REPORT ON THE INQUIRY REGARDING THE METHODS AND STATISTICS OF THE FISHERIES.

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INTRODUCTORY NOTE.

The report on the work of this division for the fiscal years 1890 and 1891 is herewith respectfully submitted. Owing to the fact that during this time the affairs of the office were under the immediate direction of Capt. J. W. Collins, the writer labors under some disadvantage in preparing a full and satisfactory account of the operations of the division. The special reports on the fisheries now in course of preparation based on the researches of this division will clearly disclose the functions of the office, and indicate the scope of the work and the nature of the inquiries carried on during the period specified. It is, therefore, unnecessary in this place to do more than give an outline of the results accomplished and to mention certain other matters that are not covered by the regular reports. In considering the operations of the division the various topics that come up for notice may be discussed under the following general heads: Abstract of the field investigations conducted by the office; summary of the miscellaneous affairs of the division; analysis of the reports printed during the two years, and record of certain prominent matters affecting the commercial fisheries.

FIELD INVESTIGATIONS.

During the years covered by this report the entire available force of the division was placed in the field and more extensive investigations were carried on than had previously been undertaken by the office. Complete studies were made covering the commercial fisheries of fifteen coast States, and special inquiries were conducted in some of the principal fishing centers and regions of the Atlantic seaboard. The field work may be referred to under the following heads: Pacific coast, New England coast, South Atlantic coast, Gulf coast, Potomac River, Lower Chesapeake Bay, and minor regions.

PACIFIC COAST.

The investigation of the fisheries of the Pacific coast of the United States, which was begun November 15, 1888, and has been referred to in a previous report of the division, was brought to a close on September 23, 1889, and Mr. W. A. Wilcox, who had been conducting the canvass, was ordered to other duty. In December, 1889, Mr. A. B. Alexander, fishery expert on the Fish Commission steamer *Albatross*, which was then at San Francisco, was assigned to temporary duty in this division and detailed to make additional inquiries on certain fisheries for the calendar year 1889 at times when his services on the vessel were not required. As a result of Mr. Alexander's work, the office came into possession of valuable statistical and descriptive information on the whale, cod, fur-seal, market, and other vessel fisheries of the west coast; the salmon-canning industry of California, Oregon, Washington, and Alaska, and the wholesale fish trade of San Francisco, for a later year than could be obtained by Mr. Wilcox.

The present importance of the fisheries of this region, and the augmented prominence they are destined to attain as a result of the industrial growth of the western States in other lines of business, warranted the very detailed investigation undertaken by the division in connection with the careful scientific and other researches carried on by the *Albatross* in the offshore waters. While the fisheries of the Pacific coast are, as a whole, less extensive than those prosecuted on the Atlantic seaboard, certain branches have precedence over all similar fisheries. The fur-seal and salmon fisheries and the canning industry, for instance, are unsurpassed in other regions, and San Francisco has recently become the leading center of the whaling industry, owing to the transfer of vessels from the Atlantic to the Pacific, occasioned by the relative scarcity of whales in the former ocean. Taken in the aggregate, the fisheries were probably as successful as during any previous period. The number of persons ascertained to be engaged in the industry in the three coast States was 13,850; the vessels, boats, apparatus, etc., employed were valued at $6,498,239; and the first value of the products taken was $6,387,803. Of salmon, the most important product, 48,806,913 pounds were secured, for which the fishermen received $2,082,809. The salmon-canning industry, exclusive of Alaska, utilized 41,632,223 pounds, which were made into 622,037 cases of canned fish, having a market value of $3,703,838.

The inquiry disclosed a very marked advance in the fisheries as compared with 1880, when Prof. D. S. Jordan and Mr. Charles H. Gilbert canvassed the fisheries of the Pacific States in behalf of the Tenth Census. Mr. Wilcox's investigation showed that the value of the ocean, shore, and river fisheries of the region, viz, $6,387,803, exceeded by $2,111,300 the results of the fisheries in 1880. Especially worthy of mention is the increase in the whale and oyster fisheries.

Up to the time of this investigation definite information was lacking as to the results which had attended the attempted acclimatization of shad and striped bass in the waters of the Pacific States, although it had been known for some years that the plants had been successful and that more or less mature fish had been taken at various places on the coast. It was found that the shad have become distributed along the entire coast north of Monterey Bay, California, and occur in special abundance in the Sacramento River. Notwithstanding the fact that the fishermen have provided themselves with no apparatus especially adapted to the capture of shad, 101,071 pounds were taken in 1888 and 170,500 pounds in 1889. The quantity caught affords no idea of the abundance of the fish, and it is thought that the use of suitable apparatus will demonstrate the existence of large bodies of these fish in all the coast waters between southern California and Puget Sound. The striped bass, although introduced some years before the shad, are apparently less abundant and less widely distributed than the latter. They are chiefly found in San Francisco Bay, where examples weighing as much as 40 pounds have been taken, although the average weight is only 8 or 10 pounds. In 1888 only about 1,000 pounds reached the San Francisco market, but in 1889 Mr. Alexander reported that at one period they became so plentiful that the price, which had been $1 a pound in 1888, fell to 18 cents. There is every reason to believe that in a short time this species will take a prominent place among the commercial fishes of the west coast.

NEW ENGLAND COAST.

Early in the fiscal year 1890 the entire field force was placed in the New England States and a very comprehensive canvass of that region was inaugurated. The field inquiries in Maine were made by Messrs. H. M. Smith, W. H. Abbott, Ansley Hall, and C. H. Stevenson; in New Hampshire by Mr. Stevenson; in Massachusetts by Messrs. W. A. Wilcox, W. H. Abbott, E. E. Race, C. H. Stevenson, and Ansley Hall; in Rhode Island by Mr. Hall, and in Connecticut by Mr. Stevenson. At Boston and Gloucester, respectively, the local agents of the office, Mr. F. F. Dimick and Capt. S. J. Martin, aided in the work, and in the vicinity of Gloucester Mr. E. F. Locke, of the Division of Fish-Culture, rendered efficient service at times when his regular duties did not require his attention. No investigation of the entire fishing industry of this region had been undertaken since 1879–80. It was well known that marked changes had occurred in the methods, extent, and character of certain fisheries in the various States; and in view of the general prominence of the New England fisheries and the important international questions arising in connection therewith, it was deemed advisable to have full and accurate data thereon.

The inquiry placed the office in possession of complete statistical and other information concerning the ocean, shore, and river fisheries for

the years 1887, 1888, and 1889. Special studies were also made of such important branches as the sardine industry, the smoked-herring industry, the lobster-canning industry, the canning of clams and other products, the menhaden industry, the oyster-packing industry, the preparation of clam bait, and the frozen-herring trade. In connection with this investigation a careful study was conducted in Boston and Gloucester, with a view to ascertain the extent of the wholesale trades in fresh fish, salt fish, smoked fish, lobsters, oysters, and other fishery products, which constitute such a prominent feature of the industrial life of those cities. The manufacture of glue, isinglass, and fish fertilizer, the trade in ice and salt consumed in the fisheries, the making of boxes for the packing of fish, the preparation of boneless fish, and various other phases of the fishing industry were also considered. Several special papers based on these inquiries, now in course of preparation, and a detailed report on the entire subject which will soon be issued, preclude the necessity for more than a general reference at this time to the results of the canvass.

The following summary gives the extent and condition of the fisheries in 1889 as determined by the inquiry: The number of persons engaged in the fisheries of the region was 36,536, of whom 15,122 were vessel fishermen, 12,295 shore fishermen, and 9,119 shoresmen. Of the 1,542 vessels employed, 1,440 were actually used in fishing, and 102 were engaged in the transportation of fishery products; the tonnage of the fleet was 79,738.49, and the value of the vessels and their outfits was $6,382,006. The fleet consisted of 1,206 schooners, 171 sloops, 88 steamers, 38 barks, 30 cat-rigged vessels, 5 ships, and 4 brigs. The boats used in the shore fisheries numbered 11,561, and had a value of $657,010. The apparatus fished consisted of 1,178 pound nets, trap nets, and weirs, 540 seines, 9,591 gill nets, 280 bag nets, 965 fyke nets, and 175,458 pots, which, together with other miscellaneous apparatus, had a value of $1,681,575. The shore and accessory property devoted to the fisheries was valued at $5,850,979, and the cash capital required to maintain the industry was $5,523,224. The aggregate investment was $20,094,794. The products taken weighed 653,170,040 pounds, for which the fishermen received $10,550,641. The gross return on the investment was, therefore, about 50 per cent. The most important single species is the cod, of which 97,145,645 pounds, valued at $2,549,757, were marketed. The fish taken in largest quantities is the menhaden, the catch of which was 173,632,210 pounds, equivalent to about 300,000,000 fish, but the value of this enormous yield was only $428,228. After the cod, in point of value, come oysters, worth $1,393,284; lobsters, worth $833,736; whale products, worth $828,463; haddock, worth $738,732; mackerel worth $731,424; and halibut, worth $725,756.

The New England fisheries have always been more important than those of any other section of the United States, and the inquiry shows that this precedence is still maintained, notwithstanding a very serious

decline in some of the most extensive fisheries and the diversion of many large fishing vessels to the Pacific States. Compared with 1880, in 1889 there were 507 less persons engaged in the fisheries; there were 445 fewer vessels and 3,226 fewer boats employed, and a corresponding decrease in the value of vessels, boats, and apparatus, but owing to a large increase in the amount of shore, accessory, and cash property the total investment was $191,837 more than in 1880. The value of the general food-fish fisheries was about $1,850,000 less in 1889; the oyster, clam, and scallop fisheries were $965,000 greater; the lobster fishery was $310,000 more valuable; the menhaden fishery exceeded by $30,000 the results in 1880; and the whale fishery declined in value $1,400,000. A net decrease in the value of the fishing industry amounting to $1,950,000 is disclosed, a sum that would be easily overcome by the return of mackerel to our shores in their former abundance.

