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REPORTS

OF THE

COMMITTEE ON FISHERIES, Congress. UNITED STATES SENATE.

FROM THE ORGANIZATION OF THE COMMITTEE, JANUARY 21, 1884, TO
THE CLOSE OF THE FORTY-NINTH CONGRESS, 1887, INCLUSIVE.

IN ONE VOLUME.

COMPILED, UNDER THE DIRECTION OF THE JOINT COMMITTEE ON PRINTING,

BY

T. H. McKEE,

CLERK, DOCUMENT ROOM, UNITED STATES SENATE.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1887.

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FORTY-NINTH CONGRESS, FIRST SESSION.

[PUBLIC RESOLUTION—No. 24.]

Joint resolution authorizing the preparation of a compilation of the reports of committees of the Senate and House of Representatives.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That there be prepared under the direction of the Joint Committee of Printing, a compilation of the reports of the Senate and House of Representatives from the Fourteenth to the Forty-eighth Congress, inclusive, classified by committees, arranged, indexed, and bound in suitable volumes for the use of the standing committees of the two Houses of Congress. And the sum of seven thousand seven hundred and fifty dollars, or so much thereof as may be found necessary, is hereby appropriated out of any money in the Treasury not otherwise appropriated, for the preparation of said work, which sum may be paid by the Secretary of the Treasury upon the order of the chairman of said Joint Committee, as additional pay or compensation to any officer or employee of the United States.

Resolved further, That the Clerk of the House and Secretary of the Senate be, and they are hereby directed, to procure and file, for the use of their respective Houses, copies of all reports made by each committee of all succeeding Congresses; and that the Clerk of the House and the Secretary of the Senate be, and they are hereby, authorized and directed at the close of each session of Congress, to cause said reports to be indexed and bound, one copy to be deposited in the library of each House and one copy in the room of the committee from which the reports emanated.

Approved, July 29, 1886.

10.2.10/8/30.

COMPILER'S NOTICE.

This compilation embraces all the printed reports made by both Houses of Congress from the commencement of the Fourteenth to the close of the Forty-ninth Congress. They are classified by committees and arranged in numerical order. The collection for each committee is divided into volumes of suitable size. Each committee has a separate index, a copy being bound in each volume.

The SPECIAL and SELECT reports are all compiled in one collection having one index, a copy of which is bound in each volume.

The plan throughout the compilation is to place each report to the committee from which it was reported, without reference to the subject-matter.

The House and Senate reports are compiled separately. Care will be required in noticing the chronological order, as in some instances an entire session or Congress may not appear in certain volumes from the fact that during this period no reports were made by this committee.

T. H. McKEE.

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TO

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FROM 1884 TO 1887, INCLUSIVE.

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IN THE SENATE OF THE UNITED STATES.

JUNE 17, 1884.—Ordered to be printed.

Mr. LAPHAM, from the Committee on Fisheries, submitted the following

REPORT:

[To accompany bill H. R. 3108.]

The Committee on Fisheries, to whom was referred the bill (H. R. 3108) to protect the fish in the Potomac, in the District of Columbia, and to provide a spawning ground for shad and herring in the said Potomac River, have duly considered the same, and respectfully report:

Your committee recommend the passage of the bill as it came from the House. In connection with said bill there have been referred to the committee certain communications and recommendations relative to the flow of oil and other refuse products into the river and its tributaries from the works of the Gas Light Companies of Washington and Georgetown, which are believed to be very destructive to young fish and fish spawn.

It appears from the reports of engineers, the letter of Major Hains, who has charge of the river improvement, the letter of Professor Baird, and his assistant, Colonel McDonald, of the Commission of Fish and Fisheries, and of Dr. Townshend, the health officer of the District, that the complaints in this respect are well founded.

It also appears from the papers that the said gas companies will arrange to stop the deposit of such waste in the river within two months from the passage of a law prohibiting the same.

The Commissioners of the District propose an amendment to the bill, to be section three of the same, which your committee report favorably and recommend its passage.

A petition of citizens engaged in fisheries has been presented, protesting against the passage of the bill in question, and asking, in case of its passage, that the petitioners be paid the value of their several outfits, as stated in said petition, or such portion thereof as may be deemed proper.

Your committee are unable to conceive any ground upon which the prayer of the petitioners asking legislative relief can be granted. They therefore ask to be discharged from further consideration of the same, and ask that it be indefinitely postponed.

which are outside of low-water mark or the *fauces terræ*, as before stated.

The bill under consideration proposes to prohibit the taking of fish within 2 miles of the Atlantic coast or in any arm of the sea not within the jurisdiction of any State.

Legislation upon the subject appears therefore to be unobjectionable, unless it is an interference with our treaty obligations with Great Britain. That question has been already determined by the report of the Committee on Foreign Relations, and is, therefore, not open for consideration by your committee.

From the testimony taken by the Subcommittee on Foreign Relations, which, with the bill under consideration, has been referred to your committee, it conclusively appears that menhaden were found all along the Atlantic coast as far east as the Penobscot, in the State of Maine, in vast numbers prior to the construction of Menhaden factories, which were first erected something over twenty years ago at different points on the coast of that State and in and about Narragansett Bay.

At first the fish were taken by sailing vessels carrying what are called purse-nets, the same averaging about 1,200 feet in length, and from 75 to 100 feet in depth, so arranged that when the net is drawn around a school of menhaden it can be pursed at the bottom to prevent their escape. Within the last ten years menhaden steamers, so called, have been employed to a great extent instead of the sailing-vessels. The advantages of the steamers are that they can surround a school of menhaden in almost any kind of weather, and with a hoisting apparatus operated by steam can empty one of the seines after it has been pursed in much less time than by the methods used when sailing vessels were employed. Gradually the menhaden enterprise has been developed to such an extent that from 1874 to 1881 there was an increase as shown by the reports of the United States Menhaden Oil and Guano Association as follows:

1874.		1881.	
Number of factories.....	64	Number of factories.....	97
men at factories..	871	men at factories..	2,805
fishermen	1,567	fishermen	2,406
sail vessels.....	283	sail vessels.....	286
steamers.....	25	steamers.....	73
Oil made (gallons).....	3,372,837	Oil made	1,266,549
Tons guano (wet)	50,976	Tons guano (dry).....	33,619
Fish caught	492,878,000	Fish caught	454,192,000
Capital invested.....	\$2,500,000	Capital invested.....	\$4,750,000

This association is comprised of all those who are engaged in the business of extracting oil and manufacturing fish guano from menhaden and other fish in the United States. Since 1881 the number of steamers has been increased to 83 in 1882, and the number of sailing vessels decreased from 286 to 212. The oils and fertilizers are useful articles of commerce, and meet with ready sales at remunerative prices. The oil is used in dressing leather and in rope factories, and to some extent with linseed-oil in making paints. The guano is used as a fertilizer. The oil commands a price of about 35 to 40 cents per gallon, and the fertilizer from \$30 to \$40 per ton.

Although commencing on the Northeast Atlantic, the industry has extended all along the coast and Long Island as far south as the Carolinas and Florida.

While the industry is an important one and should not be capri-

ciously or needlessly obstructed, it is at the same time evident to your committee that in so far as it has a tendency to lessen the supply of food-fish a reasonable regulation to avoid that result is demanded by the highest considerations of public policy.

It is very conclusively shown that the catch of menhaden from March to the middle of June, or later, is hardly compensatory from the fact that it is at or near the end of the spawning season, when the fish are very poor, furnishing but little oil, and but a limited supply of the fertilizer. As the season progresses they rapidly increase in size and fatness, and are at their best in the fall months before their disappearance from the bays and coast as cold weather approaches.

It is by no means certain, therefore, that the prohibition for which the bill provides, if limited to the spawning season and a reasonable time for the fish to recover their strength, would be detrimental to the interest of the menhaden industry.

While nearly all the witnesses examined concur in stating that the spawn begins to form before the fish disappear in the fall, the precise period of the spawning season is not fully established. The witnesses examined at and about Old Point Comfort and at some of the harbors of the Chesapeake, state, with reasonable certainty, that the menhaden spawn in the bays and harbors in that latitude after they appear in the spring, and that fish with spawn are seen as late as May or later; and the water in the bays is full of small menhaden. The use of pound nets is prohibited by the law of Virginia in those localities before the 20th of June. These small menhaden are found all along the Atlantic coast to the north, and the fact that this variety of fish exists in all the bays and the mouths of the rivers leads to the conclusion, expressed by many of the witnesses, that the early spring is the general spawning season. The menhaden is what is termed a surface fish. They swim in schools near the surface and are supposed to feed upon the supplies they find floating in the water. It is abundantly shown that they are a fish that are easily frightened, and that the use of the menhaden vessels and steamers has a tendency to break up the schools and frighten the fish from the shore to such an extent that they have almost entirely disappeared wherever the same are employed. They disappeared from the coast of Maine a half dozen years since, so that the factories have been abandoned. Very few are now taken in the Narragansett Bay, where at one time the supply seemed inexhaustible. Such is the case on the Long Island coast and the coast of New Jersey, where formerly they were very plenty. The fishermen used to catch them in large quantities, and they were purchased and taken all through the State of New Jersey and into Pennsylvania to be corned for winter use, and were prized as an article of food second only to the mackerel.

As an indication of the character of the evidence, we give a portion of the testimony of some of the witnesses:

ROBERT LLOYD sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Long Branch.

Q. How long have you lived here?—A. Fifty years.

Q. What is your occupation?—A. Fishing.

Q. How long have you followed it?—A. I commenced, I believe, when I was about twelve years old.

Q. What kind of fishing?—A. I have followed most all kinds of fishing; all the kinds of fishing we have here; bluefishing and bottom fishing, pound fishing, net fishing, with all kinds of seines.

Q. Did you ever catch menhaden or mossbunkers?—A. Yes, sir.

Q. What with?—A. Gill-nets.

Q. In what quantities?—A. Different quantities. We have landed as high as sixty four thousand in a day.

Q. With one net?—A. Two nets and three boats; that is, we were the firm; the company.

Q. What was done with them?—A. Sold them.

Q. To whom?—A. To people through the country; sold them to carters for a cent apiece, a dollar a hundred, and carters carted them up through the country.

Q. What did they do with them?—A. They sold them to people to salt.

Q. What did the people who bought them do with them?—A. Salted them to eat.

Q. How long could you catch such fish?—A. This would be in the fall of the year when we could catch them to salt; they would salt them for winter use and spring use.

Q. They would last through the winter, would they, for food?—A. Yes, sir.

Q. Are they a good fish to eat?—A. Yes, sir; I always used to have some salted.

Q. You used to corn them for your own use?—A. Yes, sir.

Q. How long is it since you have caught any for that purpose?—A. I cannot tell exactly.

Q. As near as you are able to?—A. It must be six years, I think.

Q. Why did you stop it?—A. Could not catch them; there was none to catch.

Q. What became of them?—A. There were no large ones; there were small ones to be caught, but they were not large enough to sell.

Q. I mean the kind you used to catch for market; what caused them to disappear?—A. We supposed it was those mossbunker boats that caught them up.

Q. They began to disappear when the boats began to fish here?—A. Yes, sir.

Q. Have they been diminishing ever since?—A. I think they have; yes, sir, they grow smaller every year.

Q. How many of those boats have you ever seen in a day?—A. I could not tell; I have seen as high as twenty right around in sight, so that you could stand right on the beach and count twenty.

