 96, Magdalena Bay, Lower California.

Subgenus GOBIESOX Lacépède.

2868. Gobiesox gyrinus Jordan & Evermann.

West Indies.
Gobiesox gyrinus Jordan & Evermann, Fishes North and Middle America, 1896, Cordova.

2869. Gobiesox nigripinnis Peters.

Puerto Cabello, near Aspinwall.
Gobiesox nigripinnis Peters, Berliner Monatsber. 1859, 412, Puerto Cabello, near Aspinwall.

2870. Gobiesox cephalus Lacépède. *Têtard; Testar.*

West Indies.
Gobiesox cephalus Lacépède, Hist. Nat. Poiss., II, 595, 1798, Martinique.

2871. Gobiesox strumosus Cope.

South Atlantic Coast, South Carolina to Florida.
Gobiesox strumosus Cope, Proc. Ac. Nat. Sci. Phila. 1870, 121, Hilton Head, South Carolina.

2872. Gobiesox virgatulus Jordan & Gilbert.

From Pensacola Bay north to Charleston, South Carolina.
Gobiesox virgatulus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 293, Pensacola, Florida.

2873. Gobiesox adustus Jordan & Gilbert.

Pacific coast of Mexico at Mazatlan.
Gobiesox adustus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 360, Mazatlan, Mexico.

2874. Gobiesox funebris Gilbert.

Gulf of California; Puerto Refugio (Angel Island) and La Paz.
Gobiesox funebris Gilbert, Proc. U. S. Nat. Mus. 1890, 95, Puerto Refugio, Gulf of California.

2875. Gobiesox pœcilophthalmus Jenyns.

Chatham Island, Galapagos Archipelago.
Gobiesox pœcilophthalmus Jenyns, Voy. Beagle, Fishes, 141, 1842, Chatham Island.

2876. Gobiesox rhodospilus Günther.

Panama.
Gobiesox rhodospilus Günther, Proc. Zool. Soc. Lond. 1864, 25, Panama.

2877. Gobiesox macrophthalmus Günther.

Probably West Indies.
Gobiesox macrophthalmus Günther, Cat., III, 502, 1861, locality unknown.

2878. Gobiesox cerasinus Cope.

St. Martins, West Indies.
Gobiesox cerasinus Cope, Trans. Amer. Philos. Soc., XIV, 1871, 473, St. Martins, West Indies.

Subgenus SICYASES Müller & Troschel.

Sicyases Müller & Troschel.

2879. Gobiesox erythrops Jordan & Gilbert.

Mazatlan; also Tres Marias Islands.
Gobiesox erythrops Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 360, Mazatlan, Mexico.

2880. Gobiesox rubiginosus (Poey).

Matanzas, Cuba.
Licejosus rubiginosus Poey, Synopsis, 391, 1868, wharves of Palmasola, Matanzas, Cuba.

2881. Gobiesox carneus (Poey).

Matanzas, Cuba.
Sicyases carneus Poey, Syn., 392, 1868, wharf of Palmasola, Matanzas, Cuba.

2882. Gobiesox hæres Jordan & Bollman.

Green Turtle Cay, Bahamas.
Gobiesox hæres Jordan & Bollman, Proc. U. S. Nat. Mus. 1888, 552, Green Turtle Cay, Bahamas.

2883. Gobiesox punctulatus (Poey).

Cuba.
Sicyases punctulatus Poey, Enumeratio, 124, 1875, Havana.

2884. Gobiesox fasciatus (Peters).

Puerto Cabello, near Aspinwall.
Sicyases fasciatus Peters, Monatsber. Berl. Ac. 1859, 412, Puerto Cabello.

Genus 961. RIMICOLA Jordan & Evermann.

Rimicola Jordan & Evermann, Proc. Cal. Ac. Sci. 1896, 231 (*muscarum*).

2885. Rimicola muscarum (Meek & Pierson).

Monterey Bay, California.
Gobiesox muscarum Meek & Pierson, Proc. Cal. Ac. Sci. 1895, 571, pl. 71, Monterey Bay, California.

2886. Rimicola eigenmanni (Gilbert).

Point Loma, near San Diego, California.
Gobiesox eigenmanni Gilbert, Proc. U. S. Nat. Mus. 1890, 96, Point Loma, near San Diego, California.

Genus 962. ARBACIOSA Jordan & Evermann.

Arbaciosa Jordan & Evermann, Proc. Cal. Ac. Sci. 1896, 290 (*zebra*).

2887. Arbaciosa rhessodon (Rosa Smith).

San Diego to the northern part of the Gulf of California.
Gobiesox rhessodon Rosa Smith, Proc. U. S. Nat. Mus. 1881, 140, San Diego, California.

2888. Arbaciosa humeralis (Gilbert).

Gulf of California; Puerto Refugio, Angel Island; La Paz.
Gobiesox humeralis Gilbert, Proc. U. S. Nat. Mus. 1890, 95, Puerto Refugio, Gulf of California.

2889. Arbaciosa rupestris (Poey).

Coral reefs of Cuba.
Gobiesox rupestris Poey, Memorias, II, 283, 1861, Cuba.

2890. Arbacioa zebra (Jordan & Gilbert).
Mazatlan, Mexico.
Gobiesox zebra Jordan & Gilbert, Proc. U. S. N. M. 1881, 395, Mazatlan, Mexico.

2891. Arbacioa eos (Jordan & Gilbert).
Pacific Coast of Mexico.
Gobiesox eos Jordan & Gilbert, Proc. U. S. N. M. 1881, 360, Mazatlan, Mexico.

Suborder ANACANTHINI. The Jugular Fishes.

Family CCXIX. MERLUCCIIDÆ. The Hakes.

Genus 963. MERLUCCIUS Rafinesque.
Merluccius Rafinesque, Carrat. di Alc. Nuovi Gen., etc., 25, 1810 (*smiridus*).

2892. Merluccius bilinearis (Mitchill).
Coast of New England and northward.
Stomodon bilinearis Mitchill, Rept. Fish. N. Y., 7, 1814, New York.

2893. Merluccius merluccius (Linnæus).
Coasts of Europe, straying to Greenland.
Gadus merluccius Linnæus, Syst. Nat., ed. x, 254, 1758, no locality.

2894. Merluccius productus (Ayres).
Pacific Coast, from Santa Barbara northward.
Merlangus productus Ayres, Proc. Cal. Ac. Sci. 1855, 64, no locality given; types from San Francisco market, probably from San Francisco Bay.

Family CCXX. GADIDÆ.

Genus 964. BOREOGADUS Günther.
Boreogadus Günther, Cat., IV, 336, 1862 (*fabricii*).

2895. Boreogadus saida (Lepechin).
Arctic seas, Greenland to Alaska and northern Russia; common in the far North.
Gadus saida Lepechin, Nov. Comm. Ac. Scient. Petrop. 1774, 512.

Genus 965. POLLACHIUS Nilsson. *Pollacks.*
Pollachius Nilsson, in Bonaparte, Cat. Met. Pesci Europ., 45, 1846 (*pollachius*).

2896. Pollachius chalcogrammus (Pallas).
North Pacific, south to Sitka.
Gadus chalcogrammus Pallas, Zoogr. Rosso-Asiat., III, 198, 1811, Kamchatka.

2897. Pollachius fucensis Jordan & Gilbert.
Puget Sound.
Pollachius fucensis Jordan & Gilbert, Proc. U. S. Nat. Mus. 1883, 315, Puget Sound at Tacoma, Washington.

2898. Pollachius virens (Linnæus). *Pollack; Coalfish; Green-cod.*
North Atlantic; common northward on both coasts, south to Cape Cod.
Gadus virens Linnæus, Syst. Nat., ed. x, 253, 1758, ocean, off Europe.

Genus 966. ELEGINUS Fischer.
Eleginus Fischer, Mém. Soc. Nat. Moscow, v, 4, 2d ed., 252–257, 1813 (*navaga*).

2899. Eleginus navaga Kölreuter.
Gadus navaga Kölreuter, Nov. Comm. Acad. Petrop., XIV, 1770, 484, pl. 12, coast of northern Russia.

Genus 967. MICROGADUS Gill. *Tomcods.*
Microgadus Gill, Proc. Ac. Nat. Sci. Phila. 1865, 69 (*proximus*).

2900. Microgadus proximus (Girard). *California Tomcod.*
West coast of North America, from Monterey to Alaska.
Gadus proximus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 141, San Francisco.

2901. Microgadus tomcod (Walbaum). *Tomcod; Frostfish.*
East coast of North America, from Virginia to Labrador.
Gadus tomcod Walbaum, Artedi Pisc., 133, 1792, Long Island; after Schöpf.

Genus 968. GADUS (Artedi) Linnæus. *Codfishes.*

Gadus (Artedi) Linnæus, Syst. Nat., ed. x, 251, 1758 (*callarias*).

2902. Gadus ogac Richardson.

Godhavn, Greenland.

Gadus ogac Richardson, Faun. Bor.-Amer., III, 246, 1836, no locality.

2903. Gadus callarias Linnæus. *Common Codfish.*

North Atlantic, south to Virginia.