SOUTH ATLANTIC COAST.

The field work in this region occupied parts of two years. On January 14, 1890, Mr. W. de C. Ravenel, field superintendent in the Division of Fish-Culture, who had been assigned to temporary duty in the Division of Fisheries, was detailed to make a study of the methods and statistics of the fisheries of the South Atlantic States. Mr. Ravenel had conducted a similar inquiry in this section during the previous year, and his familiarity with the fisheries made his services of special value to the office. The canvass was begun in Florida and had extended to a point on Albemarle Sound, North Carolina, when, on April 1, 1890, it became necessary to detach Mr. Ravenel from this work in order to resume his regular duties.

Owing to various exigencies, the canvass which was brought almost to a close by Mr. Ravenel could not be completed at that time, and it was not until the following year that it became feasible to do additional work in the South Atlantic region. Immediately after the completion of the inquiry in the Gulf States, to which reference will be made, the force there engaged was transferred to this section and disposed at proper intervals along the coast. Mr. Ravenel had again been assigned to this duty, and, while the investigation in the Gulf was in progress, had begun his canvass and had gotten the work well advanced by the time the regular agents were available to assist in the inquiry. He visited the fisheries of eastern Florida, Georgia, and the greater part of South Carolina before being obliged to suspend on account of other duties. Mr. Stevenson took up Mr. Ravenel's inquiry at Georgetown, S. C., finished that State and visited a part of North Carolina, Messrs. Hall and Race covering the remaining part of the State. The work was brought to a close about the middle of June, 1891.

This inquiry was addressed to every phase of the fishing industry and may be regarded as a complete canvass of all the commercial fishing interests, including those of the rivers draining into the Atlantic Ocean.

The only exception to this statement was the hunting of alligators in the interior waters of Florida, the small force available and the time required personally to visit these regions, remote and difficult of access, precluding the possibility of undertaking the work at this time. Considerable valuable information on the alligator industry of the St. Johns River and the coast sections was, however, obtained in connection with the regular fishery canvass, and, together with data relating to the western part of the State, will enable the office to possess a satisfactory knowledge of the present condition of the business.

The fisheries of this region are less valuable than those of any other coast section; the natural advantages, however, are extensive, and the possibilities for development are considerable, especially in the oyster and offshore line fisheries. Up to a comparatively recent date the South Atlantic States took precedence over the Gulf States, but the marked advances in the latter easily overcame the comparatively slight difference between the two regions in the absence of a correspondingly large increase in the South Atlantic States. Special fisheries of this section are nevertheless of great extent, and the industry as a whole has undergone a very important increase since 1880.

In 1890, 16,001 persons were engaged in the South Atlantic fisheries, $1,688,286 was invested in the industry, and $1,573,704 accrued from the sale of products, of which sum $482,403 represented shad, $254,141 oysters, $166,106 alewives, and $133,635 mullet. During the years covered by the field inquiries the fisheries of this region were, as a whole, more successful and extensive than at any previous time. Especially worthy of mention was the flourishing condition of the shad, alewife, striped bass, black bass, and other fresh-water fisheries, and of the oyster, squeteague, mullet, and other salt-water fisheries. The only important branches which have declined are the shrimp and sturgeon fisheries. More than half the proceeds of the fisheries represents fresh-water products. The fresh-water fisheries of North Carolina and Florida are more important than those prosecuted in salt water. The relative extent of the river and other fresh-water fisheries of the region is probably greater than in any other coast section, and constitutes one of the principal features of the industry; in 1890 the salt-water products had a value of $740,539, and the fresh-water were worth $833,165.

The oyster fishery and the question of oyster cultivation have of late years received more attention in these States than at any previous time. Careful surveys of the coast waters with reference to oyster-culture have been made in the three northern States of the tier, and the legislatures have shown their appreciation of the importance of the subject by enacting modern laws intended to promote and protect the oyster industry. Large areas of oyster land have been taken up for private planting purposes, new capital has been brought into the States, and a very decided impetus has been given to the oyster fishery.

Factories designed for the canning and packing of oysters have been established in every State, and have always resulted in an increased output, owing to the convenient market and ready sale afforded the fishermen.

The following table will convey a clear idea of the large advance that has taken place in the oyster fishery of each State since 1880:

Statement of the yield of oysters in the South Atlantic States in 1880, 1887, 1888, 1889, and 1890.

Year.	North Carolina.		South Carolina.		Georgia.		Florida.		Total.	
	Bushels.	Value.	Bushels.	Value.	Bushels.	Value.	Bushels.	Value.	Bushels.	Value.
1880.....	170,000	$60,000	50,000	$20,000	70,000	$35,000	20,000	$5,000	310,000	$120,000
1887.....	212,980	18,353	37,725	18,581	110,086	26,950	48,250	9,950	409,041	103,834
1888.....	204,703	46,129	40,242	19,146	120,000	29,370	57,750	12,950	423,295	107,595
1889.....	1,001,620	194,272	43,620	19,890	163,200	26,684	62,356	11,123	1,270,796	251,969
1890.....	807,260	175,567	63,150	23,204	224,357	40,520	97,350	14,850	1,192,117	254,141

GULF COAST.

For a number of years the investigation of the fisheries of the States bordering on the Gulf of Mexico had been contemplated, but the inquiry was deferred from time to time owing to the small force available and the more urgent need of studies in other coast regions. By the 1st of January, 1891, however, the opportunity for inaugurating this work seemed favorable, and accordingly four agents, Messrs. W. H. Abbott, Ansley Hall, E. E. Race, and C. H. Stevenson, were detailed to examine and report on the fisheries and related industries of this region. The fisheries of no other section of the United States had received less attention and very little information was at hand bearing on their present condition, extent, and resources. The results of the inquiry were therefore awaited with interest. Three months were consumed in work, during which time the agents canvassed the entire coastal region from Key West to the Rio Grande.

The reports of the agents show that in 1890, the last year covered by the investigation, 11,752 persons were employed in the fisheries of the Gulf States; the capital invested amounted to $2,978,292, and the value of the catch was $2,438,675. Comparing these figures with the returns from the New England, Middle Atlantic, and Pacific States, the fisheries of this region are much less extensive. It is not in their present condition, however, that their importance chiefly consists, but rather in their recent phenomenal growth and the possibilities for still greater development. The fishery resources of the Gulf States are very extensive. Few sections of the country are better supplied with desirable marine food and economic products, including fish, reptiles, mollusks, crustaceans, and sponges. The utilization of these has as yet been incomplete, but the past growth of the industry and the present attention it is receiving will doubtless greatly advance the fishing interests in the near future.

The prominent features of the fisheries, as disclosed by the inquiry, may be chiefly mentioned, as follows: The large foreign element engaged in the industry, amounting to about 25 per cent, the aliens being most numerous in Louisiana, where they constitute one-third of the fishing population; the predominance of seines as a means of capture, gill nets and lines being important only in Florida, and pound nets, trap nets, and fyke nets, which are so extensively used in some other regions, not being used; the presence of a large fleet of lug-rigged vessels in Louisiana, a type which is peculiar to the Gulf region; the recent establishment of numerous factories for utilizing raw products of the fisheries, especially oysters, turtles, and shrimps; the extent of the oyster fishery (which is the most important and yielded $796,062), the sponge fishery (the output of which had a value of $438,692), the mullet fishery (valued at $238,528), the snapper fishery (which brought the fishermen $134,716), the squeteague fishery (which yielded $122,570), and the shrimp fishery (worth $108,811).

The only previous examination of the fisheries of these States addressed to complete statistical information was undertaken in 1880 by Mr. Silas Stearns in connection with the work of the U. S. Fish Commission in behalf of the Tenth Census. Although other inquiries have since been made by this Commission covering various phases of the fisheries, the report of Mr. Stearns is the only one that essays to be complete or affords an opportunity for comparing the past and present conditions of the industry. Since 1880, the fisheries of the Gulf States have undergone an important advance in nearly every feature. The increase in the number of fishermen amounted to 6,621, or 129 per cent; the increase in investment was $2,432,708, or 446 per cent, and the increase in the value of the catch was $1,211,131, or 99 per cent. The fisheries of Mississippi have grown at an unprecedentedly rapid rate, the proportional increase in the three foregoing particulars being 825 per cent, 4,840 per cent, and 990 per cent, respectively. The importance of the oyster in this region is made manifest by the statement that nearly half of the aggregate increase during the past decade, viz, $564,862, represented that mollusk, and that in every State the output of this product has been conspicuously augmented, a condition due in no small degree to the establishment of canning and packing houses.

POTOMAC RIVER.

In May and June, 1891, a canvass of the fisheries of the Potomac River and its tributaries was made by Mr. W. A. Wilcox. At the time of the inquiry the most important fish were being caught and a favorable opportunity was thus afforded to meet the fishermen and inspect the means and methods employed. The investigation had special reference to the condition of the shad fishery, but also related to all other branches. Mr. Wilcox began work at the mouth of the river and continued his inquiries as far as the Little Falls, 3 miles above Wash-

ington. He was assisted by Mr. Charles E. Ingersoll, of this division. The fishermen of the river evinced a deep interest in the work, and extended to the agents all possible assistance. The investigation was also further facilitated by Mr. S. G. Worth, in charge of the shad-hatching station of the Commission at Fort Washington, Md., who greatly aided Mr. Wilcox in that part of the river.