Q. Steamers?—A. Yes, sir.

Q. Do they have sailing vessels also?—A. Yes, sir; the sailing vessels the majority of time are up in bays.

Q. Towards New York from here?—A. Yes, sir.

Q. I suppose the success of a sail vessel depends upon the wind?—A. Yes, sir.

Q. They cannot pursue a school of menhaden?—A. No, but they can catch the same quantity of fish when they get where they are.

Q. But a steamer would run right to a school wherever they find them?—A. Yes, they come right along here by daylight and before daylight, and go on south.

Q. How far out have you seen them fish?—A. Right in on the bar, so that the steamer would have to come in and tow the boats out.

Q. Have you ever been aboard to see what they catch?—A. No, sir; I have been alongside of one of the nets, but never was aboard of the steamers.

Q. Could you see in the nets?—A. Yes, sir.

Q. What did they catch?—A. The majority was bunkers.

Q. What other fish?—A. Weakfish, bluefish. When they lay their nets they catch all that they lay around—sharks, bluefish, sturgeon, or anything.

Q. Whatever the net surrounds they take in necessarily?—A. Yes, sir.

Q. What effect has this had upon bluefishing?—A. I don't know; there are quite a good many bluefish at days yet, but they are away offshore, and years before this they would be right in the undertow; you could stand on the beach and throw a squid and catch two or three hundred weight.

WILLIAM GREEN sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Long Branch.

Q. How long have you lived here?—A. Thirty-five years.

Q. What is your occupation?—A. Fishing and bathing. I follow the water all the time pretty much.

Q. And have during that period?—A. Well, when I am not following the water I am not doing anything else.

Q. I mean that has been your business since you have lived here?—A. Yes, sir.

Q. Can you remember a time when it was a custom to catch mossbunkers or menhaden for a market among people here?—A. Yes, sir.

Q. How largely was that industry carried on?—A. There used to be 4 or 5 or 6 nets fishing right here close by, and then they fished all the way down.

Q. How many would a net catch then?—A. Average, do you mean?

Q. Yes.—A. Of course they would not catch them every day; some days they would catch 30,000 or 40,000, and probably on other days would not catch over 8,000 or 10,000; along in that way.

Q. But they were caught in large quantities?—A. Yes, sir.

Q. And sold to the people in the country?—A. Yes, sir; carters.

Q. What did they do with them?—A. They peddled them out through the country.

Q. What did the purchasers do with them?—A. They salted them down.

Q. For family use, for food?—A. Yes, sir.

Q. Were they good fish for food?—A. I think they were. I know there was a good many of them sold.

Q. Did you ever corn them for your own use?—A. Oh, yes; always did when I could get them.

Q. How long since you corned them?—A. I have not corned any in five or six years.

Q. Why did you stop it?—A. I could not get them.

Q. What has become of them?—A. I could not say. I suppose they have been scared away by the purse-nets.

Q. Do you know of any other cause for their disappearance?—A. I do not; no, sir. There are plenty of menhaden yet, but they are small. They used to be good sized in the fall, but now you do not get any.

Q. These that are here now are not fit for food?—A. Oh, no.

Q. They are small and poor both?—A. Yes, sir.

Q. Have you ever been on these purse-net boats when they were catching fish?—A. No, sir.

Q. What kind of fish they catch, then, you don't know?—A. No more than hearsay; that of course I cannot swear to.

Q. How many of those boats have you ever seen here in one day?—A. I have seen from fifty to seventy-five; sail-boats and steamers together.

Q. All at work with these purse-nets?—A. Yes, sir; they had purse-nets aboard. Probably they would not be all at work at once.

Q. What effect has the disappearance of the menhaden had upon the other kinds of food-fish that used to be caught here?—A. We do not have any bluefish inshore now. When I first began to fish we used to catch plenty of them close inshore; now we cannot catch any.

Q. How many did you ever catch in a day off the shore?—A. I never caught a great many off the shore because I never fished much off the shore. When they came along I used to go in a boat; but I have seen four or five hundred caught in a day; two men 700 or 800 weight.

Q. How many have you caught this year?—A. I have not caught many this year; in fact I have not fished much for them.

Q. Well, since you ceased to catch the mossbunkers to corn them, as you stated, and since their disappearance, have valuable fish been caught here to any extent?—A. No, sir; not along the shore.

Q. What effect has it had upon the privileges of sporting men; men who come to the seaside for recreation?—A. I suppose that has had a great effect upon them, because the bluefish would come along shore and it is a great deal of sport to catch them. Now you hardly ever see them close in.

Q. Do you ever take fishermen out?—A. Yes, sir.

Q. Is that business carried on as it used to be?—A. Well, pretty much the same.

Q. Do they have as good luck as they used to?—A. I do not know that they do; I do not think fishing is as good as it used to be; I am satisfied it is not.

Q. How many bluefish is the most you ever caught in a day?—A. We generally go two men together and could catch 700 to 800 weight.

Q. What use was made of bluefish then when they were caught in such quantities?—A. Sometimes we ship them to New York, but sometimes we sell them to carters. In the fall of the year there is a great many salted when you can get them.

Q. They are corned for food?—A. Yes, sir.

Q. They are a good fish for corning, are they not?—A. Yes, sir; very good.

Q. As good as mackerel?—A. They are allowed to be better when you get them in the fall of the year, and they are nice and fat.

Q. When it becomes cool weather I suppose you can carry them around the country without danger?—A. Yes, sir.

Q. Well, that business is all broken up, is it not?—A. Pretty much, yes, sir; as far as net-fishing is concerned. We used to fish for bluefish a great deal.

RICHARD LAYTON sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Here, at Long Branch.

Q. How long have you lived here?—A. About thirty years.

Q. What is your occupation?—A. Fishing.

Q. Have you followed it for that length of time?—A. I have fished thirty years; yes, sir.

Q. Did you ever know a time when mossbunkers, or menhaden as they are called,

were used for food?—A. Yes, sir; we used to sell them. We have sold as high as \$600. I remember once particularly, the day before election, we caught 63,000; we landed them on the beach, and the boys said, "We won't catch any more because we cannot sell them," and on election day, at 9 o'clock, we had not one left. We got \$1 a hundred for every one we caught.

Q. And they were taken out in the country for corning and use by the people?—A. Yes, sir.

Q. Did you ever corn them for your own use?—A. Oh, yes. I don't think there is any sweeter fish in the world when first corned; take a menhaden, then, and they are the sweetest fish that swims in the water.

Q. How long is it since you corned any?—A. It must be five or six years. Ever since these fellows have been at it it don't pay us to do it.

Q. By "these fellows," who do you mean?—A. I mean these fellows with the purse-nets.

Q. Well, you have been deprived of the use of menhaden because they have come?—A. That is it. Now you goup in the country and the people will say, "What is the reason we don't have mossbunkers like we used to?" I say, "The reason is that the people catch them up," and if you do catch them there is no size to them. I have caught them weighing $1\frac{1}{2}$ pounds.

Q. Have you caught bluefish in any quantity?—A. I have caught \$600 worth; laid the anchor right on the sand, one anchor on the sand, and laid the net off a bit, with a little bow in it, and caught \$600 worth.

Q. What was done with those fish?—A. The blues?

Q. Yes.—A. They do not come in any more.

Q. What was done with those you caught?—A. Sent them to New York.

Q. Were they used for corning any?—A. Yes, sir; I got \$5 a hundred for them right on shore. All I had to do was to ship them on a sail-boat.

Q. Do you know whether they were ever used for corning among people here?—A. Oh, yes; I guess they were; we used to sell thousands of dollars worth of them.

Q. Are they good fish to corn?—A. They cannot be beat; they beat a Boston mackerel all to pieces.

The evidence shows that when the menhaden fishing first began the mesh of the nets was 2 to $2\frac{1}{2}$ inches, but witnesses testified before the committee that lately the size of the mesh has been reduced so that small fish weighing only one-fourth of a pound are now caught in the purse-nets.

It was the opinion of a witness examined at Boston, Mass., that the catch of menhaden is more injurious in the early part of the season.

He testified:

I think, however, that there are times when the seining of them is more injurious than at others. For instance, some of our vessels go south and get them very early, follow them along as they are coming on this coast for spawning; and it seems to me, for various reasons, that if the Senate should decide that they have jurisdiction, if some legislation could be had with regard to the season in which our fishermen may be permitted to take mackerel, as well as menhaden, on the coast, it would materially affect the quality of the supply which we have to give to the people of the country. When the fish first come on here in the spring for spawning they are in very poor condition; they are thin and almost tasteless, and taking them that early it throws an inferior quality of fish upon the market, which is distributed over the country for food, and at a time when, usually, the stock of the fall has not been wholly consumed, so that it comes in direct competition with it, and of course, the fish taken at that early season of the year, it must destroy a great number of the spawn which they contain; but if they went out after the fish come on here and spawn, then there seems to be a little time when they are recovering their nervous activity again, and at once they begin to fatten up. After the 15th day of July we begin to observe the fish improve very rapidly in quality, and from that time on the fish that are taken are superior in quality for consumption. They are better for dealers to handle, and in every way a more desirable article of food. While in the matter of pogies, of course that question does not come into the same consideration, because they are not used for food—by pogie I mean menhaden; we sometimes call it pogie and sometimes menhaden—yet by deferring the catching of them they are very much more valuable taken at a later season, and it would be very much more profitable for the fishermen; and, then, after the spawning time is over, of course year by year the quantity of fish in the waters must increase, and very rapidly.

He also testified:

Q. Have you ever sold the menhaden for family use?—A. They are not used in this country at all. They are used to some extent in South America, where there is a

limited call for them. A thousand or two barrels when they used to be plenty, perhaps, would be exported during the year.

He further testified :

I think if any regulation could be had with regard to the time of taking the fish that that would have more effect than anything else.

Q. Have you any suggestion to make as to the time?—A. I think if it could be controlled until the 15th of July it would be sufficient.

Q. Have you any opinion as to where the menhaden spawn?—A. I think they spawn on the shallow places of our shore, anywhere along from the coast of New Jersey north.

Q. After they come on in the spring?—A. Yes, sir.

Q. Have you ever examined them at that season of the year to see what the condition of the roe was in them?—A. I never have examined the roe, but I have examined the fish after they were taken. They are in that condition in which every fish is immediately after spawning—very poor—in May and June when you first catch them, and after the 15th of July they fatten very rapidly, so that they are almost clear oil, as you may say; they are very fat fish after the 15th of July.

Q. Have you any suggestions to make in regard to any measures that are necessary or would be advisable for the protection of the other food-fishes, the mackerel, on your coast?—A. The same suggestion that I made with regard to menhaden applies to mackerel very strongly, and, especially, as they are a more valuable food-fish than the menhaden.

Q. The mackerel industry constitutes a very large industry here?—A. Oh, yes; a very large industry.

Q. Both for domestic use and export?—A. Yes, sir; at this port they are shipped largely all over the country.

Another witness, at Boston, testified as follows :

NOAH MAYO sworn and examined.

By the CHAIRMAN :

Question. Where do you reside?—Answer. In Boston.

Q. How long have you lived here?—A. Thirty years.

Q. What is your occupation?—A. I am a wholesale fish dealer.

Q. Have you ever been a practical fisherman?—A. Yes, sir.

Q. For how long a time?—A. For six years.

Q. Do you know anything upon the question of the fish called the mossbunker or menhaden?—A. Yes, sir.

Q. What about them; what is your experience with reference to them?—A. Well, my experience is that some twenty years ago menhaden appeared upon the coast of Maine in large quantities, and they remained there until about 1879, and from 1879 to date there have been but very few menhaden caught on the Maine coast.