Gadus callarias Linnæus, Syst. Nat., ed. x, 252, 1758, Baltic Sea and ocean off Europe.

2904. Gadus macrocephalus Tilesius. *Pacific Cod.*

Bering Sea, south to coast of Oregon.

Gadus macrocephalus Tilesius, Mém. Ac. Sci. St. Petro., II, 1810, 360, Bering Sea.

Genus 969. MELANOGRAMMUS Gill. *Haddocks.*

Melanogrammus Gill, Proc. Ac. Nat. Sci. Phila. 1862, 280 (*æglifinus*).

2905. Melanogrammus æglifinus (Linnæus).

North Atlantic, on both coasts.

Gadus æglifinus Linnæus, Syst. Nat., ed. x, 251, 1758, and ed. XII, 435, 1766, ocean off Europe.

Genus 970. LEPIDION Swainson.

Lepidion Swainson, Nat. Hist. Class. Fishes, II, 1839.

2906. Lepidion verecundum Jordan & Cramer.

Off coast of Lower California.

Lepidion verecundum Jordan & Cramer, Proc. U. S. Nat. Mus. 1896, Clarion Island, Mexico.

Genus 971. ANTIMORA Günther.

Antimora Günther, Ann. Mag. Nat. Hist. 1876, 2 (*rostrata*).

2907. Antimora viola (Goode & Bean).

Banks of Newfoundland and southward.

Haloporphyrus viola Goode & Bean, Proc. U. S. Nat. Mus. 1878, 256, Le Have Bank, in 400 fathoms.

2908. Antimora microlepis Bean.

Pacific Ocean, off Queen Charlotte Islands.

Antimora microlepis Bean, Proc. U. S. Nat. Mus. 1890, 38, latitude 51° 00′ 23″ N., longitude 130° 34′ W., off Cape St. James, Queen Charlotte Islands, in 875 fathoms.

Genus 972. PHYSICULUS Kaup.

Physiculus Kaup, Wiegmann's Archiv 1858, 88 (*dalwigkii*).

2909. Physiculus fulvus Bean.

Caribbean Sea and north in the Gulf Stream to latitude 35°.

Physiculus fulvus Bean, Proc. U. S. Nat. Mus. 1884, 240, 40° 1′ N., 69° 56′ W., 79 fathoms.

Genus 973. LOTELLA Kaup.

Lotella Kaup, Wiegmann's Archiv, I, 1858, 88 (*schlegeli*).

2910. Lotella maxillaris Bean.

Gulf Stream.

Lotella maxillaris Bean, Proc. U. S. Nat. Mus. 1884, 241, latitude 39° 55′ N., longitude 70° 28′ W., in 396 fathoms.

2911. Lotella nematopus (Gilbert).

On both coasts of Lower California, in deep water.

Physiculus nematopus Gilbert, Proc. U. S. Nat. Mus. 1890, 114, on both coasts of Lower California, at Albatross Stations 2997, 3011, 3015, and 3016, in 71 to 221 fathoms.

2912. Lotella kaupi (Poey.)

Cuba.

Physicula kaupi Poey, Repertorio, I, 186, 1865, Matanzas, Cuba.

2913. Lotella rastrelliger (Gilbert).

On both coasts of Lower California, in deep water.

Physiculus rastrelliger Gilbert, Proc. U. S. Nat. Mus. 1890, 113, on both coasts of Lower California, at Albatross Stations 2987 and 3045, in 171 and 184 fathoms.

Genus 974. URALEPTUS Costa.

Uraleptus Costa, Wiegmann's Archiv 1858, 87 (*maraldi*).

2914. Uraleptus maraldi (Risso).

Nice; Madeira; Naples and Catania; also off island of Nevis, in the West Indies.

Gadus maraldi Risso, Ichth. Nice, 123, 1810, pl. 6, fig. 13, Nice.

Genus 975. LOTA Cuvier. *Burbots.*

Lota Cuvier, Règne Animal, ed. 1, II, 215, 1817 (*lota*).

2915. Lota maculosa (LeSueur). *Burbot; Lake Lawyer; Ling; Alekey Trout.*

New England and Great Lakes region, north to the Arctic seas, and west to the upper Missouri and Columbia River basins.

Gadus maculosus LeSueur, Jour. Ac. Nat. Sci. Phila., I, 83.

Genus 976. MOLVA Nilsson. *Lings.*

Molva Nilsson, Skandinav. Fauna, IV, 573, 1832 (*molva*).

2916. Molva molva (Linnæus).

Spitzbergen to Gulf of Gascon; Arcachon; San Juan de Luz; Iceland, Greenland; Faröe Islands.

Gadus molva Linnæus, Syst. Nat., ed. X, 254, 1758, and ed. XII, 439, 1766, no locality.

Genus 977. PHYCIS Bloch & Schneider. *Codlings.*

Phycis Bloch & Schneider, Syst. Ichth., 56, 1801 (*tinca*).

2917. Phycis regius (Walbaum).

North Atlantic, south to Cape Fear.

Blennius regius Walbaum, Artedi Pisc., 186, 1792, no locality.

2918. Phycis cirratus Goode & Bean.

Deep waters of the Gulf of Mexico.

Phycis cirratus Goode & Bean, Ocean. Ichth., 358, 1896, Gulf of Mexico, at 29° 03′ 15″ N., 88° 16′ W.

2919. Phycis floridanus Bean & Dresel.

Pensacola, Florida.

Phycis floridanus Bean & Dresel, Proc. Biol. Soc. Wash. 1884, 100, Pensacola.

2920. Phycis earlli Bean.

Charleston, South Carolina.

Phycis earlli Bean, Proc. U. S. Nat. Mus., III, 1880, 69, Charleston, S. C.

2921. Phycis tenuis (Mitchill).

North Atlantic, south to Virginia; abundant northward.

Gadus tenuis Mitchill, Trans. Lit. and Phil. Soc. N. Y., I, 1815, 371, New York.

2922. Phycis chuss (Walbaum).

Atlantic Coast, chiefly northward.

Blennius chuss Walbaum, Artedi Pisc., 186, 1792, no locality.

2923. Phycis chesteri Goode & Bean.

Off Massachusetts, in deep water.

Phycis chesteri Goode & Bean, Proc. U. S. Nat. Mus. 1878, 256, off Cape Ann, in 140 fathoms.

Genus 978. LÆMONEMA Günther.

Læmonema Günther, Cat., IV, 356, 1862 (*yarrellii*).

2924. Læmonema barbatulum Goode & Bean.

Gulf Stream.

Læmonema barbatula Goode & Bean, Bull. Mus. Comp. Zool., X, No. 5, 204, 1883, Gulf Stream, in 32° 43′ 25″ N., 77° 20′ 30″ W., in 230 fathoms, and 28° 35′ N., 73° 13′ W.

2925. Læmonema melanurum Goode & Bean.

Caribbean Sea, north to New York.
Læmonema melanurum Goode & Bean, Ocean. Ichth., 363, 1896, 30° 44′ N., 79° 26′ W., in 440 fathoms.

Genus 979. GAIDROPSARUS Rafinesque. *Rocklings.*

Gaidropsarus Rafinesque, Indice d'Itt. Sic., 11, 1810 (*mustellaris* = *mediterraneus*).

2926. Gaidropsarus reinhardti (Kröyer).

Greenland and east coast of United States.
Motella reinhardti Kröyer (MS.), 1852, Greenland.

2927. Gaidropsarus ensis (Reinhardt).

New York to Greenland.
Motella ensis Reinhardt, Dansk. Vidensk. Selsk. Afh., VII, 15, 1838, Greenland.

2928. Gaidropsarus septentrionalis (Collett).

Coasts of Norway and Greenland.
Motella septentrionalis Collett, Ann. Mag. Nat. Hist., 15, 82, 1874, Florö, Bergen, coast of Norway.

Genus 980. RHINONEMUS Gill.

Rhinonemus Gill, Proc. Ac. Nat. Sci. Phila. 1863, 241 (*cimbrius*).

2929. Rhinonemus cimbrius (Linnæus).

Gadus cimbrius Linnæus, Syst. Nat., ed. XII, 440, 1766, no locality.

Genus 981. BROSMIUS Cuvier.

Brosmius Cuvier, Règne Animal, ed. 1, II, 222, 1817 (*brosme*).

2930. Brosmius brosme (Müller).

Polar regions, south to Cape Cod.
Gadus brosme Müller, Prodr. Zool. Dan., 41, 1776, no locality.

Family CCXXI. MACRURIDÆ. The Grenadiers.

Genus 982. LIONURUS Günther.

Lionurus Günther, Challenger Rept., XXII, 141, 1887 (*filicauda*).

2931. Lionurus filicauda Günther.

Antarctic Ocean and deep sea, off both coasts of South America.
Coryphænoides filicauda Günther, Ann. Mag. Nat. Hist. 1878, 27, Antartic Ocean at Challenger Stations 157, 299, and 325.

2932. Lionurus liolepis Gilbert.

Off coast of southern California, in deep water.
Macrurus (*Lionurus*) *liolepis* Gilbert, Proc. U. S. Nat. Mus., XIII, 1890, 117, coast of California, at Albatross Station 2980, 33° 49′ 45″ N., 119° 24′ 30″ W., in 600 fathoms.