The Potomac is one of the most important rivers of the country viewed from the standpoint of the commercial fisheries, and in the extent and value of its shad fisheries it is surpassed only by the St. Johns, Hudson, and Delaware rivers. The shad fisheries of the river have a special interest to this office because of their early importance, their serious decline and threatened extermination in recent years, and their restoration as a result of the artificial propagation carried on by the U. S. Fish Commission. Through the courtesy of the health department of the District of Columbia, this Commission has, for many years, obtained a statement of the number of shad landed at Washington and other places from the Potomac fisheries, which, with other information on the subject received from the same and other sources, has furnished from year to year a fairly satisfactory knowledge of the abundance of shad; but no systematic canvass of the fisheries had been made since 1880 and there was but little authentic information available regarding the lower course of the river. The actual extent of the other fisheries was unknown for a later year than 1880.

The canvass showed that in 1890 3,576 persons were directly engaged in the fisheries of this region, of whom 295 were employed in the vessel fisheries and 3,281 in the shore and boat fisheries.

Thirty-two vessels engaged in dredging oysters during the season of 1889–90, and 33 other vessels found employment in running to market the oysters and fish caught in the shore fisheries; the aggregate tonnage of the vessels was 1,118.78, and the value of these and their outfit was $58,652. Besides those carried by the vessels, 1,472 boats were used in the river, having a value of $75,526. The apparatus of capture consisted of 261 gill nets, 376 pound nets, 32 seines, 903 fyke and other minor nets, 122 dredges, 1,289 tongs and rakes, the whole having a value of $112,053. The total investment in the fisheries of the river, including shore property worth $48,560, was $294,091.

The most important single product of the fisheries of this river is the oyster, which represents about half the proceeds from the fisheries. During the season terminating in the spring of 1890, 594,629 bushels of oysters were taken by fishermen living on the river, and large additional quantities of which no separate record could be obtained were secured by vessels belonging in various ports on Chesapeake Bay. In the following season 498,641 bushels were marketed. The value of the oyster yield was $256,782 the first season and $273,039 the next. Notwithstanding the diminished output in the latter year, amounting to 95,988 bushels, the market value of the catch was $16,257 more,

owing chiefly to a higher average price per bushel and a comparative scarcity of oysters in Baltimore, to which place a large part of the output goes. The decreased yield in 1890–91 was principally due to the destruction of beds in the upper part of the oyster region by the extension of the fresh water consequent upon freshets.

Next to the oyster in value is the shad, of which 2,571,002 pounds, equivalent to 731,453 fish, were taken in 1890, for which the fishermen received $75,935. The following year the aggregate catch was 2,356,759 pounds, or 621,977 fish, the value of which to the fishermen was $69,160. In 1891 there was a considerable diminution in the abundance of the fish in the upper part of the Potomac, although the fishing at the mouth of the river was regarded as very good. In both these years, however, the catch was much less than in 1889, which was one of the best seasons during the past decade, 868,900 fish, valued at $85,378, being taken. This presents a striking contrast with the condition of the shad fishery before the effects of artificial propagation began to be manifested. The present Commissioner of Fisheries, writing in 1880 concerning this river, stated:*

> The fisheries of this river annually decreased in value and production up to the time of the war. The intermission which then ensued in the fishing operations on account of those of a martial character allowed the fisheries to recuperate, so that in the years immediately succeeding the war it was found that they had in a measure recovered from their former depletion. In 1878 the minimum of production was attained, during which less than 200,000 [about 186,000] shad were taken in the entire river. In 1879 the results of previous artificial propagation first manifested themselves, and there was a considerable increase in the run of shad, from which time the shad fisheries steadily increased until, in the season of 1880, nearly 600,000 [582,872] were taken.

The alewives rank next to shad in importance, and during some seasons, 1891 for instance, they have had a greater value than shad. The output is now considerably larger than in 1880, the bulk of the catch being taken with pound nets. In 1890, 7,508,416 pounds, worth $67,481, were obtained, and, in 1891, 7,330,635 pounds were secured, which yielded the fishermen $71,402.

The decrease in the run of sturgeon is a noteworthy feature of the fisheries; 288,000 pounds were taken in 1880, since which time the catch has gradually dwindled until only 60,920 pounds were caught in 1890, and 45,710 pounds in 1891, notwithstanding the greater demand in recent years as shown by the higher prices received. The striped bass is an important fish in the Potomac, ranking next to alewives in total value and commanding a better price than any other species; 333,304 pounds were secured in 1890, the market value of which was $26,487. Among the other fishes taken in the river the following are the most important, and in 1890 yielded the amounts stated: Bluefish, $4,843; catfish, $7,555;

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*The River Fisheries of the Atlantic States. By Marshall McDonald. <The Fisheries and Fishery Industries of the United States, sec. v, vol. i.

perch, $6,512; and squeteague, $6,722. Terrapin and frogs, of the value of $2,999; crabs, worth $14,760, and crayfish, valued at $637, complete the list of products.

The aggregate value of the Potomac fisheries in 1890 was $485,523, of which sum the fresh-water and anadromous fishes represented $202,082, and the salt-water products, $283,441. No separate figures for the salt-water fisheries are available for comparison, but in 1880 the fresh-water fisheries had a value of $165,503.

Perhaps the most important feature of the present condition of the fisheries is the large number of pound nets employed. In early times haul seines were the only kinds of apparatus used in the shad and alewife fishery. About fifty-five years ago gill nets were introduced and gradually displaced the seines. Pound nets were first set in the river about 1875, and have in turn supplanted the gill nets to a considerable extent, and are now exerting an important influence on the fisheries; 330 of these nets were operated in 1889, 376 in 1890, and 411 in 1891. They are particularly numerous near the mouth of the river, and it is thought that the diminished catch of shad in the upper Potomac which has been observed in recent years has been partly due to the multiplication of these nets in the lower waters. The ultimate effect of the taking of larger and larger quantities of shad and other fish before they have reached the spawning-grounds can not fail to be harmful, and if the fisheries are to be maintained some restrictions will probably soon have to be placed on the number, nature, and location of the nets used, or artificial propagation will have to be conducted on an increasingly extensive scale. The greater prominence which the pound net is attaining in the shad and alewife fisheries is shown in the following table; notwithstanding that the aggregate catch of both of these gradually declined from 1889 to 1891, the yield in the pound nets advanced each year, and the percentage of increase was marked, while the output of both the seines and gill nets decreased actually and relatively.

Statement of the aggregate and proportional catch of shad and alewives in each form of apparatus in the Potomac River in 1889, 1890, and 1891.

Species and year.	Pound nets.		Gill nets.		Seines.		Total.	
	Number of fish.	Per cent.	Number of fish.	Per cent.	Number of fish.	Per cent.	Number of fish.	Per cent.
Shad:								
1889	219,679	25.28	462,675	53.25	186,546	21.47	868,900	100.00
1890	233,794	31.96	348,843	47.69	148,816	20.35	731,453	100.00
1891	251,760	40.48	267,164	42.95	103,053	16.57	621,977	100.00
Total	705,233	31.73	1,078,682	48.54	438,415	19.73	2,222,330	100.00
Alewives:								
1889	10,371,620	59.62	1,012,500	5.82	6,011,048	34.56	17,395,168	100.00
1890	11,200,878	59.67	1,287,500	6.86	6,282,663	33.47	18,771,041	100.00
1891	12,809,362	69.89	900,250	4.91	4,616,978	25.20	18,326,590	100.00
Total	34,381,860	63.09	3,200,250	5.87	16,910,689	31.04	54,492,799	100.00

LOWER CHESAPEAKE BAY.

The fisheries of the Lower Chesapeake, especially those tributary to Norfolk, Old Point Comfort, and Cape Charles, were the subject of an inquiry conducted by the writer in December, 1890, and January, 1891. Special attention was given to the condition and methods of the oyster fishery, the oyster shucking and canning trades, and the oyster-planting industry in Norfolk and vicinity, and to the pound-net fishery and oyster trade at Cape Charles. This region, viewed from a fishery standpoint, is one of the most important in the United States; it maintains the most extensive oyster and seine fisheries and the largest fish and oyster trades in Virginia, and the gill-net, pound-net, and other fisheries are of considerable value. The oyster vessel fishery centering at Norfolk and the oyster-packing industry of the place rank next to those of Baltimore in importance. As it is not intended to publish a special report embodying the results of this inquiry, a somewhat detailed reference to the more important features of the fishing industry may appropriately be made in this place.

Next to Baltimore, Norfolk receives more oysters than any other southern city. It is the headquarters of a large part of the extensive fleets belonging in Norfolk, Yorktown, Cherrystone, and other customs districts, and in the course of a season probably between 600 and 800 vessels land more or less of their catch there. The boat fisheries carried on from the city are also important. The large area of oyster-ground included in Hampton Roads and the James, Nansemond, Elizabeth, Lynn Haven, and other rivers, is in great part tributary to Norfolk. Numerous other sections on the western shore of the Chesapeake also contribute their quota to the oyster trade of the city, notably the Back, York, Piankatank, and Rappahannock rivers; and even parts of the bay and ocean shores of the eastern peninsula depend on Norfolk for a market.