Q. Now, when did the menhaden boats commence operations?—A. About, I should think, 1870; came into general use about 1870; that is my judgment.

Q. Steamers or sailing vessels?—A. Steamers and sailing vessels; steamers largely.

Q. Have you any opinion as to whether they had any effect upon the quantity of menhaden?—A. Well, I think menhaden is more of an intellectual fish than any fish that swims. I think they are shy, easier to take fright.

Q. That does not quite meet my question. Do you think the use of the menhaden boats has had any effect upon the quantity or supply of menhaden along that coast?—A. I think it has.

Q. To diminish it or increase it?—A. To diminish it.

Q. Materially or slightly?—A. Well, considerably, materially, on the coast of Maine during these five or ten years; the steamers, you know, can go just when they please and where they please, and are constantly on the move.

Q. Despite wind or weather?—A. Yes, sir; and they throw very large seines; I suppose some of their seines are 300 fathoms long.

The CHAIRMAN. Yes; that is all in proof, and 12 fathoms deep.

The WITNESS. Yes; 24 fathoms deep, and they have been continually slashing, going for every school they could find on the coast, and as I said before, menhaden fish, in my opinion, is considerable of an intellectual fish; they are very shy, and I think they have got the scent that there is somebody after them and have left the coast of Maine.

Q. Left from depletion and fright?—A. Yes, sir; as much as anything, because other fish go there and get the same food that menhaden do year by year.

Q. What kind of fish upon this coast feed upon menhaden?—A. Large fish, such as bluefish and all sorts, the shark, swordfish, and whale, and everything of that de-

scription. If you were going to legislate on anything, I should think it would be better to legislate on these weirs, pounds, they put down. They are destructive to fish.

Q. Pound-nets?—A. Yes, sir; they are killing them by thousands of barrels.

By Mr. CALL:

Q. That is the shore-net fishery?—A. That is the weirs that make off from the shore; what they call pounds down East.

The CHAIRMAN. One menhaden boat would catch more in a day than all the pound-nets on the coast of New England.

The WITNESS. Oh, no; they took 800 barrels night before last down at Provincetown.

By Mr. CALL:

Q. What kind of fish?—A. Small mackerel.

Q. Were they too small for use?—A. Too small.

By the CHAIRMAN:

Q. They put them in the market, did they not?—A. No, sir; they threw them back; from 6 to 7 or 8 inches. They cannot do anything with them.

Q. Did they put them back in the ocean?—A. Yes, sir.

Q. So they did not destroy them?—A. They died.

Your committee examined a number of witnesses at Portland, Me. They were dealers in fish and experienced fishermen. The general tenor of their statements will appear by quoting a portion of the evidence as follows:

PORTLAND, ME., *July 25, 1883.*

EMORY CUSHING sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Portland.

Q. How long have you lived here?—A. I have lived here since I was born.

Q. Give the number of years.—A. It will be seventy-two years in November.

Q. What is your occupation?—A. I am a cooper by trade, and fish inspector.

Q. How long have you been acting in that capacity?—A. About fifty years I have been inspector.

Q. Have you ever had any experience as a practical fisherman?—A. Never went fishing; no, sir.

Q. Never went fishing at all?—A. No, sir.

Q. You cannot speak, then, of the habits of the fish in the waters?—A. No, sir.

Q. Can you remember a time when the fish known as menhaden, or mossbunkers, were in these waters?—A. Yes, sir.

Q. They used to be plenty here?—A. Very plenty; yes, sir.

Q. You called them pogies, did you not?—A. Yes, sir.

Q. Was any use ever made of them here to your knowledge?—A. The most they have been used for has been for bait to catch other fish.

Q. What kinds of fish?—A. Well, before they commenced using seines they used to catch their fish with hooks, and they used these menhaden to grind up and throw in the water.

Q. What description of fish were caught in that way?—A. Mackerel.

Q. Only mackerel?—A. Only mackerel.

Q. How are the codfish taken?—A. They are taken with hand-lines and trawls to the bottom; they are what are called bottom fish, ground fish.

Q. What bait is used in taking those?—A. When they go trawling they ice up menhaden and mackerel and other fish that come cheaper, cut them up, and use them for bait to catch fish.

Q. Were the menhaden ever used for food?—A. Yes, sir. I have packed them thirty-five or forty years ago. There were several years I packed for people and shipped to Florida; shipped to Florida all that I put up.

Q. Corned and sent away as salt fish?—A. Yes, sir.

Q. What would they average at that time?—A. I think about \$4.50 or \$5 a barrel then.

Q. A barrel holding how much?—A. Two hundred pounds.

Q. What do they sell for fresh?—A. That depends on how bad a man wants them to catch other fish with. If they are scarce they pay more, and if they are plenty not so much.

Q. What is the usual range of the market for them as a fresh fish?—A. I think they used to measure them up in our vessels and get about \$2 and \$2.50 a barrel for them, round.

Q. They are never used by the people here, then, as food?—A. Not to my knowledge.

Q. They are cheaper than almost any other fish, are they not?—A. Yes, sir.

Q. What size did they use to grow?—A. They would average, I should think, nearly a pound, or about a pound.

Q. In what season of the year did they first make their appearance here?—A. I think about the 1st of June.

Q. What time did they leave here?—A. They leave pretty late in the season.

Q. As soon as the cold weather comes?—A. Yes, sir.

Q. They are a migratory fish?—A. Yes, sir.

Q. They go away in the fall and reappear in the early summer?—A. Yes, sir.

Q. What is their condition when they first come back?—A. When they get down as far as our coast they are decently fat; when they get here they begin to show some fat.

Q. Do they grow better until fall?—A. Yes, sir.

Q. What season of the year were those you corned caught?—A. In August and September.

Q. They weigh more then than when they first appear, do they not?—A. Yes, sir.

C. D. THOMES sworn and affirmed.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Portland.

Q. How long have you lived here?—A. I have lived here since 1843.

Q. What is your occupation?—A. Cooper, and inspector of fish.

Q. Have you ever had any experience as a practical fisherman?—A. Yes, sir.

Q. For how many years?—A. I have been in the business since 1843; that is, I have worked in the business since 1843; I have carried it on since 1849.

Q. Have you ever had any apparatus of your own for carrying on the business of fishing?—A. Yes, sir; we had vessels and seines of our own.

Q. What kind of fish have you been accustomed to take?—A. Mackerel principally; mackerel, shad, bluefish, menhaden; we handled some pogies, as we called them.

Q. Have you ever known a time when bluefish were plenty here?—A. Not very plenty. I remember about fifteen or sixteen years ago packing about 100 or 200 barrels in one season. I guess that is the most we ever packed in one season.

Q. For food?—A. Yes, sir.

Q. What time of the year?—A. I think we packed them in July.

Q. They grow better until they leave in the fall, do they not?—A. I am not so much acquainted with bluefish, because I never handled much, nor the menhaden.

Q. What do you know about the habits of the menhaden or pogies; what time of the year do they make their first appearance?—A. About the 15th of May, I think.

Q. What is their condition when they first come?—A. They are poor.

Q. When do they leave here?—A. They leave here, I think, in the last of September, or sometime in October, I have almost forgotten.

Q. When cold weather comes?—A. When the water chills they leave.

Q. Do they get in good condition here?—A. They do; yes, sir.

Q. What use have you ever made of menhaden?—A. Principally for bait.

Q. For catching what kind of fish?—A. Mackerel, codfish, and haddock; such things as those. We used to, years ago, have them put up on purpose for winter bait; used to use a good many of them; used to use them principally, and finally they went off and left; so we had to adopt some other plan.

Q. How long is it since they left?—A. I think four or five years.

Q. Disappeared entirely?—A. About all, I guess. The last two or three years there have not been any. This year we have a few again.

Q. How long is it since the menhaden boats began to fish for them here?—A. That I could not tell.

Q. About how long?—A. I could not give any idea; I should think as much as fifteen or sixteen years ago, though; I do not know.

Q. They used sailing vessels first, did they not?—A. Yes, sir.

Q. How long is it since the first steamers came here?—A. I do not know; I could not give any idea about it. When they first began to catch them up and press them they used sailing vessels, and pressed them aboard the vessels; then they adopted the use of what they called caraway boats and used to seine them in and lug them in in that way; then they commenced using steamers; I should think about twelve years ago; I do not know but what more.

Q. How many of these steamers have you ever seen here at once?—A. I think probably six or eight at a time.

Q. In this harbor?—A. In this harbor, lying around here, but not to work; laying at the wharves and watching for a chance.

Q. Are any of the factories in operation along this coast now?—A. I don't think

there is one of them unless they have started very recently. They ceased when the menhaden disappeared, or about that time.

CHARLES A. DYER sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Portland.

Q. How long have you lived here?—A. Forty-two years.

Q. What is your occupation?—A. Inspector of fish.

Q. Have you ever had any experience as a practical fisherman?—A. No, sir.

Q. What you know about the subject, then, is from observation?—A. Yes, sir.

Q. Do you remember how it was with the menhaden or pogies, as they are called here, when you first knew of them?—A. In 1866 they started the business. Mr. Church came here with a little schooner and seine and a boat, and they run one year down here on Peak's Island. I guess they had a capital of perhaps \$2,000 or \$3,000; they staid here two years, and finally went down to Round Point; went into business there; they had sail-vessels then, and finally they went into steamers, and I guess they have got now, or have had for the last four or five years, some seven steamers. Those steamers along in 1876 or 1877 caught, well, the highest 23,000 barrels; from that down to 14,000 barrels. I guess the lowest was 14,000 barrels of pogies up to 1878, when the pogies disappeared; they have not been here since.

Q. Are their factories stopped?—A. Their factories have stopped; they have got a factory down at what they call Muskingee that cost them, I think, \$115,000.

Q. Where is that?—A. Near Portland.

Q. East of here?—A. Yes, sir.

Q. Is that running?—A. No, sir; all of those factories down there are lying still.

Q. Valuable factories?—A. Yes, sir; that one cost \$150,000, machinery and everything.

Q. Do you know why they stopped?—A. They stopped because the pogies stopped coming here.

Q. Disappeared from here?—A. Yes, sir.

Q. Have they returned here in any quantities since?—A. No, sir; a month ago I saw on the Old Orchard Beach quite a number of schools, but then there does not seem to be any body. I counted there one Sunday I was over there about ten of these small schools; we have a trap over there and we catch a few barrels at a time, perhaps thirty or forty. I do not believe they are in any such body as they used to be.

Q. Have you any opinion as to the cause of their leaving this coast?—A. I think that the body were caught up, and I think that what run from the factory, the refuse water, &c., keeps them off the coast. I do not think they will go where the water is unhealthy.

Q. Poisons the water?—A. Yes, sir; I think that has a good deal to do with it, and their catching them in such large quantities. There were somewhere about ninety steamers at one time employed in catching menhaden.

Q. Does that refuse that goes into the water affect the food-fish any?—A. Yes, sir; I think it does. I know I was down there about eight years ago, and went off in a boat and caught a few mackerel, and they looked then as poor in the middle of August as could be; looked as if they were sick.