Genus 983. HYMENOCEPHALUS Giglioli.

Hymenocephalus Giglioli, Pelagos, Genoa, 228, 1884 (*italicus*).

2933. Hymenocephalus cavernosus (Goode & Bean).

Gulf of Mexico, in deep water.
Bathygadus cavernosus Goode & Bean, Proc. U. S. N. M. 1885, 598, Albatross Station 2398, at lat. 28° 45′ N., long. 86° 26′ W., in 227 fathoms.

2934. Hymenocephalus goodei (Günther).

Gulf Stream, south of New England, in deep water.
Macrurus goodei Günther, Challenger Rept., XXII, 136, 1887, between latitude 40° and 41° N. and longitude 65° and 68° W., in 304 to 1,242 fathoms.

Genus 984. BATHYGADUS Günther.

Bathygadus Günther, Ann. Mag. Nat. Hist. 1878, 23 (*cottoides*).

2935. Bathygadus favosus Goode & Bean.

Off Martinique, in deep water.
Bathygadus favosus Goode & Bean, Bull. Mus. Comp. Zool., XII, No. 5, 160, 1886, off Martinique, at Blake Station 80, in 472 fathoms.

2936. Bathygadus arcuatus Goode & Bean.

Gulf of Mexico, in deep water.

Bathygadus arcuatus Goode & Bean, Bull. Mus. Comp. Zool., XII, No. 5, 158, 1886, off Martinique, in 334 fathoms.

2937. Bathygadus longifilis Goode & Bean.

Deep waters of the Gulf of Mexico.

Bathygadus longifilis Goode & Bean, Proc. U. S. Nat. Mus. 1885, 599, Gulf of Mexico, at Albatross Station 2392, latitude 28° 47′ 30″ N., longitude 87° 27′ W., in 724 fathoms.

2938. Bathygadus macrops Goode & Bean.

Deep waters of the Gulf of Mexico.

Bathygadus macrops Goode & Bean, Proc. U. S. N. M. 1885, 598, at Albatross Station 2396, in latitude 28° 34′ N., longitude 86° 48′ W., in 335 fathoms.

Genus 985. MACROURUS Bloch.

Macrourus Bloch, Ichth., V, 152, 1787 (*rupestris*).

2939. Macrourus berglax Lacépède.

Massachusetts to Greenland and Norway.

Macrourus berglax Lacépède, Hist. Nat. Poiss., III, 170, 1800, Greenland.

2940. Macrourus acrolepis Bean.

Straits of Juan de Fuca.

Macrourus acrolepis Bean, Proc. U. S. N. M. 1883, 362, Straits of Juan de Fuca.

2941. Macrourus bairdi Goode & Bean.

West Indies to Massachusetts Bay.

Macrourus bairdi Goode & Bean, Amer. Jour. Sci. Arts. 1877, 471, Massachusetts Bay.

2942. Macrourus stelgidolepis Gilbert.

Pacific Ocean, off Point Conception.

Macrurus (*Macrurus*) *stelgidolepis* Gilbert, Proc. U. S. Nat. Mus. 1890, 116, Albatross Station 2960, 34° 10′ 45″ N., 120° 16′ 45″ W., in 267 fathoms.

2943. Macrourus cinereus Gilbert.

North Pacific and Bering Sea

Macrourus cinereus Gilbert, Rept. U. S. Fish Com. 1893 (1896), 457, at Albatross Stations 3307, 3329, and 3340, latitude 54° to 55° N. and longitude 155° to 171° W., in 399 to 1033 fathoms.

Genus 986. MALACOCEPHALUS Günther.

Malacocephalus Günther, Cat., IV, 396, 1862 (*lævis*).

2944. Malacocephalus pectoralis Gilbert.

Off the coast of Oregon.

Macrourus (*Malacocephalus*) *pectoralis* Gilbert, Proc. U. S. Nat. Mus. 1891, 563, off the coast of Oregon, at Albatross Stations 3071, 3074, and 3075, in 685 to 877 fathoms.

Genus 987. CŒLORHYNCHUS Giorna.

Cœlorhynchus Giorna, Mém. Ac. Sci. Turin, XVI, 1803, 178, pl. 1, figs. 3 and 4 (*La Ville* L., *Cœlorhynchus* Risso).

2945. Cœlorhynchus carminatus (Goode).

Caribbean Sea, north in the Gulf Stream to Long Island.

Macrourus carminatus Goode, Proc. U. S. Nat. Mus. 1880, 346, Gulf Stream, 40° 02′ 54″ N., 70° 23′ 40″ W., in 115 fathoms.

2946. Cœlorhynchus occa (Goode & Bean).

Gulf of Mexico, in deep water.

Macrourus occa Goode & Bean, Proc. U. S. Nat. Mus. 1885, 595, Gulf of Mexico, 28° 34′ N., 86° 48′ W., in 335 fathoms.

2947. Cœlorhynchus caribbeus (Goode & Bean).

West Indies, to northern part of Gulf of Mexico.

Macrourus caribbeus Goode & Bean, Proc. U. S. Nat. Mus. 1885, 594, northern part of Gulf of Mexico, in 210 fathoms.

2948. Cœlorhynchus scaphopsis Gilbert.

Gulf of California, in deep water.

Macrurus (*Cœlorhynchus*) *scaphopsis* Gilbert, Proc. U. S. Nat. Mus. 1890, 115, Gulf of California, at Albatross Station 3015, latitude 29° 19′ N., longitude 112° 50′ W., in 145 fathoms.

Genus 988. TRACHYRHYNCHUS Giorna.

Trachyrhynchus Giorna, Mém. Ac. Sci. Turin, XVI, 1803, 178.

2949. Trachyrhynchus helolepis Gilbert.

Off the coast of Central America.

Trachyrhynchus helolepis Gilbert, Proc. U. S. Nat. Mus. 1891, 562, west coast of Central America, at Albatross Station 2818, in deep water.

Genus 989. CORYPHÆNOIDES Gunner.

Coryphænoides Gunner, Trondhj. Selsk. Skrift., III, 50, 1765 (*rupestris*).

2950. Coryphænoides rupestris Gunner.

Banks of Newfoundland to Norway.

Coryphænoides rupestris Gunner, Trondhj. Selsk. Skrift., III, 50, 1765.

2951. Coryphænoides carapinus Goode & Bean.

Gulf Stream.

Coryphænoides carapinus Goode & Bean, Bull. Mus. Comp. Zool., vol. X, No. 5, 197, 1883, Gulf Stream, latitude 40°, in deep water.

Genus 990. CHALINURA Goode & Bean.

Chalinura Goode & Bean, Bull. Mus. Comp. Zool., vol. X, No. 5, 198, 1883 (*simula*).

2952. Chalinura simula Goode & Bean.

Gulf Stream.

Chalinura simula Goode & Bean, Bull. Mus. Comp. Zool. X, No. 5, 199, 1883, Gulf Stream, about latitude 40°.

2953. Chalinura serrula Bean.

East of Prince of Wales Island, in deep water.

Chalinura serrula Bean, Proc. U. S. Nat. Mus. 1890, 37, east of Prince of Wales Island, at Albatross Station 2859, in 1,569 fathoms.

2954. Chalinura filifera Gilbert.

Off Queen Charlotte Island, in deep water.

Chalinura filifera Gilbert, Rept. U. S. Fish Com. 1893 (1896), 458, off Queen Charlotte Island, at Albatross Station 3342.

Genus 991. NEMATONURUS Günther.

Nematonurus Günther, Challenger Report, XXII, 124 and 150, 1887 (*armatus*).

2955. Nematonurus gigas (Vaillant).

Atlantic and Pacific oceans.

Coryphænoides gigas Vaillant, Expd. Sci. Travailleur et Talisman, 232, pl. XX, fig. 2, 1888, off the Azores in 2,000 fathoms.

Family CCXXII. BREGMACEROTIDÆ.

Genus 992. BREGMACEROS (Cantor) Thompson.

Bregmaceros (Cantor) Thompson, in Charlesworth's Mag. Nat. Hist. 1840, 184 (*macclellandii*).

2956. Bregmaceros macclellandii Cantor.

South Pacific and Indian oceans; also off coast of Panama.

Bregmaceros macclellandii Cantor MS., Thompson, in Charlesworth's Mag Nat. Hist. 1840, figure 185, India.

2957. Bregmaceros atlanticus Goode & Bean.

Blake Stations 99 off Granada, and 113 off Nevis; also Station 185.

Bregmaceros atlanticus Goode & Bean, Bull. Mus. Comp. Zool., XII, No. 5, 165. 1886, off Nevis.

Order CC. HETEROSOMATA. The Flatfishes.

Family CCXXIII. PLEURONECTIDÆ. The Flounders.

Genus 993. ATHERESTHES Jordan & Gilbert.

Atheresthes Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 51 (*stomias*).

2958. Atheresthes stomias (Jordan & Gilbert). *Arrow-Toothed Halibut.*

San Francisco to Alaska.

Platysomatichthys stomias Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 301, off San Francisco.

Genus 994. REINHARDTIUS Gill.