The James River is perhaps the most important oyster-ground in the lower Chesapeake. For about 20 miles above its mouth there are large natural beds or "rocks," which have been seriously depleted in recent years. It is said that the beds would have been productive for a much longer period had the oystermen been obliged to return to the water the small unmarketable oysters taken with the large stock. Instead of culling the catch on the grounds, as should be required by law, this was, and is, deferred until the shore is reached, and hundreds of thousands of bushels of young oysters have thus been sacrificed, although of late the practice of making private beds with the smaller oysters has been gaining favor, and is to be commended. At the present time it is said that in every 25 bushels of oysters taken from the natural beds, 20 bushels are unmarketable. Fortunately the grounds in this river replenish from the spat with phenomenal rapidity, otherwise they must long ago have become practically barren of oysters. Owing to favorable conditions, the supply in 1890 was very abundant,

some oystermen affirming that not since the war had there been a more plentiful natural growth of oysters, although it was generally acknowledged that the quality was much poorer than usual.

One of the most noted natural oyster-grounds in this region was Hampton Bar, located on the left side of the James River at its mouth, extending parallel with the course of the stream and covering an area of about 3,000 acres. According to Col. W. N. Armstrong, who is now extensively engaged in oyster-planting on the bar, as early as 1883 the natural beds had been so exhausted that the entire yield of the tongers from Old Point Comfort to Newport News did not amount to 10 barrels a day, and the tongers who reside in Hampton were in the habit of resorting to other natural beds in the James River 20 or 30 miles distant. Since that time laws have been enacted securing the rights of planters, and extensive planting has been done on the bar; about 700 or 800 acres are now under cultivation, on which the plantings are about 600 bushels per acre, and as many as 800 barrels of oysters have been shipped from these grounds to the general markets in a single day.

With the exhaustion of the natural beds, more attention is being bestowed on artificial methods of maintaining the supply than ever before, and it is being generally recognized that the oyster industry in the near future must depend for its maintenance on planted beds.

A number of fishermen in this section were met with who use the so-called deep-water oyster tongs, a report concerning which has been prepared by this office. The depth of water in which it is commonly used is from 30 to 50 feet; oysters in this depth are far beyond the reach of ordinary tongs, and as the employment of dredges is restricted in this region the new apparatus is being advantageously operated. On the planted beds and in shoal-water fishing the old type of tongs will continue to be used. The only objection made to the new pattern is that on rough bottom it fails to work well, and even when oysters are abundant only small hauls can be made. In the Back River and a few other localities the deep-water tongs are successfully employed in taking clams (*Venus mercenaria*) in water 5 or 6 fathoms in depth.

A large percentage of the oysters landed in Norfolk goes through the packing and canning houses before reaching the consumer. This business is of large proportions and constitutes one of the principal industrial enterprises of the city. The fall and winter of 1890 was regarded by the packers as the best season in at least five years. All of them handled larger quantities of oysters than for some years, and the prices received for the prepared oysters were very satisfactory. Larger shipments to the western States and the interior formed a noticeable feature of the season's trade. It is generally held that the chief factor in bringing about this condition of affairs was the comparative scarcity and high price of oysters in the Baltimore market. Numbers of the Maryland dredging vessels transferred their operations to North Carolina

waters, and some of the Baltimore packers established houses in that State. The new Maryland "cull law," requiring the return to the water of all oysters less than 2½ inches in length, materially reduced the output and was the principal cause of the scarcity of oysters for shucking purposes.

The oyster-packing industry of Norfolk and the adjacent city of Portsmouth had the following extent in the calendar year 1890. The season of 1890–91 was not over at the time of the inquiry, and no statistics for that time could be obtained; it is known, however that the business was considerably larger than is shown by the figures.

Number of firms	24
Number of employés	1,605
Value of buildings, machinery, tools, etc	$308,125
Cash capital	$94,800
Bushels of oysters bought	1,897,871
Cost of same	$1,043,829
Cost of opening and packing	$317,060
Gallons of shucked oysters sold	1,385,307
Value received	$1,454,572
Gross profits of the trade	$93,683

During the year 1890 the average price paid by the packers for the oysters utilized was between 50 and 60 cents a bushel. The shucked oysters had an average value of $1.05 a gallon, the latter measure representing about 1⅔ bushels.

While at Norfolk, the methods of oyster-culture pursued in Lynn Haven River were studied, and a knowledge was acquired of the conditions to which the celebrated oysters there reared are subject. Lynn Haven River empties into the Chesapeake Bay about 5 miles from Cape Henry and 12 miles in an air line from Norfolk. The river has two main arms and extends inland for about 5 miles. On the east it is connected by an exceedingly long and narrow thoroughfare with Broad Bay, which, in turn, joins Linkhorn Bay. Owing to the very slight rise of tide which occurs in these bays, they can not be utilized for planting purposes, as the oysters will not fatten and thrive under such conditions, and they simply serve as natural seed beds. The river has long been the scene of oyster-raising, and of late has come into prominent notice on account of the fine grade of oysters that have been shipped from this place, known to the trade as "Lynn Haven Bays," or "Lynn Havens," which deservedly rank among the finest stock now placed on the market. As early as seventy-five years ago oysters were planted in the river, and the business may be considered to have been permanently established fifty years ago, since which time it has gradually increased in extent and importance.

The fresh-water streams emptying into the Lynn Haven River are of small size and do not carry a sufficient volume of water to affect, except in a minor degree, the salinity of the river, which is said to be almost as pronounced as that of the adjoining waters of the Chesapeake Bay. Conditions exist apparently favorable to the development of

minute vegetable organisms—desmids and diatoms—upon which oysters are now known chiefly to subsist, and the abundance of such food no doubt accounts for the rapid growth and characteristic flavor which distinguish these particular mollusks. There have been years when an apparent excess of vegetable food has imparted a green coloration to the gills of the oysters, a feature which from time to time has attracted much attention in oyster circles throughout the country, and which has been shown to be due to the absorption of the coloring matter of ingested algæ. The winter of 1888–89 was one of the seasons in which the Lynn Haven oysters became thus affected.

The oyster beds or "coves" in this river are in part leased from the State and in part owned by private individuals. The holdings vary in extent from 2 to 40 acres or more. Semi-professional fishermen usually have from 2 to 5 acres, while the regular planters lease or own 30, 40, or more acres. It is interesting to observe that much of the oyster land in the vicinity of Church Point, one of the most favorable locations, has been only comparatively recently submerged. Some of the ground is the part of an old graveyard, and even now by wading a man may feel the submerged tombstones. Nearly all persons living on the shores of the river and its multitudinous coves are more or less interested in oyster-culture. In round numbers there are 100 regular planters and as many more irregular or semi-professional, not including the persons employed in tonging, packing, carting, etc.

The entire output of the river consists of oysters that have been artificially reared, there being no natural beds. Originally most of the seed oysters in Lynn Haven River were brought from Broad and Linkhorn bays, and even at the present time a part of the yearly supply, amounting to 4,000 or 5,000 bushels, comes from those sources, but a considerable quantity is also obtained from the James River and the Chesapeake. To a small extent the planters depend on spat obtained from their own grounds, some "coves" being apparently better adapted than others for producing native seed. The practicability of sowing shells for the attachment of the spat is fully understood by those planters who depend for their supply to some extent on spawning oysters on their own beds, and this method is followed whenever it is desired to collect spat. The seed oysters placed in the river are usually one year old, and are allowed to remain down about three years. Oysters raised from the spat are taken up for market when four years old. Some oysters, destined for special trade, are left down five or six years, and reach the exceptionally large size for which the "Lynn Havens" are noted.

In recent years the ruling price for Lynn Haven oysters at first hands has been about $2.50 per bushel, regardless of size. Small quantities of specially large oysters often bring $3 or $3.50 per bushel. In 1887 26,000 bushels of oysters were reported to be on the beds in the Lynn Haven River, of which 9,500 bushels were taken up and sold, yielding $23,750. The following year there were 42,000 bushels on the grounds, and of

these 7,800 bushels were marketed for $19,500. In 1890 the output was larger than for some years, amounting to 11,153 bushels, valued at $26,100.

The principal fishing in the vicinity of Cape Charles City is with pound nets. Owing to the ample facilities for shipment by both rail and water, to the favorable character of the shore, to the proximity of the ocean, and to the general abundance of fish, this is perhaps the finest region for pound-net fishing in the Chesapeake Bay as regards marine species, the run of Spanish mackerel, bluefish, and squeteague being particularly large; but on account of the absence of fresh-water streams of any volume the catch of shad, alewives, and other anadromous fishes is very small as compared with localities on the opposite side of the bay. In 1889 17 pound nets were operated along this shore between Hunger Creek and the mouth of the bay, and in 1890 16 nets were set. The fishery in 1889 yielded 934,835 pounds of fish, for which the fishermen received $16,155, and in 1890 1,169,033 pounds, with a first value of $15,988. Some interesting notes (based on the results of the fishery) were obtained on the abundance and movements of certain species in those years. Among other commercial fishes occurring on this shore, and taken in the pound nets, the following may be briefly referred to; the common names in use in the region are given in quotation:

Scomberomorus maculatus. *"Spanish mackerel"; "Bay mackerel."*

This is the most important fish taken, and the average catch per net is probably larger than at any other locality on the Atlantic coast. The fish reach this shore late in May or early in June, and are usually in a spawning condition when they arrive. The first run consists of larger fish than those which come in July and are most abundant through the summer. In fall there appears to be another run of large fish. The average weight of the fish caught is 1¼ pounds, but examples weighing as much as 6 pounds are not rare, and, on the other hand, large quantities of very small fish are often secured. The run in 1889 and 1890 was considered quite large, although less than 10 years ago. The most noticeable feature of the fishery in 1890 was the occurrence in the fall of enormous quantities of very small fish; they weighed a quarter of a pound or less and 200 were required to fill a bushel measure. Old fishermen reported that never in their experience had there been so many "tinkers" as in August and September, 1890. Two pound nets of Mr. C. F. Wilkins, near Hunger Creek, are said to take more Spanish mackerel than any others in the bay; they have been set from the same shore for many years, and are of special interest because the first experiments in the artificial hatching of Spanish mackerel were made with eggs obtained from fish caught in these nets.