Q. How near the factory was it?—A. It was right off the factory where they were then at work.

Q. So that you think they affect the water as well as catch the fish?—A. I think they do.

I would like to say something about the pogy-fishing, because I feel a little interest in that, and I think I know as much about it as most anybody that was reared on the shore. My native place was on an island down here about 3 miles from the city, and I lived there until I was about twenty-two years old. I saw any quantity of pogies; we could catch pogies any time of the day or night by taking a little net 20 yards long and going out to the rocks and swinging it around; secure a boat-load in it. There were any quantity of pogies until these steamers commenced operations. Before the steamers we had sailing vessels that seined and carried to these factories, and they destroyed a great many fish, but they did not seem to have the effect that the steam did. When these steamers came on the ground they covered so much ground. Now, the extent of ground that the pogies occupied in this State was very limited; scarcely a pogie was ever caught, I was going to say, to my knowledge, east of Mount Desert.

Q. How far is that east of here?—A. About 110 miles. They were not very plenty as far east as that, but that was the limit, and you take those steamers running 50 or 60 or 100 miles a day, and you see they were covering the ground all over, and if a pogie made his appearance here some of them were after him. A dozen steamers would come into our bay here and there would be thousands of pogies here, and in

twenty-four hours you could not see one flip; they would clean them right out. I think the seining by these steamers is what cleaned out the pogies. I have not a doubt of it in my own mind. I think the pogies will come back of their own accord if they are let alone.

Q. They are coming back, are they not?—A. They are, yes, sir; they have got turned on to the coast here again; got started, I think. There will be no trouble if the steamers let them alone. This pogie interest is vitally interesting to the shore fishermen. A great many men in this State get their living by fishing in open boats, and they depend on pogies for their bait; they catch codfish, haddock, and hake, and it is their business principally; has been for years; they get their living in that way and support large families, and when you take the pogies away from them, you take away their bread and butter. They do not know hardly where to turn.

Q. Were they ever used for food?—A. Very little.

Q. Only used to catch food?—A. Only used to catch food. There were a great many of them slivered and used to troll for mackerel when they used to bait a hook, and then there has a great many been used to catch haddock in the winter. Men made good livings by catching pogies and slivering them up, and salting them for winter bait.

JOHN E. ROBBINS SWORN and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Deer Isle.

Q. How far is that from here?—A. It is about 100 miles.

Q. How long have you lived there?—A. I have lived there ever since I was born; thirty-eight years.

Q. What is your occupation?—A. Fishing.

Q. Fishing for what?—A. Mackerel fishing.

Q. Principally mackerel?—A. Mostly mackerel; yes, sir.

Q. Did you ever catch bluefish?—A. I never did.

Q. What do you know about the menhaden, or pogies as they are called?—A. I never fished but a very little for those.

Q. For what purpose did you catch them, if at all?—A. Bait.

Q. Do you remember when they were plenty here?—A. Yes, sir; I do. I can remember when they were very plenty right around in our harbors; right down around home there.

Q. Have they disappeared?—A. Yes, sir; they have. I have not seen any pogies down east for the last four or five years; four years, I think it is.

Q. What do you think caused them to leave here?—A. I think it was the seining them.

Q. With what?—A. With seines.

Q. With steamers?—A. Yes, sir; I think that is what drove them off. They made a practice of catching them in those small nets they used to use by hand; they used them ever since I remember until they got the steamers to going, and I do not think it drove them off. They were just as plenty up to the time the steamers went to work.

Q. How many steamers have you ever seen here at once?—A. I saw 40 sail, I should think, at a time, and I don't know but more.

Q. Have you ever seen the menhaden steamers catch them?—A. Yes, sir; I have seen them catch them right in our harbor down home; right up close to where I live.

Q. How many would they take in a haul?—A. Sometimes they got four or five hundred barrels, more or less.

Q. Do they catch any other fish?—A. Sometimes; not a great many. Pogies generally go in schools by themselves.

Q. Do you know any other reason for the pogies going away except the fishing with steamers?—A. I do not.

Q. You think that is the cause?—A. I think it is.

Q. Have the factories here stopped?—A. The factories have all stopped, I believe, down around Booth Bay.

Q. How many factories were there years ago?—A. I could not tell you how many, but there were quite a number.

Q. And have they all stopped operations since the pogies went away?—A. They have all stopped operations and gone to the southward.

By Mr. CALL:

Q. Do you think the mackerel industry is increasing?—A. No, sir; I do not.

Q. You think there are fewer mackerel here than ever before?—A. Yes, sir; I do.

Q. How was it last year?—A. There were considerable many mackerel last year, but wide offshore most of the time.

Q. I suppose that is a very important industry here, is it not?—A. Yes, sir.

Q. A great many people make their living out of it?—A. Yes, sir; there are lots of people who depend on mackerel fishing.

Q. Do you think it advisable that there should be some legislation; is that the opinion of the fishermen?—A. Yes, sir; I think it is. I have talked with a number of captains and men who are interested in the business, and they seemed to think it would be a good thing; that it would be a benefit. Mackerel would strike onto this coast nearer inshore; give them a chance to go on to their spawning grounds and spawn and stop there.

Q. What kind of a law do you and other gentlemen interested in fishing think ought to be passed to protect that kind of fish?—A. I think there ought to be something passed. I don't think they ought to issue license up to, well, say, the 15th or 20th of June. I think that is as soon as a man ought to start for mackerel fishing.

Q. Ought not to be allowed to fish for mackerel with purse-seines, I suppose?—A. Not allowed to fish for them in any way whatever.

Q. Until the 15th of June?—No; I don't think they had.

Q. Either with hand-lines or seines?—A. No, sir; or weirs either.

F. F. JOHNSON sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Deer Isle, Maine.

Q. How far is that from here?—A. About 80 miles.

Q. What is your occupation?—A. Fishing, mostly, for thirty-five years.

Q. Fishing in what waters?—A. In American and English waters; south of the Saint Lawrence and Banks on this coast.

Q. What do you know about menhaden or pogies?—A. I never was in that business, but I have lived right where they have done that work.

Q. Tell us what you know about it.—A. The oldest people where I have lived that have been in the business say they never knew pogies to fail coming on this coast as long as they could remember back before these last three years; that is, while they fished with nets and seines and the steamers have been coming they have been diminishing every year until they have been driven off. I do not know of any other cause.

Q. Did you ever see the steamers catch them?—A. Oh, yes; plenty of them.

Q. Do they catch any other kinds of fish?—A. Once in a while they will make a mistake and get a school of mackerel, but they fish for menhaden.

Q. When they catch mackerel I suppose they put them on the market?—A. Sometimes, and sometimes they used to let them go.

Q. Go into the factories or into the water?—A. Trip the seine and let them out, because they were not prepared to take care of them; they could not dress them; have no barrels and salt, and so they had to let them go. Probably if it had been the same as it is now where they are putting them up fresh, they would be glad to take them and run them into market.

Q. The mackerel would not be worth much for making oil?—A. No, sir; I guess they never pressed any mackerel oil to make a business of it.

Q. What season of the year did pogies come here?—A. We used to look for pogies where I live about the 10th to the 20th of June.

Q. How long did they remain here?—A. Until October.

Q. They continue to grow fleshy as long as they stay here?—A. Oh, yes; they flesh up. Pogies generally get good and fat about the 1st of July and August; keep increasing until August.

Q. How heavy do they get before they leave in the fall; what would a school average in weight, undressed?—A. I suppose they would gain in weight about one-eighth part.

Q. Well, gain so as to weigh how much in the fall, say in October?—A. I generally reckon on four pogies to the pound, dressed.

Q. But undressed?—A. They would be about half a pound.

Q. What use was made of them?—A. We used to use them for bait. When we went jig-fishing we used to have to grind them up for mackerel bait, and have used them for trawling.

Q. Did you ever know them to be used for food?—A. Oh, yes; a good many used to like pogies well enough to eat them.

Q. Did you ever know them to be corned for food; packed down?—A. Yes, sir.

Q. To what extent?—A. Not very much. I do not know as they were ever put up really for a market.

Q. But the people in the country put them up; the farmers?—A. Yes, sir put up a barrel or two, just to eat.

Q. For winter use?—A. For winter use, just to eat.

The evidence discloses the very important fact that in 1874 the quantity of menhaden caught was larger than in any year since. In 1874,

492,878,000; in 1881, 454,192,000; in 1882, 346,638,555. The fish caught in 1874 produced 3,372,837 gallons of oil, while those caught in 1881 produced only 1,266,549 gallons. It is shown by the evidence that the fish are smaller and of an inferior quality from year to year as the industry has been extended.

On July 17, at Berkeley, N. J., the chairman addressed letters to Mr. Louis C. d'Homergue, Mr. Oscar Friedlander, and other gentlemen engaged in the menhaden business, who had previously given their views on the subject of the inquiry, inviting them to appear before the committee and make any further statements, and present any statistics they wished to, and on the 25th of July received at Portland, Me., the following letter and inclosure from Mr. d'Homergue:

178 WASHINGTON STREET,
Brooklyn, L. I., July 18, 1883.

Hon. E. G. LAPHAM :

DEAR SIR: In reply to yours of the 17th, I have the pleasure of inclosing the statistics requested and the various views of members on fish legislation. My views remain unchanged and more than confirmed by the results of last year's business; such veterans as R. L. Fowler, Henry Wells, John A. Williams, and others agree with me; we see that something must be done, and that the steamers are a curse to the business. If I am needed for further examination, will be pleased to attend at Brighton, Saturday afternoon.

Respectfully,

LOUIS C. D'HOMERGUE.

The evidence taken at Old Point Comfort and in the Chesapeake Bay shows the important fact that the menhaden industry is extending southward, and that the fish are interrupted while on their way to the northern coasts early in the season.

Your committee refer to the following portions of the testimony on this subject.

C. S. MORRISON sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Up in Northumberland County, Virginia.

Q. What is your post-office address?—A. Fairport.

Q. How long have you lived there?—A. All my life.

Q. What is your occupation?—A. Fishing.

Q. How long have you followed that?—A. I have followed it about twelve years, I think.

Q. What kind of fishing?—A. Purse-net. I have been at it ever since it started on the bay. I think it has been twelve years, to the best of my recollection.

Q. For whom do you fish?—A. Capt. E. W. Reed.

Q. Does he own a factory?—A. Yes, sir; three or four.

Q. With what kind of vessel did you fish when you first commenced?—A. Sail-vessel.

Q. And now you run a steamer?—A. I run one now.

Q. How long have you run that?—A. Two years. I have been running sail-vessels all this year until about a month ago.

Q. To whom does the steamer belong?—A. Captain Reed.

Q. How many steamers has he?—A. He has but one.

Q. How many sailing vessels?—A. Two this year.

Q. How many menhaden factories do you know of in this vicinity?—A. I think there are about twelve or fifteen on Cockrell's creek.

Q. Where is that?—A. That is up here in Northumberland County.

Q. Do they catch menhaden in that Creek?—A. No, sir.

Q. But the steamers can run to the factories there?—A. Yes, sir.

Q. It is a navigable stream?—A. Oh, yes.

Q. Where does the creek empty?—A. The mouth of the great Wicomico.

Q. You have stated the number on one stream. How many do you know of in all?—A. There are some that I have never seen, I guess.