Reinhardtius Gill, Cat. E. C. Fishes, 50, 1861 (*hippoglossoides*).

2959. Reinhardtius hippoglossoides (Walbaum). *Greenland Halibut.*

Arctic parts of the Atlantic, south to Finland and Grand Banks.

Pleuronectes cynoglossus Fabricius, Fauna Grœnlandica, 163, 1780, Greenland; not of Linnæus.

Genus 995. HIPPOGLOSSUS Cuvier.

Hippoglossus Cuvier, Règne Animal, ed. 1, II, 221, 1817 (*hippoglossus*).

2960. Hippoglossus hippoglossus (Linnæus). *Halibut.*

All northern seas, southward in deep waters to France, Sandy Hook, and San Francisco.

Pleuronectes hippoglossus Linnæus, Syst. Nat., ed. x, 269, 1758, European Ocean.

Genus 996. LYOPSETTA Jordan & Goss.

Lyopsetta Jordan & Goss, in Jordan, Cat. Fish. N. A., 135, 1885 (*exilis*).

2961. Lyopsetta exilis (Jordan & Gilbert).

North Pacific, in rather deep water; San Francisco to Alaska.

Hippoglossoides exilis Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 154, off San Francisco, between the Golden Gate and Point Reyes.

Genus 997. EOPSETTA Jordan & Goss.

Eopsetta Jordan & Goss, in Jordan, Cat., 135, 1885 (*jordani*).

2962. Eopsetta jordani (Lockington). *California Sole.*

West coast of United States, from Puget Sound to Monterey.

Hippoglossoides jordani Lockington, Proc. U. S. Nat. Mus. 1879, 73, San Francisco.

Genus 998. HIPPOGLOSSOIDES Gottsche.

Hippoglossoides Gottsche, Wiegmann's Archiv 1835, 164 (*"lamanda"=platessoides*).

2963. Hippoglossoides platessoides (Fabricius).

North Atlantic, south to Cape Cod, and coasts of England and Scandinavia.

Pleuronectes platessoides Fabricius, Fauna Grœnlandica, 164, 1780, Greenland.

2964. Hippoglossoides elassodon Jordan & Gilbert.

Puget Sound and northward.

Hippoglossoides elassodon Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 278, Puget Sound, at Seattle and Tacoma, Washington.

Genus 999. PSETTICHTHYS Girard.

Psettichthys Girard, Proc. Ac. Nat. Sci. Phila. 1854, 140 (*melanostictus*).

2965. Psettichthys melanostictus Girard.

Pacific Coast of North America, from Alaska south to Monterey.

Psettichthys melanostictus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 140, San Francisco; Astoria, Oregon.

Genus 1000. HIPPOGLOSSINA Steindachner.

Hippoglossina Steindachner, Ichth. Beitr., v, 13, 1876 (*macrops*).

2966. Hippoglossina macrops Steindachner.

Pacific Coast of Mexico, Mazatlan.
Hippoglossina macrops Steindachner, Ichth. Beitr., v, 13, pl. 3, 1876, Mazatlan.

2967. Hippoglossina stomata Eigenmann & Eigenmann.

Off San Diego, California.
Hippoglossina stomata Eigenmann & Eigenmann, Proc. Cal. Ac. Sci. 1890, 22, San Diego.

2968. Hippoglossina bollmani Gilbert.

Pacific Coast, off coast of Colombia.
Hippoglossina bollmani Gilbert, Proc. U. S. Nat. Mus. 1890, 122, off coast of Colombia at Albatross Station 2805, 7° 56′ N., 79° 41′ 30″ W., in 51½ fathoms.

Genus 1001. XYSTREURYS Jordan & Gilbert.

Xystreurys Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 34 (*liolepis*).

2969. Xystreurys liolepis Jordan & Gilbert.

Coast of California, from Point Conception southward.
Xystreurys liolepis Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, p. 34, Santa Barbara, California.

Genus 1002. PARALICHTHYS Girard.

Paralichthys Girard, U. S. Pac. R. R. Surv., x, 146, 1858 (*californicus*).

2970. Paralichthys californicus (Ayres). *Bastard Halibut; Monterey Halibut.*

Coast of California, Tomales Bay to San Diego.
Hippoglossus californicus Ayres, Proc. Cal. Ac. Sci. 1859, 29, and 1860, fig. 10, San Francisco.

2971. Paralichthys brasiliensis (Ranzani).

South America, said to range northward to Guatemala.
Hippoglossus brasiliensis Ranzani, Nov. Spec. Pisc., 10, tab. III, 1840, Brazil.

2972. Paralichthys adspersus (Steindachner).

Pacific Coast of tropical America; Cape San Lucas to Peru.
Pseudorhombus adspersus Steindachner, Ichth. Notizen, v, 1867, 9, pl. 2, Chinchas Islands.

2973. Paralichthys woolmani Jordan & Williams.

Galapagos Islands.
Paralichthys woolmani Jordan & Williams, Proc. U. S. Nat. Mus. 1896, Galapagos Islands.

2974. Paralichthys dentatus (Linnæus). *Summer Flounder.*

Atlantic Coast of United States from Cape Cod to Florida.
Pleuronectes dentatus Linnæus, Syst. Nat., ed. XII, 1, 458, 1766, and of numerous copyists.

2975. Paralichthys lethostigma Jordan & Gilbert. *Southern Flounder.*

South Atlantic and Gulf coasts of United States, north to New York.
Paralichthys lethostigma Jordan & Gilbert, Proc. U. S. Nat. Mus. 1884, 237, Jacksonville, Florida.

2976. Paralichthys squamilentus Jordan & Gilbert.

South Atlantic and Gulf coasts of United States.
Paralichthys squamilentus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, p. 303, Pensacola, Florida.

2977. Paralichthys albigutta Jordan & Gilbert.

South Atlantic and Gulf coasts of United States.
Paralichthys albigutta Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 302, Pensacola; Beaufort.

2978. Paralichthys oblongus (Mitchill). *Four-spotted Flounder.*
Coasts of New England and New York.
Pleuronectes oblongus Mitchill, Trans. Lit. and Philos. Soc., 1, 1815, 391, New York.

2979. Paralichthys æstuarius Gilbert & Scofield.
Upper part of Gulf of California.
Paralichthys æstuarius Gilbert & Scofield MS., 1896, near mouth of Colorado River.

Genus 1003. ANCYLOPSETTA Gill.
Ancylopsetta Gill, Proc. Ac. Nat. Sci. Phila. 1864, 224 (*quadrocellata*).

2980. Ancylopsetta dendritica Gilbert.
Gulf of California.
Ancylopsetta dendritica Gilbert, Proc. U. S. Nat. Mus. 1890, 121, Gulf of California, at Albatross Station 3022, 30° 58′ 30″ N., 113° 17′ 15″ W., in 11 fathoms.

2981. Ancylopsetta quadrocellata Gill.
South Atlantic and Gulf coasts of United States.
Ancylopsetta quadrocellata Gill, Proc. Ac. Nat. Sci. Phila. 1864, 224, Pensacola (not *Platessa quadrocellata* Storer).

Genus 1004. NOTOSEMA Goode & Bean.
Notosema Goode & Bean, Bull. Mus. Comp. Zool., x, No. 5, 193, 1883 (*dilecta*).

2982. Notosema dilectum (Goode & Bean).
Gulf Stream.
Notosema dilecta Goode & Bean, Bull. Mus. Comp. Zool., x, No. 5, 193, 1883, Gulf Stream, off coast of South Carolina.

Genus 1005. GASTROPSETTA B. A. Bean.
Gastropsetta B. A. Bean, Proc. U. S. Nat. Mus. 1894, 633 (*frontalis*).

2983. Gastropsetta frontalis B. A. Bean.
Key West and Apalachicola, Florida.
Gastropsetta frontalis B. A. Bean, Proc. U. S. Nat. Mus. 1894, 633, Key West and Apalachicola, at Albatross Stations 2317 and 2373, in 45 fathoms.

Genus 1006. BOTHUS Rafinesque.
Bothus Rafinesque, Carratteri di Alcuni Nuovi Gen., 23, 1810 (*Bothus rumolo* Rafinesque=*Pleuronectes rhombus* Linnæus).

Subgenus LOPHOPSETTA Gill.
Lophopsetta Gill, Proc. U. S. Nat. Mus. 1888, 603 (*maculatus*).

2984. Bothus maculatus (Mitchill).
Atlantic Coast of United States, from Cape Cod to South Carolina.
Pleuronectes maculatus Mitchill, Rept. Fish. N. Y., 9, 1814, New York.

Genus 1007. TRICHOPSETTA Gill.
Trichopsetta Gill, Proc. U. S. Nat. Mus. 1888, 603 (*ventralis*).

2985. Trichopsetta ventralis (Goode & Bean).
Gulf of Mexico, in deep water.
Citharichthys ventralis Goode & Bean, Proc. U. S. Nat. Mus. 1885, 592, Gulf of Mexico, at Albatross Station 2386, 29° 15′ N., 88° 6′ W., in 60 fathoms.

Genus 1008. ENGYOPHRYS Jordan & Bollman.
Engyophrys Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 176 (*sancti-laurentii*).