The following table, showing the daily catch of these pounds in 1889 and 1890 will be of interest as indicating the times of arrival and depart-

ure of the fish in this locality and the fluctuations in abundance; the figures do not include the small mackerel referred to, of which no account was taken. As such detailed and accurate information is not often obtainable, it probably warrants the full presentation given it.

Daily pound-net catch of Spanish mackerel near Hunger Creek, Northampton County, Va.

Month and day.	Number caught. 1889.	1890.	Month and day.	Number caught. 1889.	1890.	Month and day.	Number caught. 1889.	1890.
May 24	.....	2	July 1	916	42	Aug. 9	79	69
26	.....	2	2	1,154	238	10	274	.....
27	.....	2	3	1,336	1,012	12	877	310
29	.....	7	4	899	623	13	67	.....
30	.....	1	5	1,800	314	14	198	57
31	.....	2	6	475	.....	15	1,038	187
Total	.....	16	7	.....	506	16	164	2
			8	535	55	17	301	.....
			9	241	682	18	.....	1,050
			10	84	.....	19	166	100
June 2	.....	10	11	37	275	20	146	220
4	4	3	12	284	75	21	96	169
5	15	11	13	76	.....	22	121	(*)
6	13	179	14	.....	318	23	146	(*)
7	.....	135	15	42	500	24	227	(*)
8	8	.....	16	1,080	1,300	25	.....	62
9	.....	6	17	344	505	26	143	.....
10	111	21	18	190	1,979	28	22	.....
11	59	15	19	2,400	250	29	.....	13
12	93	13	20	1,474	.....	30	12	9
13	53	.....	21	.....	119	31	30	.....
14	15	3	22	925	5	Total	6,428	4,633
15	122	.....	23	257	.....	Sept. 1	646	12
16	.....	30	24	815	1	2	.....	1
17	281	1	25	137	45	3	69	.....
18	221	6	26	1,380	163	4	56	.....
19	85	170	27	225	.....	5	50	9
20	11	381	28	.....	107	6	96	14
21	2	91	29	2,135	1,684	7	95	.....
23	.....	746	30	621	369	8	.....	18
24	101	50	31	180	2,715	9	.....	49
25	195	66				10	.....	3
26	316	115	Total	20,048	13,882	11	.....	2
27	541	124				13	.....	8
28	635	98	Aug. 1	254	286	15	.....	5
29	358	.....	2	895	102	16	.....	1
30	.....	18	3	544	.....	17	.....	9
Total	3,329	2,292	5	262	575	Total	1,012	131
			6	72	1,120			
			7	137	132	Grand total	30,817	20,954
			8	157	80			

* On these days a storm was raging and no fish were caught.

Another lot of pounds, consisting of 4 nets in 1889 and 3 nets in 1890, situated nearer the ocean than the foregoing, took the following number of mackerel:

Monthly pound-net catch of Spanish mackerel near Cape Charles City, Va.

Month.	Number of fish caught. 1889.	1890.
May	.....	58
June	3,378	3,132
July	15,304	3,223
August	3,655	3,459
September	250	10,723
Total	22,587	20,595

The aggregate yield of Spanish mackerel on this shore was 151,934 pounds in 1889 and 124,640 pounds in 1890, valued at $10,783 and $6,799, respectively. The fish are sold by the piece, at the uniform price of 8½ cents each. The fishermen explain that the somewhat smaller yield in 1890 was not due to a scarcity of fish, but to conditions of weather and temperature which kept the fish offshore or beyond the reach of the nets.

Pomatomus saltatrix. *"Bluefish."*

Next to the Spanish mackerel the bluefish is the most valuable species taken in the pound nets. July and August are the months during which the largest runs occur; the catch then is always greater than in May, June, September, and October. The fish was as abundant at Cape Charles in 1890 as it was ever known to be, but as the schools kept well offshore for the most part, the catch was not commensurate with the abundance. The following statement, based on the catch in nets for which detailed figures are available, shows the monthly variations in the abundance of the fish in the inshore waters:

Monthly pound-net catch of bluefish in the vicinity of Cape Charles, Virginia.

Month.	1889 (6 nets).	1890 (5 nets).
	Pounds.	*Pounds.*
May	35	2,214
June	6,080	6,772
July	10,073	13,567
August	13,436	14,420
September	1,773	8,190
October	.....	490
Total	40,997	45,653

The total catch of bluefish in pound nets was 71,420 pounds, valued at $2,193, in 1889, and 112,703 pounds, worth $3,161, in 1890. The yield of most of the nets is sold on the grounds at the uniform rate of $2 a bushel.

Cynoscion nebulosum. *Spotted squeteague; "Trout"; "Salmon trout"; "White trout."*

The spotted squeteague ranks next to the preceding species in commercial value. It occurs from April to October, inclusive, although it is taken in small quantities early and late in the season, as only a few and often no pound nets are then in operation. The fish is most common in July and August, during which months more than half of the catch is made. The fish was four times more abundant in 1890 than in the previous year, although it is usually not subject to variations so marked as this. The aggregate catch in the pound nets of this section was 62,610 pounds in 1889 and 262,110 pounds in 1890, for which the fishermen received $672 and $2,251, respectively. Nearly all the fish are sold locally by the bushel, at prices ranging from 50 cents to $1, according to the demand. The average weight of the fish is one-half

pound. The monthly fluctuations in abundance are shown in the following table, representing the catch of a part of the nets:

Monthly pound-net catch of spotted squeteague in the vicinity of Cape Charles, Virginia.

Month.	1889 (6 nets).	1890 (5 nets).
	Pounds.	*Pounds.*
April	.....	70
May	.....	8,138
June	5,010	10,406
July	7,636	29,540
August	7,438	25,078
September	3,343	8,488
October	280	4,690
Total	23,707	86,410

Cynoscion regale. *Weakfish; "Gray trout."*

Unlike its congener, the spotted squeteague, the weakfish is found on this shore only early in the season, being very rarely taken after July. It would seem that coincident with the beginning of the largest catch of bluefish, there is a cessation in the run of weakfish. The fish have an average weight of 1½ pounds, and, like bluefish, are mostly sold at $2 a bushel, which is equivalent to about 3 cents a pound. In 1889 12,720 pounds were caught, and in 1890 19,800 pounds. The monthly yield of the nets for which detailed figures are available was as follows:

Monthly pound-net catch of weakfish in Northampton County, Va.

Month.	1889 (6 nets).	1890 (5 nets).
	Pounds.	*Pounds.*
May	1,313	1,026
June	4,128	5,482
July	1,738	2,022
Total	7,179	9,130

Elacate canada. *Cobia; "Bonito"; "Coalfish."*

Most common in June, and probably more numerous on the eastern shore of Virginia than elsewhere in the Chesapeake. The fish taken weigh about 20 pounds on an average and sell for 25 cents each. Next to the sturgeon this is the largest food-fish occurring regularly in the bay; it reaches a weight of 150 pounds.

Trachynotus carolinus. *"Pompano"; "Sunfish."*

Weighs about 1¼ pounds and sells at 12½ cents each. Occurs sparingly between May and September. During some seasons it becomes very abundant. The fish doubtless spawns in the Chesapeake, as ripe fish have been found in June.

Caranx hippos. *Crevallé; "Trevallé."*

Occurs abundantly in the lower Chesapeake, but is generally so small that when taken it is *not* utilized; it weighs less than half a pound. It seems to enter the bay for the purpose of spawning, which takes place in midsummer.

Roccus lineatus. *Striped bass; "Rock."*

This valuable food-fish occurs regularly on this shore in March, April, and May, but is much less numerous than formerly. In 1890 the entire pound-net catch was only 15,512 pounds, valued at $566. Dr. John T. Wilkins states that this species was formerly very abundant in the lower bay, where it was taken by seine fishermen of the eastern shore and sent to Norfolk by the vessel load, selling for 25 to 50 cents a bushel. The yield was enormous; hauls of 200 to 400 bushels were often made, and an average catch for a 100-fathom seine was 40 bushels to each haul, from the last of March to the middle of May. About 1855 the fish began to decrease, and have continued more or less scarce to the present time. Three sizes of fish are taken on this coast, to which the fishermen have applied different names. The smallest ones, called little rock, weigh 1 or 2 pounds; the next size, called chub rock, average 10 pounds in weight; the largest, or bass rock, range from 20 to 60 pounds, averaging about 35 pounds. The run of the little rock precedes that of the others; it begins in March, and is soon joined by that of the chub rock, the two sizes being found till about May 15. About May 10 the bass rock appear and continue running until June 1. Another short run occurs in September and October, but few fish are then taken.