Q. We will take your information about it.—A. I think there are twenty-five on the bay anyhow, if not more.

Q. Have you any idea of their cost?—A. No, sir; I have not.

Q. They all have to have an engine, do they not?—A. No, sir; all of them do not.

Q. Most of them do, do they not?—A. Most of them now do; some of them use Kettles.

Q. Your steamboats have an engine and hoisting apparatus?—A. Yes, sir.

Q. And you load and unload by steam?—A. Yes, sir.

Q. How many is the most you ever caught?—A. We caught 136,000; that is the most I ever caught at a haul this year.

Q. How many fish does your employer use in a season?—A. Sometimes he gets more than he does at others.

Q. State the largest number you ever knew of his using in one year?—A. I guess he got about as many this year as he ever did. I think he got about nine million.

Q. Are they all caught with two sail-boats and a steamer?—A. Yes, sir.

Q. What proportion of them was caught with the steamer?—A. There was not many caught with her. I do not think that they caught 500,000 with the steamer. He ran three sailing gears until about a month ago.

Q. Until the time you took the steamer?—A. Yes, sir.

Q. The steamer and the three sailing vessels before that, and two since, have caught in all about nine millions?—A. I reckon about that; I do not know exactly; I think somewhere in that neighborhood.

Q. Do you catch anything besides menhaden—A. No, sir; once in a while we catch tailors, but not as many as we can eat.

Q. And sharks?—A. Yes, sir; we catch sharks once in awhile.

Q. What mesh do you use?—A. Two-inch.

Q. By 2-inch do you mean 2 inches square?—A. Two inches corner wise; an inch square; 2 inches in length.

Q. That will catch a fish weighing a quarter of a pound, will it not?—A. Oh, yes.

Q. A fish weighing a quarter of a pound would not go through your nets?—A. No, sir; I do not think it would.

Q. When are the menhaden in the best condition?—A. In the fall, I believe, as a general thing.

Q. They continue to grow fat up to the time they disappear, do they not?—A. Yes, sir.

Q. Grow large and fat and oily?—A. Yes, sir; I believe they do.

Q. They are much better for oil late in the season than early?—A. Yes, sir.

Q. About how early have you ever commenced fishing?—A. I have commenced the 1st of May. I commenced this year the 26th, I believe.

Q. Have you ever commenced earlier than the 1st of May?—A. Yes, sir; I commenced once the 15th of April.

Q. Which way were they going then?—A. They were going up.

Q. Going north?—A. Going up the bay.

Q. What time do they commence going down the coast?—A. They start down in October, I think.

Q. Are they now running down the coast?—A. I think they are; yes, sir.

Q. When they get full grown what is the size of the menhaden that you catch ordinarily?—A. I do not know. I do not know that I ever saw any full grown here.

Q. What is the size of the largest you catch, then?—A. I do not suppose they would weigh over half a pound.

Q. Did you ever see one that would weigh a pound?—A. No, sir; I know I never did.

Q. Do you know where they spawn?—A. No, sir; I do not.

Q. Is there any spawn in them in the early spring when you first begin to catch them?—A. I never saw any.

Q. Is there not in the fall?—A. I have never seen but one or two that had any spawn in them.

Q. Early or late?—A. There are a great many young fish about 2 or 3 inches long in the creeks in the fall of the year going out. I guess they must spawn in there some time during the summer or spring.

Q. There are myriads of them, are there?—A. Yes, sir.

Q. Do they go down, too?—A. They go down the coast; yes, sir.

Q. Do you know how long it takes a menhaden to grow; will those small fish that you see going out be large enough to catch next year?—A. I cannot tell; I do not think they will, hardly.

Q. You think it requires more than one season?—A. I think so; yes, sir.

Q. Those you catch vary in size, do they not?—A. Yes, sir; different sizes.

Q. You catch them as small as a quarter of a pound, 4 ounces?—A. I do not know; we may catch some that small. I never weighed one to know what they weigh.

Q. Where does your employer find a market for his manufactures?—A. In Baltimore, I think.

Q. He makes oil and fertilizers, I suppose?—A. Yes, sir.

Q. Are the fertilizers used any in this State?—A. Oh, yes; a great deal of it is used in this State.

Q. How is it considered compared with guano?—A. It is cheaper; but I do not suppose it is as good.

Q. Not as rich, you think?—A. No, sir; it is not.

Q. What do they put with it?—A. I do not think the farmers around with us put anything with it.

Q. But the manufacturers, do not they put in something besides the fish scrap?—A. I suppose they do.

Q. Do you know what they use?—A. I think they use this South Carolina rock, some of them.

Q. Phosphates out of the South Carolina beds?—A. Yes, sir.

Q. They use some acid, do they not?—A. I do not know.

Q. What does it sell for at your factory?—A. It sells from \$12 to \$26 this year, I think. Dried, I think, it is worth about \$26; decomposed, about \$12.

Q. What does the oil bring?—A. About 35 cents, I think.

Q. What is it used for?—A. I do not know.

Q. Did you ever know it to be used for painting?—A. Yes, sir; I have; we use it for painting outside some.

Q. I understood that they mix it with linseed oil.—A. I do not know but they do. I have heard that they do.

Q. Does it make good paint?—A. It gets kind of dark after awhile.

Q. It fades out?—A. Yes, sir. I do not think it would stand a long time.

Q. Now, you have some idea of the amount of money invested in one of these factories about here; how much does it cost to put up one in running order?—A. I think Captain Reed's cost between \$10,000 and \$15,000.

Q. They will average about that, will they not?—A. I think they will.

Q. What do the steamers cost?—A. Different prices. I do not know what Captain Reed's cost. I think when he bought it he paid about \$4,000 for it.

Q. Second-hand, I suppose?—A. Since that he has had some repairs put on it, and I suppose it has cost about as much again, and it is not worth much now.

Q. What do sailing vessels cost?—A. He does not own sailing vessels; he hires them.

Q. What is about the value of one, such as they use for purse-fishing?—A. From \$1,000 up to \$3,000. I think the two he had were worth about \$2,500.

Q. What do the purse-nets cost?—A. About \$500.

Q. What length of net do you use?—A. One hundred and twenty-five fathoms, I think.

Q. What depth?—A. Seven hundred meshes.

Q. When you go around a school of menhaden how long does it take to purse a net?—A. About five minutes; sometimes longer.

Q. And then they are fast; they cannot get away?—A. After you get them pursed up they cannot get away unless they break the net or something.

Q. How near to the shore do you fish?—A. I have not fished very near it for two or three years; there have not been many fish inshore.

Q. How near?—A. About two or three miles, I think; three miles.

Q. How near to the shore could you fish with your boats if the menhaden were found along the shore?—A. Some places we could go closer than we could others.

Q. You can go wherever there is sufficient depth of water for your seines?—A. Oh, yes.

Q. Is it necessary that the water should be as deep as the depth of the seine?—A. No, sir.

Q. You can purse a net in water shallower than the seine?—A. Yes, sir.

Q. Do you fish in any of these rivers and bays?—A. No, sir; not with steamers.

Q. Do you with sailing vessels?—A. Sailing vessels fish in the bay, not in the rivers.

Q. Menhaden come into the bay, then?—A. Yes, sir.

Q. Of what rivers do you speak out of which the young menhaden come in the fall?—A. The Great Wicomico River, and from that I judge all.

Q. Are there myriads of them; are these little fish countless in number?—A. Yes, sir; there are a good many of them.

Q. You think, then, that the fish spawn in these streams?—A. I do; yes, sir.

Q. And hatch there?—A. Yes, sir.

Q. Spawn when they come up in the spring?—A. I think so; yes, sir.

Q. If there is anything else you wish to state we will be glad to have you do so; we want to get all the facts.—A. I do not know that there is anything.

Q. Are pound-nets used to any extent about here in catching menhaden?—A. They catch a few in them, very few, though.

Q. They do not catch large quantities?—A. No, sir.

Q. Do mackerel come as far south as here?—A. Yes, sir; they come in the bay here.

Q. What time of the year?—A. Along in July. There are some mackerel in the bay here now.

Q. Do you know whether they spawn here?—A. No, sir; I do not.

Q. How are they caught here?—A. They catch them sometimes in pounds—a few; do not catch many, though.

Q. Do they catch any with hook and line?—A. Yes, sir; catch them with hook and line, and gill-nets, I believe.

Q. What bait do they use?—A. Crab bait.

Q. Is the menhaden used for bait any here?—A. No, sir.

Q. You never heard of their being used for bait?—A. No, sir.

Q. Do the people corn them at all for winter use?—A. Yes, sir; some do.

Q. To what extent?—A. Very small.

Q. Do those who are accustomed to corn them like them?—A. Yes, sir; they have a barrel or two.

Q. Have you ever had a barrel of them?—A. I have had, but not for two or three years.

Q. What do you think of them as a fish for family use?—A. I do not think much of them; there are too many bones in them.

Q. There are not as many as there are in a shad, are there?—A. More, I think.

Q. Do shad ever get down here?—A. Yes, sir; we have shad here. I think menhaden have more bones than shad, in proportion to the size of the fish.

Q. How large are the shad that are caught here?—A. I do not know.

Q. Five or six pounds?—A. I guess about five pounds—about four or five pounds.

Q. Are they plenty in the season of shad fishing?—A. Some seasons they catch right smart.

Q. How are bluefish caught here?—A. They catch them in pounds, I think, when they catch any. They do not catch many.

Q. Are they not caught with hook and line at all?—A. Some; but gill-nets, I believe, mostly.

Q. What bait do they use?—A. Crab, I think, when they fish with hook and line.

Q. How do they catch tailors?—A. I mean the tailors; no big bluefish come in this bay.

Q. They are the same kind of fish, are they not?—A. The same, I think, only maller.

Q. Good table fish, are they not?—A. Yes, sir.

Q. What do they feed on?—A. They feed on these little oldwives, I think.

Q. By oldwives you mean what we call menhaden?—A. Yes, sir.

Q. Do sharks feed on them?—A. I think they do; yes, sir.

Q. You cannot catch menhaden in the Chesapeake Bay this season, can you?—A. Not in a steamer.

Q. And that is why you come down here?—A. Yes, sir.

Q. Do the sail-vessels come here, too?—A. They come down sometimes when they cannot find any fish up the bay; but there are more fish in the Chesapeake Bay this year than there has been for five or six years, I think.

Q. Have they disappeared from there?—A. Yes, sir.

Q. How long ago?—A. About a month or six weeks ago.

Q. May not the cold weather have had something to do with that?—A. It may have; yes, sir.

Q. Has it not been cooler here than usual?—A. Yes, sir.

Q. Have you had any frost?—A. I have not seen any; do not think we have had any.

Q. What are you waiting here for now?—A. We are waiting for good weather.

Q. You can surround the fish when a sailing vessel cannot, I suppose?—A. They can surround them as well as we can if they can get to them.

Q. But you can reach them where they cannot?—A. Oh, yes.

Q. You command a vessel?—A. Yes, sir.

Q. How many are the most fish you ever knew of being captured in one season for one factory?—A. I do not know. I reckon these factories down the bay here do better than those up above. I think they have made as high as 800 or 900 tons of chum; some of them run three or four gears.

Q. How many fish would that be?—A. About 10,000,000, I think.

Mr. WESLEY RAYNOR. Down to the southward they made 1,900 tons.

Q. How many fish would that be, taking the average estimate?—A. I do not know.

Q. How many fish to a ton?—A. It would take about 9,000, I think; I think that is what they count on.

Q. And they made 1,900 tons?—A. That is what I understood.

The CHAIRMAN. That would be over 17,000,000 fish.

JAMES S. DARLING sworn and examined.