2986. Engyophrys sancti-laurentii Jordan & Bollman.
Pacific Ocean, off coast of Colombia.
Engyophrys sancti-laurentii Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 176, Pacific Coast, off coast of Colombia, at Albatross Stations 2795, 7° 57′ N., 78° 55′ W., and 2805, 7° 56′ N., 79° 41′ 30″ W., in 33 and 51 fathoms.

Genus 1009. LIOGLOSSINA Gilbert.

Lioglossina Gilbert, Proc. U. S. Nat. Mus. 1890, 122 (*tetrophthalmus*).

2987. Lioglossina tetrophthalmus Gilbert.

Gulf of California.

Lioglossina tetrophthalmus Gilbert, Proc. U. S. Nat. Mus. 1890, 122, Gulf of California, at Albatross Stations 3014 and 3016, in 29 and 76 fathoms.

Genus 1010. AZEVIA Jordan & Goss.

Azevia Jordan & Goss, Review Flounders and Soles, Rept. U. S. Fish Com. 1886 (1889), 271 (*panamensis*).

2988. Azevia panamensis (Steindachner).

Pacific Coast of Central America.

Citharichthys panamensis Steindachner, Ichth. Beitr., III, 62, 1875, Panama.

2989. Azevia querna Jordan & Bollman.

Pacific Coast of America, off coast of Colombia.

Azevia querna Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 174, off Colombia, at Albatross Stations 2800, 8° 51′ N., 79° 31′ 30″ W., in 7 fathoms, and 2802, 8° 38′ N., 79° 31′ 30″ W., in 16 fathoms.

Genus 1011. CYCLOPSETTA Gill.

Cyclopsetta Gill, Proc. U. S. Nat. Mus. 1888, 601 (*fimbriata*).

2990. Cyclopsetta chittendeni B. A. Bean..

Trinidad Island.

Cyclopsetta chittendeni B. A. Bean, Proc. U. S. Nat. Mus. 1894, 635, fig. 2, Trinidad Island.

2991. Cyclopsetta fimbriata (Goode & Bean.)

Deep waters of the Gulf of Mexico.

Hemirhombus fimbriata Goode & Bean, Proc. U. S. Nat. Mus. 1885, 591, deep waters of Gulf of Mexico.

Genus 1012. CITHARICHTHYS Bleeker.

Citharichthys Bleeker, Comptes Rendus Acad. Sci. Amsterd., XIII, Pleuron., 6, 1862 (*cayennensis*=*spilopterus*).

2992. Citharichthys sordidus (Girard).

Pacific Coast of North America, in water of moderate depth from British Columbia to Lower California.

Psettichthys sordidus Girard, Proc. Ac. Nat. Sci. Phila., VII, 1854, 142, San Francisco.

2993. Citharichthys fragilis Gilbert.

Gulf of California.

Citharichthys fragilis Gilbert, Proc. U. S. Nat. Mus. 1890, 120, Gulf of California, at Albatross Stations 3011, 3016, 3017, and 3033, in 18 to 76 fathoms.

2994. Citharichthys xanthostigma Gilbert.

Magdalena Bay, west coast of Lower California, and in Gulf of California.

Citharichthys xanthostigma Gilbert, Proc. U. S. Nat. Mus. 1890, 120, west coast of Lower California in Magdalena Bay, and in the Gulf of California, at Albatross Stations 3039, 3043, and 3044, in 47 to 74 fathoms.

2995. Citharichthys stigmæus Jordan & Gilbert.

Coast of southern California.

Citharichthys stigmæus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 410, 411, Santa Barbara, California.

2996. Citharichthys dinoceros Goode & Bean.

Deep waters of Gulf of Mexico.

Citharichthys dinoceros Goode & Bean, Bull. Mus. Comp. Zool., XII, No. 5, 157, 1886, off Martinique, St. Lucie, and Barbados.

2997. Citharichthys arctifrons Goode.

Deep waters of Gulf Stream.

Citharichthys arctifrons Goode, Proc. U. S. Nat. Mus. 1880, 341, 472, Gulf Stream, off southern New England Coast.

2998. Citharichthys unicornis Goode.

Deep waters of the Gulf Stream.
Citharichthys unicornis Goode, Proc. U. S. Nat. Mus. 1880, 342, Gulf Stream, southeast of New England.

2999. Citharichthys macrops Dresel.

South Atlantic and Gulf coasts of United States.
Citharichthys macrops Dresel, Proc. U. S. N. M. 1884, 539, Pensacola, Florida.

3000. Citharichthys uhleri Jordan & Evermann.

West Indies.
Citharichthys uhleri Jordan & Evermann, Fishes North and Middle America, 1896, West Indies.

3001. Citharichthys spilopterus Günther.

Both coasts of tropical America, north to New Jersey and Mazatlan.
Citharichthys spilopterus Günther, Cat., IV, 1862, 421, Bahia; New Orleans; San Domingo; Jamaica.

3002. Citharichthys gilberti Jenkins & Evermann.

Pacific Coast of tropical America, from Gulf of California to Panama.
Citharichthys gilberti Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 157, Guaymas, Mexico.

3003. Citharichthys microstomus Gill.

Gulf of Mexico.
Citharichthys microstomus Gill, Proc. Ac. Nat. Sci. Phila. 1864, 223, Beesley Point, New Jersey.

Genus 1013. ETROPUS Jordan & Gilbert.

Etropus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 364 (*crossotus*).

3004. Etropus crossotus Jordan & Gilbert.

Tropical America, on both coasts, north to Guaymas, Mexico, and Cape Hatteras, North Carolina.
Etropus crossotus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 364, Mazatlan.

3005. Etropus rimosus Goode & Bean.

Gulf of Mexico.
Etropus rimosus Goode & Bean, Proc. U. S. Nat. Mus., VIII, 1885, 593, Gulf of Mexico, at Albatross Station 2408, 28° 28′ N., 84° 25′ W., in 210 fathoms.

Genus 1014. MONOLENE Goode.

Monolene Goode, Proc. U. S. Nat. Mus. 1880, 338 (*sessilicauda*).

3006. Monolene sessilicauda Goode.

Deep waters of the Gulf Stream.
Monolene sessilicauda Goode, Proc. U. S. Nat. Mus. 1880, pp. 337, 338, deep water south of New England.

3007. Monolene atrimana Goode & Bean.

Deep water of the Caribbean Sea.
Monolene atrimana Goode & Bean, Bull. Mus. Comp. Zool., XII, 155, 1886, deep water off Barbados.

Genus 1015. PLEURONICHTHYS Girard.

Pleuronichthys Girard, Proc. Ac. Nat. Sci. Phila. 1854, 139 (*cœnosus*).

3008. Pleuronichthys decurrens Jordan & Gilbert.

Pacific Coast of United States, south to Monterey.
Pleuronichthys decurrens Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 453, San Francisco; Monterey Bay.

3009. Pleuronichthys verticalis Jordan & Gilbert.

Coast of California, in deep water.
Pleuronichthys verticalis Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 49, San Francisco.

3010. Pleuronichthys cœnosus Girard.

Alaska, southward to San Diego; most common about Puget Sound.
Pleuronichthys cœnosus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 139, San Francisco.

Genus 1016. **HYPSOPSETTA** Gill.

Hypsopsetta Gill, Proc. Ac. Nat. Sci. Phila. 1864, 195 (*guttulatus*).

3011. Hypsopsetta guttulata (Girard). *Diamond Flounder.*

Coast of California, Cape Mendocino to Magdalena Bay.
Pleuronichthys guttulatus Girard, Proc. Ac. Nat. Sci. Phila. 1856, 137, probably Tomales Bay, California.

Genus 1017. **PAROPHRYS** Girard.

Parophrys Girard, Proc. Ac. Nat. Sci. Phila. 1854, 139 (*vetulus*).

3012. Parophrys vetulus Girard.

Pacific Coast of North America, Alaska to Santa Barbara.
Parophrys vetulus Girard, Proc. Ac. Nat. Sci. Phila. 1854, 140, California.

Genus 1018. **INOPSETTA** Jordan & Goss.

Inopsetta Jordan & Goss, in Jordan, Cat. Fishes N. A., 136, 1885 (*ischyrus*).

3013. Inopsetta ischyra (Jordan & Gilbert).

Puget Sound, probably northward to Alaska.
Parophrys ischyrus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 276 and 453, Puget Sound.

Genus 1019. **ISOPSETTA** Lockington.

Isopsetta Lockington, in Jordan & Gilbert, Synopsis, 832, 1883 (*isolepis*).

3014. Isopsetta isolepis (Lockington).

Puget Sound to Point Conception, in rather deep water.
Lepidopsetta isolepis Lockington, Proc. U. S. N. M. 1880, 325, San Francisco.

Genus 1020. **LEPIDOPSETTA** Gill.

Lepidopsetta Gill, Proc. Ac. Nat. Sci. Phila. 1864, 195 (*umbrosus*).

3015. Lepidopsetta bilineata (Ayres).

Pacific Coast of North America, Alaska to Monterey.
Platessa bilineata Ayres, Proc. Cal. Ac. Sci. 1855, 40, San Francisco.