Chætodipterus faber. *"Porgy"; "Moonfish."*

Weighs 3½ to 4 pounds, and is a food-fish of some value. It sells at 10 cents each. Arrives in schools late in May, and is most numerous in June and July, when most of the fish are caught. It usually remains in the bay until the latter part of September. In 1889 six nets took 1,164 of these fish, 1 being caught in May, 891 in June, and 272 in July. The following year the fish were comparatively scarce, and only 111 were taken in the same nets. It is more abundant on the eastern side of this part of the bay than on the western shore, where the salinity of the water is reduced by a large volume of fresh water brought down by the rivers. The following interesting account of the spawning conditions, eggs, etc., of this fish in this part of the Chesapeake Bay is from an unpublished article by Mr. R. Edward Earll:

Porgies seem to visit Chesapeake Bay for the purpose of spawning. When they first arrive the ovaries and spermaries are well advanced, and soon individuals may be found with the eggs and milt running freely from them. On June 3 several females were seen at New Point, Va., with eggs nearly ripe, while ripe males were very abundant. June 28 ripe fish of both sexes were found at Crisfield, Md., and eggs were taken from several females and impregnated, after which they were confined in floating boxes having wire-cloth bottoms, which had been placed in the water of

the harbor. They hatched out in eighteen hours, with the water at a temperature of 84° F. Other lots were also taken and successfully hatched, the time varying with the temperature; with the water at 78° F. it required twenty-four hours.

The eggs are one twenty-sixth of an inch in diameter, and have a specific gravity almost exactly the same as that of salt water; when there is no motion most of them remain at or near the surface, but with the least current they become generally distributed through the mass. Each egg has a very prominent oil globule, which keeps it in a proper position in the water.

The porgy is a very prolific species, a good-sized individual probably containing about a million of eggs. These ripen irregularly, some being quite green and immature after the first have been deposited. As the eggs ripen they burst the membrane that holds them and pass down the channel that leads to the vent; they are thus thrown out gradually, or at intervals of a few days at most, the time required by the individual for spawning being not less than six weeks, while the spawning season for the species must extend into September. The species evidently matures when young or are of slow growth, for an individual weighing only half a pound was seen with the spermaries fully developed and the milt running freely.

Archosargus probatocephalus. *Sheepshead.*

Arrives in small schools early in May and remains until November. Most common in the pound nets in June. Weighs about 4 pounds and sells for 35 cents each. Much less numerous than it was a few years ago, when a single net took more than the aggregate yield in 1890. When pound nets were first introduced it is said that large catches were often made, and it is reported that during one day in September, 1877, a single net on this shore took 1,700 sheepshead, which were sold in Norfolk for $600.

Clupea sapidissima. *Shad.*

Arrive in March and are taken until June. The entire catch in all the pound nets is usually less than that in a single net on the opposite side of the bay, being 12,700 pounds in 1889. In 1890, however, there was a larger run, and 44,872 pounds were obtained.

Brevoortia tyrannus. *Menhaden; "Alewife"; "Oldwife."*

A small pound net set near Cape Charles City in December, 1890, caught small numbers of menhaden. The fish were of medium size, and, while not abundant, were quite constant in their occurrence at that time. Similar evidence has recently been adduced going to show that the fish is a regular, but perhaps not abundant, winter inhabitant of the Chesapeake.

Other economic fish taken in the pound nets are alewives (*Clupea æstivalis* and *C. pseudoharengus*), called "herring"; sturgeon (*Acipenser oxyrhynchus sturio*); redfish (*Sciæna ocellata*), called "drum" and "red drum;" sea bass (*Centropristis striatus*), locally known as "black will" and "black bass"; harvest fish (*Stromateus paru*), the "butterfish" of the fishermen; spot (*Leiostomus xanthurus*); flounders (*Paralichthys dentatus* and other species); kingfish (*Menticirrhus saxatilis*); albacore (*Albacora thynnus*), called "horse-mackerel," and numerous other salt-water fishes taken irregularly or in small numbers.

In September, 1890, Mr. William P. Seal, superintendent of aquaria of the U. S. Fish Commission, visited this region for the purpose of obtaining a collection of living fishes. Mr. Barton A. Bean, assistant curator of the department of fishes in the U. S. National Museum, accompanied the party and has published a list* of the fishes there observed, which is an important contribution to the knowledge of the fish fauna of the lower Chesapeake. Sixty-nine species were detected during a visit of two weeks and an inquiry made earlier in the season would doubtless demonstrate the occurrence of a great many additional species.

At Cape Charles an inspection of the works of the International Oyster Company was made, and an opportunity was there afforded to witness the method of "wiring" oysters for distant shipment in the shell, on which process this company holds letters patent. The method originated with Mr. A. A. Freeman, the present manager of the company, and was first employed on a small scale in Philadelphia. In 1888 a stock company was formed to utilize the principle and the plant was located where it now is. The "wiring" is a simple process, consisting of the application of a rather stout wire tightly around the valves of the oyster. At first all the work was done with pliers and was necessarily slow, but in November, 1890, special machines were introduced, by means of which one man has been known to wire 48 oysters in a minute; but the average is much less. The advantage claimed for this process is that the natural juices are retained and the deterioration in quality which ensues upon their evaporation is prevented. In the prospectus which the company issues, Prof. John A. Ryder is quoted as indorsing the value of the method as follows:

I have examined and had in my possession a number of wired oysters, and I am satisfied that the oyster can be preserved when the shells are thus wired for a considerable length of time. I have carefully examined oysters which I am satisfied have been wired for sixty days and I find that their vitality is fully preserved and the oyster in no way deteriorated in quality or flavor. I think the process of preserving oysters by placing a wire around them is a practically useful process, and in my opinion would lead to the transportation of oysters to distant points as an article of commerce, when it would be otherwise impossible to transport them alive in the shell.

* Proceedings of U. S. National Museum, vol. XIV, p. 83.

MINOR FIELD WORK.

A number of other investigations, some of a more or less local nature, were undertaken by the division, among which the following may be mentioned:

The canvass of the fisheries of the State of New York, referred to in a previous report, which began in May, 1889, occupied the next fiscal year until August 24, when Mr. Charles H. Stevenson, the field agent who had been conducting it, was transferred to work in the New England States. This inquiry related to the calendar years 1887 and 1888, and the information was in part utilized in a statistical abstract of the coast fisheries.

In March, 1891, Mr. W. A. Wilcox made an examination of the wholesale fish and oyster trades of Philadelphia. Part of the information obtained was utilized in a report on the statistics of the fishery industries, and part will be available for incorporation in a later report on the fisheries of the Middle Atlantic States, the investigation of which is contemplated.

Independently of the extensive investigation of the entire fishing industry of the New England States, to which reference has been made, Mr. F. F. Dimick, the local agent of the office at Boston, Mass., has boarded each vessel landing fish at that port and obtained an account of the quantities and values of each kind of fish taken and the grounds on which the fishing was done, together with other information relating to the number and nationality of the crew, value of vessel, value of outfit and apparatus, etc. As Boston is the center of the fresh-fish fishery of New England, and as a large fleet of market and other vessels belonging not only at Boston but at many other fishing ports on the New England coast makes its headquarters at that place, the returns thus made by Mr. Dimick convey a very good idea of the extent and condition of the vessel fisheries of that region and are especially valuable in that they definitely indicate the actual and relative importance of the various fishing-grounds resorted to by the different vessels engaging in the different fisheries. Work essentially similar to that in Boston is done by Capt. S. J. Martin, a local agent, at Gloucester, Mass., and taken in conjunction with the inquiry made by Mr. Dimick in whole or in part covers the operations of nearly seven-eighths of the offshore fishing vessels of New England.

In June, 1891, Mr. Stevenson visited Wilmington, Del., and Newark, N. J., to obtain certain statistical and other information concerning the porpoise fisheries on the North Carolina coast south of Cape Hatteras. These are controlled by oil and leather companies located in the cities named, and the data desired by the office could not be secured at the time the agent visited the region in the course of the regular investigation of the fisheries of North Carolina already alluded to.

MISCELLANEOUS AFFAIRS OF THE DIVISION.

Relations with the Census Office.—With a view to secure the coöperation of the Fish Commission with the Census Office in taking a census of the fisheries and the subsequent preparation of reports thereon, as was done in the census of 1880, the Superintendent of Census, Hon. Robert P. Porter, in July, 1889, entered into communication with the Commissioner of Fish and Fisheries, and on August 26, 1889, appointed Capt. J. W. Collins, assistant in charge of the Division of Fisheries, a special agent in charge of the fishery census. On December 18, 1889, Capt. Collins resigned this position, other official duties demanding his entire time. Close relations between the two bureaus were still maintained, however; and, in response to requests from the Superintendent of Census, such data as the Fish Commission had collected were placed at the disposal of the Census Office.

Treasury Circular, "Statistics of the Fisheries."—The purposes and provisions of this circular have been fully discussed in previous reports of the Commissioner and the division. Its operation began in December, 1885, and continued in active force until October, 1890. During the five and a half years ending June 30, 1891, the number of circulars received was 23,177, of which 4,649 were received in 1889–90 and 2,266 in 1890–91; during the last six months of the fiscal year 1891 only 614 circulars were forwarded to the office. The circumstances which led to the discontinuance of the circular are embraced in the following correspondence between the Fish Commission and the Treasury Department:

[The Commissioner of Fish and Fisheries to the Secretary of the Treasury.]

WASHINGTON, D. C., *August 18, 1890.*

SIR: Permit me to call the attention of your Department to the fact that in certain customs districts the requirements of Treasury Circular, Statistics of the Fisheries (No. 45, Bureau of Navigation, series of 1887), are apparently being overlooked or disregarded, to the detriment of the work of this office.

I have the honor to transmit a list giving the names of the customs districts that are derelict, together with such brief annotations as are thought necessary to show your Department the special conditions prevailing in each case.