By the CHAIRMAN :

Question. Where is your residence ?—Answer. Hampton, Va.

Q. How long have you lived there ?—A. I have lived there seventeen years.

Q. What is your occupation ?—A. My occupation formerly was milling. Now I only attend to the oyster interest and this menhaden business. I am not the practical man in this business, but will give what information I can, and my opinion.

Q. How long have you been connected with this menhaden business ?—A. It is six years since I first went into it.

Q. At this place only ?—A. No, sir; we first located at Fisherman's Inlet.

Q. Have you more than one factory now ?—A. Only one; that is this one here.

Q. What do you call this place ?—A. Back River.

Q. How long have you been here ?—A. Five years.

Q. What amount of menhaden do you manufacture annually ?—A. I should say the average has been about 20,000,000, probably 22,000,000; say 22,000,000 would be somewhere near the average.

Q. What kind of craft do you have for catching them ?—A. Sailing vessels entirely.

Q. You have no steamers ?—A. No, sir.

Q. Never have had ?—A. No, sir.

Q. What time do you commence fishing for them ?—A. We have commenced as early as March—the 15th of March—but our experience has been that it does not pay; that we fish too early.

Q. The fish are too poor ?—A. They are too poor, and we catch them when they should be protected. They have spawn in them until about the middle of May. When Mr. McDonald was here before we had not as much information upon that point as we have at the present time.

Q. Where do you think they spawn here ?—A. In the rivers.

Q. Did you ever see young menhaden ?—A. Yes, sir.

Q. Multitudes of them ?—A. Yes, sir.

Q. Where do they go in the fall ?—A. I have no idea; my impression is, though, that they go off to deep water in the bay and stay there.

Q. Did you ever see them with spawn in the fall before they leave ?—A. Yes, sir, I think I have. I think I have heard the fishermen speak of it, more particularly late in the fall.

Q. How late do you fish ?—A. We generally fish here until November; sometimes the middle of November; just as the fish run.

LORENZO DOW MOGER sworn and examined.

By the CHAIRMAN :

Question. Where do you reside ?—Answer. I live in Elizabeth City County.

Q. How long have you lived here ?—A. I have lived here nearly seven years.

Q. What is your occupation ?—A. Fishing.

Q. How long have you followed that ?—A. About seventeen years; nearly all that time in the summer season.

Q. What fishing did you follow before coming here ?—A. The same as I do now, catching these alewives.

Q. For whom ?—A. I have fished for several different parties. I have fished for Wicks & Co., for Gillott & Co., and for Smith & Co.

Q. Were you in their employ or did you fish and sell to them ?—A. Yes, sir; I suppose the way I was fishing then I was in their employ; I used their seines.

Q. How many menhaden factories do you know of; take this whole circle of Hampton Roads and the bay ?—A. On this bay?

Q. Yes; about how many ?—A. I suppose twelve or fifteen. I know there are a great many more than that, from what I have heard.

Q. Is this establishment of Darling & Smithers one of the largest ?—A. I think it is.

Q. Are you in their employ now ?—A. Yes, sir.

Q. Do you run sail or steam vessels ?—A. Sail-vessels.

Q. Have they any steam-vessels ?—A. No, sir.

Q. Have any of the manufactories in this region steamers ?—A. Yes, sir.

Q. How many steamers do you know of ?—A. I know of four.

Q. What do you think of the steamers; are you in favor of them ?—A. No, sir; I cannot say that I am.

Q. What reason do you give for opposing the use of steamers ?—A. My reason is that years ago, when we first commenced fishing, fish were more plentiful when I was home than they are now. While we find beds of fish now every season equal, perhaps, to those that we did fifteen years ago, yet they are apt to be further in the

capas here, or in the middle of the bay or out of the bay, and north where I lived, on the south side of Long Island—I lived there before I came here—we used to have plenty of fish close to the shore.

Q. These steamers scatter them, do they not?—A. I think they do.

Q. Scatter them or frighten them; is it fright, or what is it?—A. It is a general thing with all fish, I suppose, that the more water is navigated, the more steamboats and vessels, the scarcer the fish. Here the steamers come very close in; they work right in with the fish.

Q. Your fishing is in the Chesapeake Bay mainly, I suppose?—A. Yes, sir.

Q. You never go out on the ocean?—A. No, sir.

Q. Do the steamers?—A. Yes, sir.

Q. How far out from shore do they go?—A. I could not say, but sometimes they go out a long distance. I believe they are not allowed to fish in the bay.

Q. Have you ever seen menhaden full of spawn?—A. Yes, sir.

Q. When?—A. In the spring.

Q. Early in the spring?—A. Yes, sir.

Q. What month?—A. I think the menhaden spawn from the first of March until May.

Q. What is the condition of the fish at the end of this spawning season?—A. The fish we get then are generally scattered about in different sizes, and poor.

Q. How is the supply this year compared with former years?—A. Of the alewives?

Q. Yes.—A. I think it is about an average season.

Q. Smaller, are they not?—A. They are smaller; yes, sir.

Q. How do you account for that?—A. Well, that is just as I just told you; I think the same fish that were here last year, small, have grown a little larger this year, and they are the fish we are catching.

Q. Do you think the pound-nets interfere with them at all?—A. I do not think they do much, except as to the time of the year for spawning. They do not catch a great many of them, but they catch them in the spawning season.

Q. Catch them when they are breeding?—A. Yes, sir.

Q. Have you ever seen the small menhaden in the streams?—A. Yes, sir; I have seen them tolerably small.

Q. How small?—A. I have seen them two inches long; three inches, I think.

Q. In the rivers?—A. Yes, sir.

Q. What time do they spawn, according to your idea?—A. I think they spawn somewhere from March to May.

Q. Did you ever see any with spawn in them late in the fall?—A. I do not know whether I have or not.

Q. But you have seen them in the spring?—A. Yes, sir; I have seen them in the spring.

Q. They are full of spawn in the spring?—A. Generally; yes, sir.

Q. Like the shad?—A. Yes, sir.

Q. And the mackerel?—A. Yes, sir; they are full of spawn in the spring; that I know, and I think I have seen them in the fall, but I would not say that I have.

Q. But in the spring you know that the menhaden are full of spawn?—A. Yes, sir.

Q. Are mackerel full of spawn then?—A. I do not think I ever caught one at that season of the year.

Q. Are the shad?—A. The shad are; yes, sir.

Q. How many has your factory caught this year?—A. I think it has caught about 25,000,000.

Q. All caught here in the Chesapeake Bay?—A. I think that is a little overestimated; I think, perhaps, 20,000,000 to 25,000,000.

Q. Well, they are all caught in the Chesapeake Bay?—A. I know there are ten nets, and I know what I have caught, but I think they are not all doing quite as well.

Mr. McDONALD. Twenty-seven million. Captain Darling reported.

The WITNESS. Well, he knows; that is correct.

W. G. SMITHERS sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. I live in Elizabeth City County, right on the beach here. Hampton is my post-office.

Q. How long have you resided here?—A. I have been here ever since the war.

Q. What is your occupation?—A. My occupation is the manufacture of this menhaden oil and guano.

Q. How long have you been in that business?—A. This is the sixth season; six years.

Q. Had you any experience before that?—A. None at all.

Q. Here is your first enterprise, then?—A. We first started at Cape Charles, over on the eastern shore; we were there one season.

Q. What amount of menhaden do you manufacture here annually?—A. I suppose the average will be somewhere between 22,000,000 and 23,000,000. I have not added up my fish account yet; it will be somewhere within a fraction of 27,000,000 this season, and last season we did not get over 20,000,000. I suppose the average would be somewhere near 24,000,000, as near as I can get at it.

Q. You use sailing vessels only?—A. Sailing vessels only.

Q. You never used steamers?—A. No, sir.

Q. Have you any objection to them?—A. Yes, sir; we have serious objections.

Q. What are they?—A. We think so many steamers harassing the fish one day with another will drive them away, whereas with sailing gears we have so many calm days when we cannot get at them that we do not harass them so much; we think in the end steamers will be a disadvantage on that account, and I believe that is the conclusion that a great many men who own steamers have come to.

Q. What is your impression as to the season of the year when you could be prevented from catching them without detriment to your business?—A. In the spring, I think.

Witnesses at Cape May and at Berkeley, N. J., gave evidence of the same general tenor and to the great diminution of the leading varieties of food-fish since the menhaden enterprise was inaugurated.

While the committee was engaged at the latter-named place, the menhaden steamers in numbers were seen passing south in the morning and returning later in the day, apparently heavily loaded.

Seth Green, of Rochester, N. Y., superintendent of the fish commission of that State, was examined as a witness. He has devoted his life to the subject of the habits of fish, the modes of propagation, and as a practical fisherman, he gave it as his opinion that the use of purse and pound nets on the coast of the Atlantic would in time exhaust the supply of food-fish, and that their use should be prohibited during the season of spawning. This was illustrated by his own experience in the use of such nets in Lake Ontario, and by his observations on the ocean coast. His general and direct answer was as follows:

Q. The main point on which we called you here, Mr. Green, was to get your view of the question as to whether the supply of fish in the ocean can be destroyed or greatly diminished as well as in the inland waters of the States?—A. Yes, sir; I think it can. I have not the least doubt of it at all.

The demand for food-fish, both fresh and salt, is increasing yearly. Mr. Eugene G. Blackford, one of the commissioners of fisheries of the State of New York, and one of the largest dealers in fish in Fulton Market, in that State, among other things, testified as follows:

Q. Please state in your own way what your judgment is as to the effect of the menhaden industry upon the quantity of food-fishes, and the reasons for it; I would like to get your theory about it.—A. My attention was called to this fact from parties calling upon me to make complaint to me, as commissioner of fisheries, that the menhaden fishermen were catching food-fishes and carrying them to their factories to be made into oil and scrap. I replied to all those parties that my position as commissioner of fisheries gave me no authority whatever; that there was no law to prohibit that, and no interference would be made with the business. I have noticed, of course, as I have with everything connected with the fish questions coming up from time to time, that the menhaden interest up to within two years was a growing and expanding interest; that the number of boats was increasing year by year; that our coast was fished from Maine to North Carolina persistently from the time the menhaden made their appearance until the cold weather; that those points where the fisheries were commenced and most actively prosecuted seemed to be exhausted after a few years—I speak more particularly of the coast of Maine, where it is called porgy fishery. They call them porgy, which is a different fish from what we know as porgies. It is the menhaden there—and that, from my own knowledge, every year those fishes which feed upon menhaden grow more scarce. The quantity diminishes most notably in the striped bass, and the present year has been one of very marked scarcity in this, one of our choicest fishes. It is not scarce in one particular point, but it is scarce all along the coast where it is usually found. There have been several instances which have been spoken of here, of my own knowledge, where the menhaden vessels have

taken large schools of food-fish and have brought them to market. This very large catch of 1881, about a year ago, just about this time of the year, was principally of weakfish. Some four or more vessels came up to Fulton Market with a cargo, a quantity of at least 200,000 pounds, nearly all weakfish, and out of that 200,000 pounds about one-fourth of it was marketed.

Q. Where had they been taken?—A. They had been taken probably not over five miles from where we sit, right along this coast here, the coast of Long Island.