Genus 1021. **LIMANDA** Gottsche.

Limanda Gottsche, Wiegmann's Archiv 1835, 100 (*limanda*).

3016. Limanda ferruginea (Storer).

Atlantic Coast of North America, Labrador to New York.
Platessa ferruginea Storer, Fishes Massachusetts, 141, pl. 2, 1839, Cape Ann.

3017. Limanda proboscidea Gilbert.

Bristol and Herendeen bays, Alaska.
Limanda proboscidea Gilbert, Rept. U. S. F. C. 1893 (1896), 460, Bristol Bay, Alaska, at Albatross Stations 3239, 3240, and 3248, in 11 to 21 fathoms.

3018. Limanda aspera Pallas.

Coasts of Alaska and Kamchatka.
Pleuronectes asper Pallas, Zoogr. Rosso-Asiat., III, 425, 1811, east coast of Siberia.

3019. Limanda beani Goode.

Deep water, off coast of New England.
Limanda beani Goode, Proc. U. S. Nat. Mus. 1880, 473, southern coast of New England.

Genus 1022. **PSEUDOPLEURONECTES** Bleeker.

Pseudopleuronectes Bleeker, Compt. Rend. Ac. Amst., Pleur., 7, 1862 (*planus*).

3020. Pseudopleuronectes americanus (Walbaum). *Common Flatfish or Winter Flounder.*

Atlantic Coast of North America, from Labrador to Cape Lookout.
Pleuronectes americanus Walbaum, Artedi Piscium, 113, 1792, Long Island; based on the "Flounder" of Schöpf.

3021. Pseudopleuronectes pinnifasciatus (Kner).

Sea of Kamchatka, Decastris Bay.
Pleuronectes pinnifasciatus Kner, in Steindachner, Ueber einige Pleuronectiden, etc., aus Decastris Bay, 2, pl. 1, fig. 1, 1870, Decastris Bay.

Genus 1023. PLEURONECTES (Artedi) Linnæus.

Pleuronectes (Artedi) Linnæus, Syst. Nat., ed. x, 268, 1758 (includes all flounders).

3022. Pleuronectes quadrituberculatus Pallas.

Coasts of Alaska and Kamchatka.

Pleuronectes quadrituberculatus Pallas, Zoogr. Rosso-Asiat., III, 423, 1811, sea between Kamchatka and Alaska.

Genus 1024. LIOPSETTA Gill.

Liopsetta Gill, Proc. Ac. Nat. Sci. Phila. 1864, 217 (*glaber*).

3023. Liopsetta putnami (Gill).

Atlantic Coast of North America, from Cape Cod northward to Labrador and beyond.

Euchalorodus putnami Gill, Proc. Ac. Nat. Sci. Phila. 1864, 216–221, Salem, Massachusetts.

3024. Liopsetta glacialis (Pallas).

Arctic Ocean, south to St. Michaels.

Pleuronectes glacialis Pallas, Itin., III, App., 706, 1776, mouth of river Obi.

Genus 1025. PLATOPHRYS Swainson.

Platophrys Swainson, Nat. Hist. Classn. Fishes, etc., II, 302, 1839 (*ocellatus*).

3025. Platophrys spinosus (Poey).

West Indies.

Rhomboidichthys spinosus Poey, Synopsis, 409, 1868, Cuba.

3026. Platophrys tæniopterus Gilbert.

Gulf of California and western coast of Lower California.

Platophrys tæniopterus Gilbert, Proc. U. S. Nat. Mus. 1890, 118, Gulf of California and coast of Lower California.

3027. Platophrys constellatus Jordan & Evermann.

Galapagos Archipelago.

Platophrys constellatus Jordan & Evermann, Fishes North and Middle America, 1896, Galapagos Islands.

3028. Platophrys ocellatus Swainson.

Tropical America; sandy shores from Long Island to Rio Janeiro.

Platophrys ocellatus Swainson, Nat. Hist. Classn. Fishes, II, 302, 1839, no locality given.

3029. Platophrys maculifer (Poey).

West Indies.

Pleuronectes maculiferus Poey, Memorias, II, 316, 1860, Cienfuegos, Cuba.

3030. Platophrys ellipticus (Poey).

West Indies.

Pleuronectes ellipticus Poey, Memorias, II, 315, 1860, Cuba.

3031. Platophrys lunatus (Linnæus).

West Indies.

Pleuronectes lunatus Linnæus, Syst. Nat., ed. x, 269, 1758; based on Catesby, and of the various copyists.

3032. Platophrys leopardinus (Günther).

Gulf of California.

Rhomboidichthys leopardinus Günther, Cat., IV, 434, 1862, locality unknown.

Genus 1026. SYACIUM Ranzani.

Syacium Ranzani, Nov. Spec. Pisc., Dis. Sec. 1840, 20 (*micrurum*).

3033. Syacium papillosum (Linnæus).

West Indies.

Pleuronectes papillosus Linnæus, Syst. Nat., ed. x, 271, 1758; based on Marcgrave, and of the earlier copyists.

3034. Syacium latifrons (Jordan & Gilbert).
Pacific Coast of tropical America; Panama.
Citharichthys latifrons Jordan & Gilbert, Bull. U. S. F. C. 1881, 334, Panama.

3035. Syacium ovale (Günther).
Pacific Coast of Tropical America, Mazatlan to Panama.
Hemirhombus ovalis Günther, Proc. Zool. Soc. Lond. 1864, 154, Panama.

3036. Syacium micrurum Ranzani.
West Indies; Key West to Rio Janeiro.
Syacium micrurum Ranzani, Nov. Spec. Pisc. Disc. Sec., 1840, 20, pl. 5, Brazil.

Genus 1027. PLATICHTHYS Girard.
Platichthys Girard, Proc. Ac. Nat. Sci. Phila. 1854, 136 (*rugosus*=*stellatus*).

3037. Platichthys stellatus Pallas. *California Flounder.*
Pacific Coast of America, from Point Conception to the Arctic Ocean, and south to Sakhalin.
Pleuronectes stellatus Pallas, Zoogr. Rosso-Asiat., III, 416, 1811, Alaska.

Genus 1028. EMBASSICHTHYS Jordan & Evermann.
Embassichthys Jordan & Evermann, Fishes N. and M. Amer., 1896 (*bathybius*).

3038. Embassichthys bathybius (Gilbert).
Coast of California south of Point Conception.
Cynicoglossus bathybius Gilbert, Proc. U. S. Nat. Mus. 1890, 123, Santa Barbara Channel, at Albatross Station 2980, in 603 fathoms.

Genus 1029. MICROSTOMUS Gottsche.
Microstomus Gottsche, Wiegmann's Archiv 1835, 150 (*latidens*); not *Microstoma* Risso, 1826.

3039. Microstomus kitt (Walbaum). *Smear Dab.*
Arctic Europe, west to the sea between Greenland and Iceland.
Pleuronectes kitt Walbaum, Artedi Piscium, III, 120, 1792, after Ray; the description in part confused with that of *Lepidorhombus*.

3040. Microstomus pacificus (Lockington).
Pacific Coast of North America, Monterey to Vancouver Island, and probably northward.
Glyptocephalus pacificus Lockington, Rept. Cal. Com. Fisheries 1878-79, 43, off Point Reyes, California.

Genus 1030. GLYPTOCEPHALUS Gottsche.
Glyptocephalus Gottsche, Wiegmann's Arch. 1835, 156 (*saxicola*=*cynoglossus*).

3041. Glyptocephalus cynoglossus (Linnæus).
North Atlantic, chiefly in deep water, south to Cape Cod and France.
Pleuronectes cynoglossus Linnæus, Syst. Nat., ed. x, 269, 1758; after Gronow.

3042. Glyptocephalus zachirus Lockington.
Deep waters of the Northern Pacific; thus far known only from about San Francisco.
Glyptocephalus zachirus Lockington, Proc. U. S. Nat. Mus. 1879, 88, San Francisco.

Family CCXXIV. SOLEIDÆ. The Soles.

Genus 1031. ACHIRUS Lacépède.
Achirus Lacépède, Hist. Nat. Poiss., IV, 659, 1803 (*fasciatus*, etc.).

3043. Achirus achirus (Linnæus).
Atlantic coasts of tropical America.
Pleuronectes achirus Linnæus, Sys. Nat., ed. x, 268, 1758; based on Gronow.

3044. Achirus inscriptus Gosse.
West Indies, north to Key West.
Achirus inscriptus Gosse, Nat. Sojourn Jamaica, 52, pl. 1, fig. 4, 1851, Jamaica.

3045. Achirus klunzingeri (Steindachner).

Pacific Coast of tropical America, Panama to Guayaquil.
Solea klunzingeri Steindachner, Zur Fische des Cauca und der Flusse bei Guayaquil, 44, 1879, Guayaquil, Ecuador.

3046. Achirus lineatus (Linnæus).

West Indies, Key West and Egmont Key to Uruguay.
Pleuronectes lineatus Linnæus, Syst. Nat., ed. x, 268, 1758; based on Brown & Sloane; not of ed. xii, which is *Achirus fasciatus*.