It should be stated that at one time all the districts in question were complying with the circular; but, for reasons unknown to this office, they have, for a greater or less length of time, ceased regarding it.

I have to request that you will kindly have this matter brought to the attention of the collectors of the districts named, to the end that reports omitted in the past may be forwarded, and that in the future the requirements of the circular may be promptly and completely carried out.

I desire to improve this opportunity to convey to you an expression of the obligation felt by the Fish Commission for the assistance given by your Department in the matter of collecting fishery statistics. I have pleasure in expressing my hearty appreciation of the faithful manner in which the work has generally been performed by customs officials, and it only needs the addition of the few links in the chain, which

I have indicated, to make the work complete, which is not only an important auxiliary in our statistical inquiry, but has the additional merit of being inexpensive.

Yours, very respectfully,

M. McDONALD,
Commissioner.

[The Secretary of the Treasury to the Commissioner of Fish and Fisheries.]

WASHINGTON, D. C., *October 6, 1890.*

SIR: Your letter of the 18th of August last, relating to the statistics of the fisheries, was brought to my attention on my return recently to the Department.

It appears that collectors of customs in certain customs districts are disinclined to obtain the statistics you desire. The Department understands that when the subject of obtaining statistics through the offices of collectors of customs was first considered there was an intention of obtaining Congressional action in regard to the matter, and that the work to be performed by the customs officers in ascertaining and forwarding the information was to be temporary only. This was in the year 1886. It now appears from your communication that the statistics obtained are defective, owing to neglect on the part of the customs officers, and it has been stated to the Department that statistics somewhat similar are being gathered by the Census Bureau.

In the absence of any special appropriation for the purpose, or authority of law, it seems to me inexpedient to attempt further to collect the statistics through the officers of the customs.

The supply of blanks prepared by this Department is exhausted.

Respectfully, yours,

W. WINDOM,
Secretary.

Special information and statistics furnished.—The division is called upon to furnish to private parties, State officials, Congress, and the Executive Departments descriptive and tabular matter on various special subjects connected with the fisheries, which in the course of a year often constitutes a prominent feature of the work. While much of the information requested is already available and is readily furnished, some of the inquiries occasion protracted research, and may occupy the attention of the office force for a considerable time. An idea of the nature of the calls made on the division may be gained from the following partial list of data prepared for Government and State officials in the years 1890 and 1891:.

An opinion relative to the effect on the abundance of fish in this country of the unrestricted use of pound nets, traps, purse seines, and gill nets.

Statistical and descriptive data covering the sponge fishery of Florida.

Statistics and observations regarding the salt-clam bait used by British provincial fishermen.

Summary statement of persons employed in the fisheries of Barnstable County, Mass., in 1889.

Detailed table giving the capital invested in vessels, boats, apparatus, etc., in Barnstable County, Mass., in 1889.

Statement of the quantities and values of each fishery product taken in the fisheries of Barnstable County, Mass., in 1889.

Comparative table showing the extent of the fisheries of Barnstable County, Mass., in 1880 and 1889.

A series of twelve tables showing the extent of the fisheries of Florida.

Comparative statistics of the oyster fishery of Connecticut, Maryland, and Virginia, in 1880 and 1890, with a synopsis of the laws in force and a discussion of the influence of the States' policy on the increase or decrease in the industry.

The whale fleet of the United States in 1889 classified by rigs of vessels and fishing-grounds.

The whale fleet of the United States in 1889 classified by hailing ports and fishing-grounds.

Table showing by hailing ports of vessels the products of the whale fishery of the United States in 1889.

Detailed statements for the year 1889 giving the operations of the San Francisco whale fleet in 1889, of the New Bedford fleet rendezvousing at San Francisco, of the New Bedford fleet having headquarters at that place, and of the Boston, Edgartown, Provincetown, Stonington, and New London fleets.

Summary of the receipts of whale products at Boston, from 1880 to 1889, inclusive.

Summary of the receipts of whale products at Provincetown, from 1883 to 1889, inclusive.

Summary from 1880 to 1889, inclusive, of the whaling vessels arriving at Edgartown, and the products landed by them.

Summary from 1880 to 1889, inclusive, of the whaling vessels arriving at New Bedford, and the products landed by them.

The San Francisco fur-seal, sea-otter, and walrus fleets in 1888.

The porpoise industry of North Carolina in 1889-90.

Three tables covering the fisheries of the Chesapeake Bay.

A series of six tables exhibiting the condition of the oyster fishery and oyster-packing trade of Virginia.

Three tables giving the extent of the coast and river fisheries of Maine in 1887 and 1888.

A detailed table showing by townships the condition of the lobster fishery of Maine in 1887, 1888, and 1889.

A statement by counties of the extent of the lobster-canning industry of Maine in 1887, 1888, and 1889.

When requests for information of the foregoing nature come from private individuals, an effort is always made to comply therewith, provided the desired data can be prepared without serious detriment to the regular work of the division. Demands have occasionally been refused, because, in order to fill them, days of research by many clerks would be necessary.

International Maritime Exhibition, Boston, Mass.—This exhibition was held for the purpose of presenting a history of the development of naval architecture and the shipping trades. It opened on November 4, 1889. The United States Fish Commission sent models of the steamers *Albatross* and *Fish Hawk*, and a number of photographic enlargements and crayon sketches of fishing vessels, boats, and methods, as well as swinging screens containing views illustrating the same subjects. Mr. W. H. Abbott, a field agent of this division, was detailed to superintend the installation of the articles.

ANALYSIS OF REPORTS ISSUED.

While the number of reports prepared by the division and printed during the years covered by this report was not large, several of them were very extensive and were important contributions to the subjects considered. Several other papers dealing with the commercial fisheries were prepared and submitted for printing in this period, but they were not issued until after the close of the period under consideration. The reports printed were as follows:

1. The beam-trawl fishery of Great Britain, with notes on beam-trawling in other European countries. (Bulletin U. S. Fish Commission, VII, pp. 289–407, 23 plates, 34 text figures.)

This report deals with the most important vessel fishery of Great Britain. Special chapters treat of the history and importance of the fishery, the fishing-grounds, the fishermen, the vessels, the apparatus, the methods of fishing, marketing of the catch, the effects of the fishery on the abundance of fish, beam trawling on the continent of Europe, attempts to use the trawl in the United States, and the possibility of its successful employment in this country. Some idea may be gained of the extent of this fishery when it is stated that about 20,000 persons find exclusive employment therein, and that the annual production is about 450,000,000 pounds, having a value of over $13,000,000, a sum that represents more than one-third the value of the entire coast and inland fisheries of the United States.

2. Suggestions for the employment of improved types of vessels in the market fisheries, with notes on British fishing steamers. (Bulletin U. S. Fish Commission, VIII, pp. 175–192, 10 plates.)

The recent improvements in the methods of preserving fish in a fresh condition, and in shipping them to distant points, have demonstrated the necessity for securing the more rapid landing of the fish after being caught, in order that they may reach the consumer in the best possible state of preservation. The greatest amount of deterioration ensues between the taking and the landing of the fish, and it is the reduction to a minimum of this impairment in quality which is demanded by the present conditions of the fresh-fish trade. To secure this result, an improvement in the form of the fishing vessels is the principal consideration, and in this report the special types of vessels adapted to different fisheries and to particular regions are indicated, described, and figured. Speed and seaworthiness are the main lines along which advances may be made in the building of fishing vessels; the possession of these factors will not only secure the landing of an improved quality of fish and the economy of time, but will also permit vessels to visit the more distant and less frequented grounds and thus perhaps add to the amount of the catch. The specially important subjects considered in the paper are the desirability of employing steamers in the market fishery of New England; the urgent need of

steam vessels in the market fisheries of the Pacific coast, especially those of San Francisco; the advantages that would accrue as the result of the adoption of steam carriers in certain Chesapeake Bay fisheries; and the necessity for welled vessels and boats in the shore fisheries of southern California.

3. Review of the fisheries of the Great Lakes. (Report U. S. Fish Commission, xv, pp. 3-333, 44 plates.)

This report is a geographical review of the entire fishing industry of the Great Lake system. The history, methods, condition, and statistics of the fisheries are considered by minor civil divisions; the fishermen, apparatus, vessels, boats, and fishing-grounds are described; notes on the natural history, abundance, movements, etc., of the commercial fishes are given; the methods of preserving and shipping the catch are discussed; the extent of the wholesale trade in fishery products in the principal cities is shown; the changes in the methods of the fisheries since 1880 are indicated; detailed comparisons are made with 1880; the effects of artificial propagation on the maintenance of the supply is considered; illustrations are presented of the types of boats, vessels, principal forms of apparatus, methods, and most of the important food-fishes, and a series of large charts indicates the position and number of pound nets operated. The fisheries of the Great Lakes, which are the most extensive lake fisheries in the world, are shown by the report to have given employment to 10,355 persons; the capital invested was $4,520,081; the quantity of fish taken was 99,842,076 pounds, and the value of the catch to the fishermen was $2,691,866. An edition of 1,250 copies of this report was distributed among the fishing interests of the Great Lakes.

4. Notes on the crab fishery of Crisfield, Maryland. (Bulletin U. S. Fish Commission, ix, pp. 103-112, 6 plates.)

The business of catching crabs, impounding them until after the shedding process, and of shipping them to market as soft-shell crabs, has in recent years attained considerable importance in Chesapeake Bay. A special study of the industry was made at Crisfield in 1888, which formed the basis for the remarks in this paper. Crisfield has the distinction of being the center of the most extensive crab-fishery in the United States, and the industry has of late years increased with wonderful rapidity. In 1888, 785 fishermen engaged in taking crabs in Crisfield and vicinity; 4,437,823 crabs were obtained, for which the fishermen received $72,129. The dealers in Crisfield, to whom the entire catch is sold, shipped 3,782,057 crabs, the market value of which was $111,731. The difference between the number of crabs caught and the number sent to market, amounting to 655,766, represents the mortality among the crabs as a result of the molting process and injuries received when caught.