Q. The outer coast of Long Island?—A. As I recollect, it was right in the vicinity of Rockaway they were taken. About one fourth of those fish were in good condition, fit for food. These are the fish that were lying upon the top layers, so to speak. The fish had been taken and dumped into the holds of vessels, and it being very warm weather, heated of course, where they lay packed in underneath with the weight of those on top, and men were put to work discharging the fish, distributing them to every dealer who would take them on consignment to sell. They were sold as low as one cent a pound. There was an effort for immediate distribution of the fish because of the warm weather, and they needed immediate attention to keep them any time. The balance of those cargoes were sent to the factories. The vessels steamed away with them, and they were rendered into oil and scrap.

Q. Now the other part of my question, as to the effect of the menhaden fishery upon the food-fish and the reasons for it; can you state that?—A. In my opinion the effect of the great amount of fishing that is carried on for menhaden all along the coast breaks up the schools of fish which are followed by the striped bass and bluefish, and has a tendency to make those fish seek other feeding grounds. I speak more particularly with regard to the striped bass, as that is a voracious fish on the menhaden. The striped bass ten years ago were found in more or less quantities nearly the entire summer and late in the fall. Very large catches were taken on the Long Island coast, as many as 20,000 pounds per day coming to Fulton Market. That quantity has been steadily diminishing year by year, and this year the scarcity is more marked than ever before. I have my own views as to the proper legislation that should be had for the protection of this particular branch of fisheries, and, if proper, I will speak of that.

Q. I will be glad to have you give it.—A. That would be to make a close time for the catching of menhaden, extending from the 1st of April to the 1st day of July, or such other dates as this committee might find, after full investigation, to be the time that would cover the spawning season of the menhaden. I have been led to this view of the matter from conversations more particularly with the menhaden men themselves.

Q. You mean to prohibit the taking of menhaden?—A. Yes, to prohibit the taking of the menhaden from the 1st of April until the 1st of July. I think this would be a measure which would do the least injury to the menhaden interests, which we are bound to consider, the large amount of capital and the number of men employed.

Q. And their products are valuable?—A. And their products are valuable, but we believe that the food product for the people should have the first consideration; that that is of more vital importance.

He also stated :

I have testified to my experience as a dealer and as commissioner of fish and fisheries, and as fisherman, as proprietor of nets and fishing privileges. I would say that I have noticed a marked diminution in the quantity of menhaden, as in our nets at Montauk we have caught more or less menhaden which we have sold to factories along with our food-fish, and with the decreased supply of menhaden we have also found a decreased supply of food-fish.

Q. Especially of the striped bass?—A. Yes, sir; more particularly with regard to the striped bass. Your inquiry under the resolution is not limited to any particular kind of fish.

The CHAIRMAN. No, sir. The bill upon which the inquiry arose is a bill containing an absolute prohibition against the catching of menhaden with the kind of nets now used within two miles of the shore upon the Atlantic coast; that is the bill, without mentioning any other fish than the menhaden. The object is to stop the use of those purse-nets within two miles of the shore everywhere.

The WITNESS. There will be a difficulty with regard to the prohibiting of purse-nets, that you would interfere with the mackerel fishery.

The CHAIRMAN. It is the catching of menhaden in purse nets that the bill specifies.

The WITNESS. If you specify the kind of fish—

The CHAIRMAN. It does.

The WITNESS. There are a great many difficulties with regard to any legislation of that kind.

The CHAIRMAN. The bill does not prohibit the use of nets at all except to catch menhaden.

The WITNESS. The difficulty with regard to legislation of that kind is that a man

can get his net around a fish that looks like menhaden and it may turn out to be mackerel, and *vice versa*. But from my experience in regard to all kinds of fish, and protection of fish, there is no doubt but the protection of the fish during its spawning season would give greater results and be most effective.

The CHAIRMAN. The same policy as in our State legislation.

The WITNESS. Exactly.

The CHAIRMAN. We do not allow brook trout or bass to be caught during the spawning season.

The WITNESS. Yes, and the same provision with regard to sea-fishing will give us good results.

Later in the investigation the witness testified as follows :

Q. What proportion of the food of the people of the city of New York, in your best judgment, consists of fish, the various varieties of salt-water fish ?—A. In my own judgment, I should think it would be 15 to 20 per cent. of the entire subsistence of the city of New York.

Q. About what quantity of ocean fish is annually sold at Fulton Market, if you are able to state ?—A. From the best of my recollection, about 8,000,000 pounds per annum.

Q. You have statistics that show it ?—A. We have exact statistics ; yes, sir.

Q. But you haven't them here ?—A. No, sir.

Q. We would be very glad if you would furnish to the committee whatever you have upon the subject ; we would like to include it in the report.—A. I would state that my information in that respect was derived as agent for the United States Fish Commission in compiling the statistics of New York City for the census, so that you have that much more accurately detailed in the census reports.

Q. Those you believe to be accurate ?—A. Those I believe to be as nearly accurate as possible to obtain them.

Q. You remember that was two years ago ?—A. Yes ; that was two years ago.

Q. What is the present supply ?—A. I do not think there is any very material change ; some fishes are scarcer and others are more plentiful.

Q. Do you think the menhaden would be an important food-fish if it was preserved until it had grown to a good size ?—A. In the event of great scarcity of fish in the market the menhaden can be sold in large quantities to the poorer classes.

Q. You think it is a valuable food-fish, then, in that respect and under those conditions ?—A. Well, I am not of the opinion that it is a valuable food-fish. I think that it would be only under exceptional circumstances that any large quantity could be marketed.

Q. Its value, then, you think, consists in its value as a food for other fishes ?—A. Yes, sir.

Q. Well, in that respect do you think it is necessary to be preserved in order to continue the supply of other food-fishes ?—A. Yes, sir.

Q. You think some of the other food-fishes are dependent almost entirely on the menhaden ?—A. I do.

Q. What kind ?—A. Principally the bluefish. I will state here that the bluefish is probably one of the most, if not the most, important food-fish for the people at this time of the year.

Q. The largest in quantity ?—A. The largest in quantity, and the greatest demand is for bluefish. To give you an example, a hotel of this kind will use 1,000 pounds of bluefish to 10 pounds of salmon.

By the CHAIRMAN :

Q. How is it with sea bass ?—A. About the same.

Q. The same as salmon ?—A. Yes, sir. We will take all the kinds of fish in the aggregate, and we sell ten times as many bluefish to the hotels of Coney Island as we do of all other kinds put together.

Q. What is your opinion, in view of the rapidly increasing population of the United States, of the necessity of legislating for the preservation of the food-fishes ?—A. I believe that there is a necessity for legislation for the protection of food-fishes.

Q. Do you think that the supply of food for the people will depend in any important respect upon the food-fish of the sea ?—A. Yes, sir ; I do.

Q. In other words, would there be a scarcity of food if this supply of fish from the sea were cut off ?—A. Oh, I do not think we would starve.

By the CHAIRMAN :

Q. We should lose a luxury as well as a partial subsistence ?—A. Yes, sir.

By Mr. CALL :

Q. You are of the opinion, then, that legislation is advisable for the protection of the fish ?—A. I am so.

Q. Is it not apparent that fishing with nets so small as they are, they catch the young fish?—A. Yes, sir.

Q. From that point of view, then, it would seem to be advisable that there should be some action upon it?—A. There should be some action by which the meshes of their nets should be larger.

By the CHAIRMAN:

Q. From what extent of ocean fishing do you obtain fish?—A. During the year?

Q. Yes, in your own business, I mean.—A. We draw supplies from Mobile and Pensacola on the Gulf, as far south as Key West on the Florida Peninsula, and then from all points between Key West and Labrador on the north, and as far west as San Francisco.

Q. And to what localities do you sell fish; what territory is covered by your operations?—A. The largest portion of my business is in the supplying of large consumers like the Coney Island houses, the Saratoga hotels, Long Branch hotels. We ship fish as far west as Saint Louis; supply two hotels at Saint Louis with fish.

Q. But it is only within a few years that could be done?—A. Only within a few years; yes, sir.

By Mr. CALL:

Q. I suppose the increased facilities for preserving fish with ice, ice-cars, and steam transportation enable you to supply almost the entire country?—A. Yes, sir.

Q. Wherever there is a demand for it you can furnish it?—A. Wherever there is a demand and railroad we can furnish it. Great loads of shad are sent during the shad season to Chicago in refrigerator cars.

Q. What fish do you get from Florida?—A. From Key West we get what you call the kingfish; they are a fish similar to the Spanish mackerel, only not so large; we get sheep's-head; we get what you call spotted trout, which is a variety of our weak-fish, the red snapper, and, of course, the Saint John's River gives us our first shad.

Q. Do you get them in considerable quantities?—A. It has diminished within a few years. We generally receive our first shad from Florida about Christmas time, but the quantity of shad from Florida has decreased year by year, until this last winter it was very small indeed.

By the CHAIRMAN:

Q. Do you attribute that to the large number of people who go there to stay through the winter?—A. No, sir; I think unless shad are properly protected and the supply kept up by artificial propagation, it can be exterminated from the river, but the past season from Florida to the Connecticut River has been a poor season; a light catch.

Q. Does not that grow partly—and I may say, substantially—from the fact that they are caught in the spawning season, and before they are fully grown?—A. Yes, sir.

Before closing the evidence Col. Marshall McDonald, who attended the sub committee on behalf of the United States Commission of Fish and Fisheries, was examined as a witness. His testimony, which was very interesting, will be found on pages 364 to 370. Upon the precise question before the committee his evidence was as follows:

As an illustration we will take the Chesapeake basin, into all the tributaries of which there is each season a run of shad and herring. The shad enter these streams in February and early in March for the purpose of spawning. Successive schools of them are passing up to their spawning-grounds from April on as late as July. The young fish that are spawned remain in the rivers feeding and growing until the cool weather of the fall comes on. They then begin to drop down stream, and by the last of November they have passed out into the bay, and we lose sight of them until they come back as spawning fish. Now, the probability is that of a hundred that go out not more than one returns to the river. As young fish in the river they are the food of the rock, the white perch, the bass, and other species of predaceous fishes that are found in the streams. As soon as they reach the salt waters of the bay the number of their enemies multiplies, and from the time of their birth up to the time of their return to our rivers they are incessantly preyed upon by other fish, so that they are not decimated only, but of one hundred that leave the rivers, hardly one reaches maturity and finds its way back to them, there to deposit its eggs and contribute to the perpetuation of the species. While man's destructive agency in the matter, when we come to consider the number captured by him, seems very insignificant in comparison with the destruction by natural causes, yet if natural causes destroy 95 per cent., and man takes the other 5 per cent. which is necessary for the maintenance of supply, then he destroys the fishery by the capture of that 5 per cent. That small proportion would have been sufficient to maintain production and make up the waste through

natural agencies. So there is no question that modes of fishing, prosecuted to their utmost limit, can be made the means of destroying our river fisheries.

Now, as regards the menhaden, which is the principal object of this inquiry, the investigations in the Chesapeake region, as the chairman will remember, although the evidence was circumstantial, showed beyond a doubt that the menhaden on entering the Chesapeake Bay in the spring of the year entered there full of spawn; that by the middle of May that spawn had been cast and the fish were then lean and impoverished. As to the menhaden in the Chesapeake region, though usually regarded as an ocean species, spawning broad off from the shores the probability is, and the conviction of the fishermen is that it spawns in that region in the tidal creeks and salt-water estuaries of the rivers, and of course it would be under the same conditions and as far as exhaustion is concerned, affected by the same agencies as the river species. If this question be settled in the affirmative, and the question of legislation to maintain production and control the fisheries comes up then we are at sea. We are at sea if we attempt any general law that aims to control the methods and prescribe the apparatus of capture. But as regards our great sea-fisheries, viz, the mackerel and the menhaden, it seems to me that legislation should be directed not so much to prohibition of fishing during the spawning season, about which we are not yet fully certain, but rather to such general regulations as will contribute to maintain production and put that product in the market under the most profitable conditions to the fisherman.