3047. Achirus mazatlanus (Steindachner). *Mexican Sole; Tcipalcate.*

Pacific Coast of tropical America.
Solea mazatlana Steindachner, Ichth. Notizen, ix, 23, 1869, Mazatlan.

3048. Achirus fonsecensis (Günther).

Pacific Coast of tropical America, Mazatlan to Fonseca.
Solea fonsecensis Günther, Cat., iv, 475, 1862, Gulf of Fonseca.

3049. Achirus fischeri (Steindachner).

Pacific coast of Isthmus of Panama.
Solea fischeri Steindachner, Beitr. Kenntniss Flus-Fische Sud-Amer., 13, 1879, Rio Mamone, near Panama.

3050. Achirus scutum (Günther).

Pacific Coast of Central America.
Solea scutum Günther, Cat., iv, 474, 1862, Gulf of Fonseca, Panama.

3051. Achirus fimbriata (Günther).

Gulf of Fonseca.
Solea fimbriata Günther, Cat., iv, 477, 1862, Gulf of Fonseca.

3052. Achirus fasciatus Lacépède. *American Sole; Hog-choker.*

Atlantic Coast of United States, from Cape Cod to Texas; often ascending streams.
Achirus fasciatus Lacépède, Hist. Nat. Poiss., iv, 659, 662, 1803, Charleston, S. C.; description based entirely on the Linnæan account of the fish sent by Garden.

3053. Achirus panamensis (Steindachner).

Pacific Coast of Tropical America, Panama.
Solea panamensis Steindachner, Ichth. Beitr., v, 10, pl. 2, 1876, Panama.

Genus 1032. APIONICHTHYS Kaup.

Apionichthys Kaup, in Wiegmann's Archiv 1858, 104 (*dumerili*).

3054. Apionichthys unicolor (Günther).

West Indies.
Soleotalpa unicolor Günther, Cat., iv, 1862, 489, West Indies.

Genus 1033. SYMPHURUS Rafinesque.

Symphurus Rafinesque, Indice d' Ittiologia Siciliana, 52, 1810 (*nigrescens*).

3055. Symphurus marginatus (Goode & Bean).

West Indies.
Aphoristia marginata Goode & Bean, Bull. Mus. Comp. Zool., x, No. 5, 153, 1883, off St. Vincent, etc.

3056. Symphurus atramentatus Jordan & Bollman.

Off coast of Colombia.
Symphurus atramentatus Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 177, off coast of Colombia, at Albatross Station 2795, 7° 57′ N., 78° 55′ W., in 33 fathoms.

3057. Symphurus elongatus (Günther).

Pacific Coast of tropical America.
Aphoristia ornata var. *elongata* Günther, Fishes Cent. Am., 473, 1869, Panama.

3058. Symphurus leei Jordan & Bollman.

Off the coast of Colombia.
Symphurus leei Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 178, off coast of Colombia, at Albatross Station 2804, 8° 16′ 30′ N., 79° 37′ 45″ W., in 47 fathoms.

3059. Symphurus atricauda (Jordan & Gilbert).
Lower California, north to San Diego.
Aphoristia atricauda Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 23, San Diego, California.

3060. Symphurus plagusia (Bloch & Schneider). *Acedia.*
West Indies, south to Rio Janeiro.
Pleuronectes plagusia Bloch & Schneider, Syst. Ichthyol., 162, 1801; after Brown.

3061. Symphurus plagiusa (Linnæus). *Tongue-fish.*
South Atlantic and Gulf coasts of United States.
Pleuronectes plagiusa Linnæus, Syst. Nat., ed. XII, 455, 1766, on a specimen from Dr. Garden, probably from Charleston, but the locality not quite certain.

3062. Symphurus diomedeana (Goode & Bean).
Gulf of Mexico, off Key West, Florida.
Aphoristia diomedeana Goode & Bean, Proc. U. S. Nat. Mus. 1885, 589, off Key West, Florida, at Albatross Station 2414, 25° 4′ 30″ N., 83° 21′ 15″ W., in 24 fathoms.

3063. Symphurus pusillus (Goode & Bean).
Off Atlantic Coast of United States, in deep water.
Aphoristia pusilla Goode & Bean, Proc. U. S. Nat. Mus. 1885, 590, Gulf Stream, at 40° 7′ 48″ N., 70° 45′ 54″ W., and 40° 1′ N., 69° 56′ W.

3064. Symphurus piger (Goode & Bean).
West Indies and Gulf of Mexico, in deep water.
Aphoristia pigra Goode & Bean, Bull. Mus. Comp. Zool., XIII, No. 5, 154, 1886, St. Kitts, Key West, and Cedar Keys, in about 250 fathoms.

3065. Symphurus nebulosus (Goode & Bean).
Gulf Stream.
Aphoristia nebulosa Goode & Bean, Bull. Mus. Comp. Zool., XII, 192, 1883, Gulf Stream, off the coast of California.

3066. Symphurus williamsi Jordan & Starks.
West coast of Mexico.
Symphurus williamsi Jordan & Starks, in Jordan, Fishes Sinaloa, 506, 1895, Mazatlan, Sinaloa.

3067. Symphurus fasciolaris Gilbert.
Gulf of California.
Symphurus fasciolaris Gilbert, Proc. U. S. N. M. 1891, 566, Gulf of California.

Order DD. PEDICULATI. The Pediculate Fishes.

Family CCXXV. LOPHIIDÆ. The Fishing Frogs.

Genus 1034. LOPHIUS (Artedi) Linnæus. *Fishing-Frogs.*
Lophius (Artedi) Linnæus, Syst. Nat., ed. XII, 402, 1766 (*piscatorius*).

3068. Lophius piscatorius Linnæus. *Fishing-frog; Monk-fish; Goose-fish; Angler; All-mouth; Bellows-fish.*
North Atlantic, on both coasts.
Lophius piscatorius Linnæus, Syst. Nat., ed. XII, 402, 1766, no locality given.

Genus 1035. LOPHIOMUS Gill.
Lophiomus Gill, Proc. U. S. Nat. Mus. 1882, 552 (*setigerus*).

3069. Lophiomus setigerus Wahlenberg.
Coasts of China and Japan.
Lophius setigerus Wahlenberg, Skrivt. Naturh., IV, 214, tab. 3, figs. 5 and 6.

Family CCXXVI. ANTENNARIIDÆ.

Genus 1036. PTEROPHRYNE Gill.

Pterophryne Gill, Proc. Ac. Nat. Sci. Phila. 1863, 90 (*histrio*).

3070. Pterophryne histrio (Linnæus).

Tropical parts of the Atlantic; abundant on our Gulf Coast and occasional southward.

Lophius histrio Linnæus, Syst Nat., ed. x, 237, 1758, in the open sea.

Genus 1037. ANTENNARIUS Lacépède.

Antennarius Lacépède, Hist. Nat. Poiss., i, 421, 1798 (*chironectes*).

3071. Antennarius sanguineus Gill.

Cape San Lucas, Lower California.

Antennarius sanguineus Gill, Proc. Ac. Nat. Sci. Phila. 1863, 91, Cape San Lucas, Lower California.

3072. Antennarius strigatus Gill.

Cape San Lucas, Lower California.

Antennarius strigatus Gill, Proc. Ac. Nat. Sci. Phila. 1863, 92, Cape San Lucas, Lower California.

3073. Antennarius scaber (Cuvier).

Caribbean Sea; Port Castries; St. Lucia.

Chironectes scaber Cuvier, Mém. Mus., iii, 425, pl. 16, fig. 2.

3074. Antennarius reticularis Gilbert.

Gulf of California.

Antennarius reticularis Gilbert, Proc. U. S. Nat. Mus. 1891, 566, Gulf of California, at Albatross Station 2825, in 7 fathoms.

3075. Antennarius multiocellatus (Cuvier & Valenciennes).

Garden Key, Florida, to Martinique.

Chironectes multiocellatus Cuvier & Valenciennes, Hist. Nat. Poiss., 422, 1837, Martinique.

3076. Antennarius tigris Poey.

Cuba.

Chironectes tigris Poey, Memorias, i, 217, pl. 17, fig. 2, 1851, Cuba.

3077. Antennarius inops Poey.

West Indies.

Antennarius inops Poey, Ann. Sci. Nat. Madrid 1874, Puerto Rico.

3078. Antennarius corallinus Poey. *Martin Pescador.*

Cuba.

Antennarius corallinus Poey, Repertorio, i, 188, 1865, Havana.

3079. Antennarius tenebrosus (Poey).

Cuba.

Chironectes tenebrosus Poey, Memorias, i, 219, pl. 17, fig. 1, 1851, Cuba.

3080. Antennarius ocellatus (Bloch & Schneider).

Pensacola, Florida.

Lophius ocellatus Bloch & Schneider, Syst. Ichth., 142, 1801.

3081. Antennarius sonntagii (Müller).

Gulf of Mexico.

Chironectes sonntagii Müller, Reisen in Mexico, etc., i, 180, 1864, north of the Bahamas.

Genus 1038. CHAUNAX Lowe.

Chaunax Lowe, Trans. Zool. Soc. Lond., iii, 1846, 339 (*pictus*).