5. Notes on an improved form of oyster tongs. (Bulletin U. S. Fish Commission, IX, pp. 161–163, 1 plate.)

The tongs described are adapted to deep-water fishing and may be successfully operated in 200 feet of water. The apparatus consists of two curved iron bars riveted together, terminating in a series of teeth, and is manipulated by means of a rope. By its use large areas of natural oyster beds have been brought within reach of the boat fishermen, whose earnings have been considerably augmented. In places on the Chesapeake Bay individual fishermen have, during some seasons, taken five times as many oysters with the new tongs as they could with the old form. The principle involved in this apparatus is of wide application in the fisheries, and will in time no doubt be extensively utilized in the clam, scallop, sponge, and other fisheries.

REMARKS ON THE FISHERIES.

Certain special matters having an important bearing on the commercial fisheries which have been brought to the notice of the office by its general and local agents and correspondents may be properly mentioned in this report. It is not the intention, however, to enter into an extended review of the condition of the fishing industry, a subject which will be fully treated of in the separate papers published by the office.

The modus vivendi.—An important provision of the proposed fishery treaty between Great Britain and the United States was the so-called *modus vivendi*, which accorded to United States fishing vessels certain privileges in Canadian ports pending the ratification of the treaty. Although the latter was rejected by the United States Senate in August, 1888, the Canadian Government extended the operation of this part of the treaty, and numbers of American vessels have taken advantage of it. In 1888, 36 vessels from New England ports paid $3,831 for licenses obtained in Canada; the following year 78 vessels paid $9,589.50; and in 1890, 119 American fishing schooners took out licenses for which $14,461.50 was expended. The license fee is $1.50 per net ton, and the privileges thereby secured are the right (1) to enter Canadian ports to buy bait, apparatus, and supplies, (2) to transship the catch, and (3) to ship crews. The vessels engaging in the bank cod and halibut fisheries are those which have the greatest occasion to avail themselves of this regulation.

Effects of abrogation of Washington treaty on the herring fisheries and the bait supply.—A report on the fisheries of the New England States now being prepared will contain the following reference to the influence which the expiration in 1885 of the fishery treaty with Great Britain

has had on the herring fishery of Maine and on the development in certain places of an important bait fishery to supply the needs of American vessels:

Since 1885 the herring fishery of Maine has undergone a noticeable increase, which has been chiefly due to the abrogation of the Washington treaty. The manufacturing enterprises connected with the canning of lobsters, the canning and smoking of herring, etc., have steadily increased, and new life and new capital have been put into the industry to meet the demand for larger supplies of raw materials, among which herring rank first in quantity and importance. The increase in the number of weirs and other appliances of capture has been more marked each year, and the growth and extension westward of the fishery and the dependent shore industries has been one of the most noteworthy features of the fisheries of this State during the past decade.

An increase in the herring weir fisheries has in most localities been attended with a corresponding increase in the smoked-herring business, but in the region of Mount Desert Island a most interesting and important exception to this rule is to be observed, due to its favorable location as a baiting rendezvous for the bank cod fishermen of both Maine and Massachusetts. In this vicinity the increase in the number of herring weirs has had no appreciable effect on the smoking of herring, the smokehouses being more neglected than ever before. This condition is due to the circumstance that herring can be sold fresh for bait at better prices than would result from smoking them. The demand for bait in this section is now so constant and so great that the weir fishermen have not been able to meet it, and an extensive herring fishery with gill nets has been inaugurated within the past three years to supplement the weir fishery. At the Cranberry Isles and also in the vicinity of Southwest Harbor and Bar Harbor large numbers of bank and shore vessels are baited each year, and the practice of taking bait in this vicinity is annually becoming more popular and of increasing importance to the deep-sea fisheries. Prior to the building of weirs there was little or no baiting done here, and vessels were obliged to resort to more distant places and often had to go to the provinces at great loss of time.

The marked effect which the expiration of the reciprocity treaty with Canada has had on the development of the fisheries and fishery industries of the entire eastern coast of Maine has been nowhere more noticeable than in the increased facilities afforded American vessels to procure an abundant supply of bait in home ports through the building of brush weirs.

Eastward movement of menhaden.—One of the most prominent and interesting features of the New England fisheries during the decade terminating in 1888 was the practically complete absence of menhaden from the Gulf of Maine, where they had previously resorted in enormous bodies and supported an industry of great importance. This failure of the menhaden to appear within such a large area was one of the most remarkable variations in the movements of our Atlantic coast fishes that has been recorded, and was much more noteworthy, although less important, than the present scarcity of mackerel. In 1888 large schools of menhaden were found east of Cape Cod, considerable numbers being taken as far east as Frenchman Bay, Maine. The next season there was a return of the fish to the Maine coast in schools fully as large and numerous as had ever before been observed. The fishery, which was begun on a limited scale in 1888, was greatly augmented, and many vessels from Rhode Island and other States found it more profitable to fish in Maine waters during a part of the season, which

was one of the most successful since the establishment of the fishery. The Maine fishermen took over 10,000,000 pounds of menhaden in 1889, for which they received more than $28,000, and the factories located in the State utilized over 26,000,000 fish in the preparation of oil and guano, having a value of $87,144.

New England vessels fishing for Spanish mackerel in Florida.—The winter and spring of 1889–90 was quite noteworthy in the annals of the New England and Florida fisheries because of the experimental visits of two mackerel vessels belonging at Gloucester, Mass., to the west coast of Florida for the purpose of engaging in the capture of Spanish mackerel, which abound in these waters at that season. The vessels made their headquarters at Key West, and shipped their catch in ice to Tampa, Punta Gorda, and New York. One of the vessels, the schooner *Hattie S. Clark*, fished from December 1, 1889, to April 1, 1890, and caught during that time 100,000 pounds of Spanish mackerel, for which $8,000 was received, the crew of 12 men sharing $225 each. The other schooner, the *Schuyler Colfax*, made only two trips, between February 1 and April 1, 1890, and landed 30,000 pounds, the value of which was $2,400. The owner of the schooner reports that the vessels averaged 8,000 or 10,000 pounds of fish each trip and that this catch was made in half a day's actual fishing, although, because of the delay in getting ice, it usually took about two weeks to complete a trip. This trial opens up a new field for winter operations on the part of mackerel vessels, and the continued scarcity of regular mackerel on the New England coast may lead to the establishment of an important winter fishery off the coast of Florida.

Voyage to Africa for mackerel.—The scarcity of mackerel on the Atlantic coast of the United States, which has been marked since 1885 and has been more prolonged than during any previous similar period in the history of the fishery, prompted the owner of the schooner *Alice*, of Provincetown, Mass., to undertake the prosecution of the fishery on the southern coast of Africa, where whalers and merchantmen had reported that mackerel occurred in abundance. The vessel sailed for Cape of Good Hope in October, 1889, and made the longest cruise ever accomplished by a mackerel vessel, the distance being about 7,000 miles. On arriving at the grounds, fish were found in considerable numbers, and during the first nine months about 900 barrels of mackerel were packed, and some were shipped to the United States, where they arrived about December 1, 1890. Some of the fish were of large size, being 2 feet in length and weighing over 3 pounds when salted, and the consignment sold at $14 to $18 per barrel. Examples were sent to this office for examination, and the fish were found to be the bull's-eye, chub, or thimble-eye mackerel (*Scomber colias*), and not the common mackerel of our coast (*S. scombrus*). During the second season of the vessel's sojourn on the African coast only a few fish were

taken, and the vessel returned home in June, 1891, after a cruise that was not on the whole successful, although important.

Increase of shore cod as a result of artificial propagation.—Few subjects that have recently come up in connection with the New England fisheries possess greater interest and importance than the results which have been achieved by the planting by the U. S. Fish Commission of cod in the inshore waters of the southern New England coast during the past few years. Very few of the fishermen of the region had much confidence in the feasibility of this attempt to increase the supply of codfish, and they were much surprised, as well as pecuniarily benefited, by the appearance of young cod in great abundance on grounds on which the fish have been scarce or absent for years. The fishery began in 1889, when a few small vessels made good fares, one schooner landing 300,000 pounds of small fish. The inquiries conducted by the office showed that in 1890, by the last of July, about 4,000,000 pounds of small and medium sized cod were taken in the inshore waters of southern New England, which even the most skeptical fishermen were willing to acknowledge were fish that had been artificially propagated at the government hatcheries at Woods Holl and Gloucester. As a result of this single fishery over $100,000 was added to the income of the fishermen, and there is reason to believe that a permanent summer fishery has been inaugurated that promises good returns.

Other fishery matters.—Various other events of importance to the economic fisheries during the period covered by this report attracted more or less attention, which need only be mentioned and not discussed. Among these were the Bering Sea dispute and the seizures of American and Canadian sealing vessels for violating the regulations of the United States regarding the capture of fur seals in that region, the fish paragraphs in the new tariff law and in the reciprocity treaties made with countries of Central and South America, the agitation of the oyster question in Maryland and Virginia, the seizures of Rhode Island menhaden vessels for fishing in Massachusetts waters in Buzzards Bay, etc.