3082. Chaunax pictus Lowe.

Madeira and off the coast of Rhode Island.

Chaunax pictus Lowe, Trans. Zool. Soc. Lond. 1846, 339, Camera de Lobos.

Family CCXXVII. CERATIIDÆ.

Genus 1039. CERATIAS Kröyer.

Ceratias Kröyer, Naturhist. Tidsskrift, 2 Række, I, 1844, 639 (*holbölli*).

3083. Ceratias holbolli Kröyer.

Greenland.
Ceratias holbölli Kröyer, Naturh. Tidsskrift 1844, 639, Greenland.

Genus 1040. MANCALIAS Gill.

Mancalias Gill, Proc. U. S. Nat. Mus., I, 1878, 227 (*uranoscopus*).

3084. Mancalias uranoscopus (Murray).

Deep seas; taken at Madeira and off the coast of southern New England.
Ceratias uranoscopus Murray, in Wyville Thompson, The Atlantic, II, 67, 1878, off Madeira.

3085. Mancalias shufeldti (Gill).

Western Atlantic.
Typhlopsaras shufeldti Gill, Forest and Stream, November 8, 1883, 284, western Atlantic.

Genus 1041. CRYPTOPSARAS Gill.

Cryptopsaras Gill, Forest and Stream, November 8, 1883 (*couesii*).

3086. Cryptopsaras couesii Gill.

Gulf Stream.
Cryptopsaras couesii Gill, Forest and Stream, November 8, 1883, 284, Gulf Stream, at Albatross Station 2101.

Genus 1042. ONEIRODES Lütken.

Oneirodes Lütken, Overs. Kong. Dansk. Vidensk. Selsk. Forhandl. 1871, 56 (*eschrichtii*).

3087. Oneirodes eschrichti Lütken.

Deep sea, off Greenland.
Oneirodes eschrichti Lütken, Dansk. Vidensk. Selsk. Forh. 1871, 57, Greenland.

Genus 1043. HIMANTOLOPHUS Reinhardt.

Himantolophus Reinhardt, Dansk. Vid. Selsk. Nat. 1837, 74 (*grœnlandicus*).

3088. Himantolophus grœnlandicus Reinhardt.

Greenland.
Himantolophus grœnlandicus Reinhardt, Dansk. Vidensk. Selsk. Nat. Math. Afh., 1837, 74, Greenland.

Genus 1044. CORYNOLOPHUS Gill.

Corynolophus Gill, Proc. U. S. Nat. Mus. 1878, 219 (*reinhardti*).

3089. Corynolophus reinhardti (Lütken).

Greenland.
Himantolophus reinhardti Lütken, Dansk. Vid. Selsk. 1878, 321, Greenland.

Genus 1045. LINOPHRYNE Collett.

Linophryne Collett, Proc. Zool. Soc. Lond. 1886, 138 (*lucifer*).

3090. Linophryne lucifer Collett.

Open Atlantic.
Linophryne lucifer Collett, Proc. Zool. Soc. Lond. 1886, 138, pl. 15, off Madeira, lat. 36° N., long. 20° W.

Genus 1046. LIOCETUS Günther.

Liocetus Günther, Challenger Rept., XXII, 57, 1887 (*murrayi*).

3091. Liocetus murrayi Günther.

Mid-Atlantic at Challenger Stations 106 and 348.
Melanocetus (*Liocetus*) *murrayi* Günther, Challenger Rept., XXII, 57, pl. 11, fig. A, 1887, mid-Atlantic.

Genus 1047. CAULOPHRYNE Goode & Bean.

Caulophryne Goode & Bean, Oceanic Ichth., 496, 1896 (*jordani*).

3092. Caulophryne jordani Goode & Bean.

Atlantic Coast, off New Jersey.

Caulophryne jordani Goode & Bean, Ocean. Ichth., 496, fig. 409, 1896, Gulf Stream, at 39° 27′ N., 71° 15′ W., in 1,276 fathoms.

Family CCXXVIII. OGCOCEPHALIDÆ. The Bat-Fishes.

Genus 1048. OGCOCEPHALUS Fischer.

Ogcocephalus Fischer, Zoognosia, 78, 1813 (*vespertilio*).

3093. Ogcocephalus vespertilio (Linnæus).

West Indies, north to Carolina.

Lophius vespertilio Linnæus, Syst. Nat., ed. XII, 402, 1766, American coast of Atlantic Ocean.

Genus 1049. ZALIEUTES Jordan & Evermann.

Zalieutes Jordan & Evermann, Fishes North and Middle America, 1896 (*elater*).

3094. Zalieutes elater (Jordan & Gilbert).

West coast of Mexico.

Malthe elater Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 365, Mazatlan, Mexico.

Genus 1050. HALIEUTICHTHYS Poey.

Halieutichthys Poey, in Gill, Proc. Ac. Nat. Sci. Phila. 1863, 89 (*reticulatus*).

3095. Halieutichthys aculeatus (Mitchill).

Cuba to southern Florida.

Lophius aculeatus Mitchill, Amer. Month. Mag. 1818, 325, Straits of Bahama.

Genus 1051. HALIEUTÆA Cuvier & Valenciennes.

Halieutæa Cuvier & Valenciennes, Hist. Nat. Poiss., XII, 455, 1837 (*stellatus*).

3096. Halieutæa spongiosa Gilbert.

Pacific Ocean, off Lower California.

Halieutæa spongiosa Gilbert, Proc. U. S. Nat. Mus. 1890, 124, at Albatross Station 2992, 18° 17′ 30″ N., 114° 43′ 15″ W., in 460 fathoms.

Genus 1052. HALIEUTELLA Goode & Bean.

Halieutella Goode & Bean, Proc. Biol. Soc. Wash. 1882 (1885), 88 (*lappa*).

3097. Halieutella lappa Goode & Bean.

Gulf Stream.

Halieutella lappa Goode & Bean, Proc. Biol. Soc. Wash. 1882 (1885), 88, Gulf Stream, at Fish Hawk Station 1151, 39° 58′ 30″ N., 70° 37′ W., in 125, fathoms.

Genus 1053. DIBRANCHUS Peters.

Dibranchus Peters, Monatsb. König. Preuss. Ak. Wiss., Berlin, 1875 (1876), 736 (*atlanticus*).

3098. Dibranchus atlanticus Peters.

Gulf Stream.

Dibranchus atlanticus Peters, Monatsberichte König. Preuss. Ak. Wiss. Berlin, 1875 (1876), 736, 10° 12′ 9″ N., 17° 25′ 5″ W., coast of west Africa.

INTRODUCED SPECIES.

Family CYPRINIDÆ.

1. **Cyprinus carpio** Linnæus. *Carp; German Carp.*

Fresh waters of Asia, but introduced into Europe and America as a food-fish. It has been extensively introduced into private ponds in nearly all parts of the United States. From the ponds it has escaped into the streams and lakes, and is now an abundant fish in most of our larger, warmer rivers and in the ponds and bayous of the Mississippi Valley, on the south shore of Lake Erie, in the lower Columbia River, and in many other places.

Cyprinus carpio Linnæus, Syst. Nat., ed. x, 320, 1758.

2. **Carassius auratus** (Linnæus). *Goldfish.*

Native to China and Japan, but introduced everywhere as an aquarium fish and now naturalized in many of the streams in the eastern United States.

Cyprinus auratus Linnæus, Syst. Nat., ed. x, 323, 1758.

3. **Tinca tinca** (Linnæus). *Tench.*

Native in Europe. Introduced into the United States, but not yet well established anywhere.

Cyprinus tinca Linnæus, Syst. Nat., ed. x, 321, 1758, "habitat in Europæ stagnis lacubus."

4. **Idus idus** (Linnæus). *Golden Ide.*

Native in Europe. Introduced into the United States, but it has not yet become well established.

Cyprinus idus Linnæus, Syst. Nat., ed. x, 324, 1758, fresh waters of Europe.

Family SALMONIDÆ.

5. **Salmo trutta levenensis** (Walker). *Loch Leven Trout.*

Loch Leven, in Fifeshire, and other lochs in the south of Scotland and north of England. Introduced by the U. S. Fish Commission into Shoshone Lake, in the Yellowstone National Park, and elsewhere.

Salmo levenensis Walker, Wernerian Memoirs, I, 541, 1808.

6. **Salmo fario** Linnæus. *Von Behr Trout; Brown Trout.*

Northern Europe. Introduced into the waters of Yellowstone Park and elsewhere.

Salmo fario Linnæus, Syst. Nat., ed. x, 309, 1758, "habitat in Sveciæ, Helvetiæ fluviis."

ADDENDUM.

The following species were inadvertently omitted from the foregoing list:

740½. **Stolephorus scofieldi** Jordan & Culver.

Mazatlan, west coast of Mexico.

Stolephorus scofieldi Jordan & Culver, Fishes of Sinaloa, 410, 1895, Mazatlan.

1999½. **Nexilaris concolor** (Gill).

Panama.

Euschistodus concolor Gill, Proc. Ac. Nat. Sci. Phila., 1862, 145, Panama.

This is a valid species, the type of the genus *Nexilaris* Gilbert MS., distinguished by the adnate preopercle.

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