Now, the result of our investigation on the coast, I think, defines very clearly the character of the legislation not only that is necessary, but that will be acceptable, or at least accepted, by the fishermen themselves. The mackerel fishermen, or rather the men who handle the mackerel and control the fishermen, are found to have a very general concurrence of opinion in favor of a national law prohibiting fishing for mackerel before the 20th of June.

The CHAIRMAN. The Portland witnesses were unanimous on that.

The WITNESS. Yes; and I think in Boston, with probably one exception. In the Chesapeake region we found that the principal men engaged in the menhaden fishery, those who had the largest money interest in it, were willing for the enactment of a similar law in regard to the menhaden fishery. So, it seems to me, we are brought up to the point where legislation may be enacted that will increase the production of those two fishes, put them into the market under better conditions, and therefore indicates a proper policy in legislation in regard to the matter. To go further than to prohibit purse-net fishing prior to definite date each season I do not see the way for.

Q. Would not you stop the pound-nets for a certain period?—A. Well, the pound-nets on the sea-coast are not a very important agency of destruction. In our river and in our interior waters they are, but how to reach them by Congressional legislation is a question. If it were possible or proper to enact a law in regard to the river fisheries I would say prohibit all modes of fishing at such a period in the season as would leave enough in the river to maintain the supply.

Q. The States do that.—A. Well, they pass a law but do not enforce it.

Q. Our State does. Now take the New Jersey coast; pound-nets are used all along that coast.—A. On the sea-side, from Cape May to Long Branch, there are very few.

Mr. EUGENE G. BLACKFORD. There is a very large number on the sea shore, commencing at Sandy Hook and going to Barnegat.

The WITNESS. Yes; but at Cape May there are only two, and they are on the bay side.

The CHAIRMAN. But there will be no harm in forbidding their use, if they are not in use, to prevent multiplication of them and to stop them from being used if they are an agency, like the purse-nets, that would lead to the destruction of the variety and species.

The WITNESS. The only question about that is this: I believe it would be better for the fishing industries if the control of the commercial fisheries was entirely under the jurisdiction of the General Government, especially in waters like the Potomac, which drain several States.

The CHAIRMAN. That is impossible.

The WITNESS. But to complicate any matters of legislation with a question of that kind would be to defeat any legislation at all.

The CHAIRMAN. The law here, although a Federal law, arises under the jurisdiction given to Congress by the Constitution. This is a State for that purpose. We could not, as a national legislature, touch the Potomac. It is only by the provision of the Constitution giving absolute jurisdiction to Congress that we can prohibit the catching in the waters within the District by law; just as the State of New York or New Jersey may prohibit in their own waters the catching of fish.

The WITNESS. There is one other thing that is clearly under the jurisdiction of the Government, and furnishes very appropriate subject of legislation, to which I wish to call the attention of the committee. We are now expending a very large sum annually in the artificial propagation and distribution of different species of fish

in our waters, and, at the same time, in those very streams in which we are making plants of the anadromous fishes, the Government has erected, and is continuing to erect year after year, obstructions that negate every result of artificial planting. In other words, salmon and shad—these being the two principal species—are being placed in the headwaters of our streams in all sections of the country in vast numbers, and yet the Government, through its engineers, is engaged at the same time in erecting obstructions that render all this work of no avail so far as those sections of the country are concerned that lie above the obstructions, and a vast section of country it often is. Now, I am convinced that if we permit the fish to reach their spawning-grounds by destroying or providing the means to enable them to pass the obstructions which year by year are contracting the breeding areas of the shad and the salmon, and restore to them the range that they had before we put obstructions in the rivers, we will accomplish as much year by year by natural means as we are now accomplishing by artificial, and it seems to me it would be a proper suggestion for the committee to make in this connection that whenever the plans for the improvement of the navigation of any of our rivers contemplates the erection of obstructions which will intercept the passage of fish, the engineer in charge of such improvement be instructed to provide in his plans and estimates for suitable fish-ways, to be erected in accordance with plans prescribed by the United States Commission of Fish and Fisheries.

If the General Government will set the example by providing suitable fish-ways over the obstructions now erected, or to be erected, in our navigable rivers the useful results will be soon apparent. The several States will follow, and the areas of production thus recovered will determine a permanent increase in the productive capacity of the river.

Your committee are satisfied that the capture of fish by vessels and apparatus fitted for that purpose during certain portions of the year within the waters of the Atlantic less than 3 miles from the boundaries of the jurisdiction of the States has become a serious evil. The vastly increasing interest in the food-fisheries upon the Atlantic coast, in consequence of the multiplication of the summer resorts thereon, and the increasing demand for fish for food, require a kindred protection to that so generally provided by the legislation of the States in respect to their inland waters.

The theory of such legislation has been as far as practicable to protect the fish from capture during the season of spawning.

Upon the facts and statements aforesaid your committee are of the opinion—

First. That the use of purse and pound nets, fyke or weir, in the waters of the Atlantic outside low-water mark should be absolutely prohibited within 3 miles of the shore prior to the 1st day of June in each year south of a line drawn east from the south cape of the Chesapeake Bay and prior to the 1st day of July north of that line, with suitable penalties for any violation of the law in this respect.

Second. That the use of meshes in such nets of less than $1\frac{1}{2}$ inches in size bar measure should in like manner be prohibited at all seasons so as to prevent the taking of young and immature fish. Your committee have, therefore, prepared a bill in accordance with these views, which is offered as a substitute for the proposed bill.

TESTIMONY

TAKEN UNDER

SENATE RESOLUTION OF JULY 26, 1882,

DIRECTING

A subcommittee of the Committee on Foreign Relations, consisting of Mr. Lapham (chairman), Mr. Edmunds, Mr. Miller of California, Mr. Windom, and Mr. Morgan, in conjunction with the Commission of Fish and Fisheries, to examine into the subject of the protection to be given by law to the fish and fisheries on the Atlantic coast, as proposed in the bill S. 1823, first session, Forty-seventh Congress.

NEWPORT, R. I., September 1, 1882.

DANIEL CHURCH sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Tiverton, R. I.

Q. In what business are you engaged?—A. I am engaged in the menhaden fishery.

Q. Which means the manufacture of oil and fertilizers from fish?—A. Yes, sir.

Q. Exclusively from menhaden?—A. No, sir; we fish for other fish in a small way, with traps, in Narragansett Bay, in the spring.

Q. What are the varieties?—A. Tautaug, sea bass, and porgies are the chief fish we are after.

Q. How long have you been in the business?—A. I have been in this menhaden business about twenty years.

Q. There is a corporation or company, is there not, engaged in the business?—A. Well, that is simply a voluntary association of all those engaged in the business, where they get together and compare notes, and do business together for a common purpose.

Q. What is the title of the association?—A. The United States Menhaden Oil and Guano Association.

Q. Where is its principal place of business?—A. Our meetings are held in New York.

Q. Have you any manufactory in New York or vicinity?—A. Yes, sir; we do business in company with others in the vicinity of New York, but do not do any regular business of our own in New York.

Q. Who are the officers of the company?—A. R. L. Fowler is president.

Q. How long has that company been formed?—A. I should say in the neighborhood of seven years.

Q. Are there any menhaden factories in or about New York?—A. Yes, sir; below New York.

Q. At what point?—A. At Barren Island.

Q. Where is that?—A. That is near Coney Island; within half a mile of Coney Island to the east.

Q. Is there any other?—A. There are works on the east end of Long Island; there are factories in Long Island, and up to the east end of Long Island; and there are two or three at Monmouth Bay, New Jersey, and then there is one back of Staten Island, New Jersey; then there are several between Sandy Hook and Cape May, along in those inlets, Egg Harbor. But the principal place where the New Yorkers do their business is Barren Island.

Q. Who is the proprietor there?—A. Oscar O. Friedlander, 36 Broadway, New York.

Q. That is the gentleman whose name we have in our remonstrances against the passage of the law, I think.—A. Yes, sir; that is the man. Then there is Jones & Co., 1201 Broadway; they do business there. Then there is a company called Hawkins Brothers; their headquarters is down at this end of Long Island, down at Greenport. They have a factory here at the east end of Long Island, at Montauk, and another at Barren Island. Then there is another firm that is run by d'Homergue, secretary of the association.

Q. What is his full name?—A. Louis O. d'Homergue.

Q. Where is his place of business?—A. I do not know as he has any office. His residence is 47 Willow street, Brooklyn, N. Y. The men he does business with are Chambers Brothers, 81 Pine street; they are his financial backers.

Q. Are you able to tell the extent of territory covered, taking it one year with another, by the capture of menhaden for your purposes?—A. Yes, sir; very nearly. The ground that is being fished now extends from the capes of Virginia to Narragansett Bay.

Q. Are the fish confined to within the sound or outside?—A. Most of the fish are being caught in the sea this year. I think nineteen fish out of twenty that are being taken to factories are taken out in the ocean; that is, on the seaboard.

Q. Can you approximate to the capital invested in the business?—A. I could not; I do not recollect details of that kind. I can send you the report of the association, which gives it.

Q. When was the last report of the association made?—A. That was made last January. Mr. Friedlander or Mr. d'Homergue can furnish it.

Q. That will tell the whole story?—A. Of all the fisheries.

Q. That takes in the whole United States?—A. Yes, sir.

Q. Has any one been engaged in the business longer than yourself?—A. Yes sir; John Carpenter, who is here, was in the business before I was. It is a business that was very extensively carried on before we engaged in it. If you want me to say anything except in answer to your questions, I can tell you about how this used to go in Narragansett Bay.

Q. I hardly think that detail is necessary to our purposes. It is the present condition of the business we are after now. I want to make these general inquiries to get at the matter historically. Since you commenced the business, have you ever been engaged in the capture of fish for market—food fish?

The WITNESS. What, with these purse-seines?

The CHAIRMAN. No; with any.

A. Yes, we have always been in the seine business; we have always been in food-fish; always followed that.

Q. Down to the present time?—A. Yes sir; that was my original

business, and I have followed that from that day to this, from the start until now.

Q. Now, you may state briefly how the seines that are used for the capture of food-fish and those that are used for capturing menhaden differ.—A. A trap that we use for taking food-fish is fixed in the water. It is something like a sugar box with the top off and one end knocked up, and it is set off about 1,200 feet from the shore with anchors, the same as a box floating in the water, and the fish, in coasting along the shore, follow the leader and go into the box. That is the trap we use in taking fish for food.

Q. What is the size of that?—A. The leaders are somewhere about 150 fathoms long that lead the fish in from the shore, and the box-trap, I think, 12 fathoms to 20 fathoms long—about 100 feet long by 70 feet wide and 30 feet deep.

Q. What is the size of the mesh?—A. Well, they use most any kind, generally about $2\frac{1}{2}$ -inch mesh; they use condemned-purse seines. Generally when they are condemned for taking menhaden we use them for food-fish—about an average of $2\frac{1}{2}$ -inch mesh.

Q. Now give a general description of the menhaden seine.—A. A purse-net that takes menhaden is on the average 1,200 feet long and about 75 to 100 feet deep. It is rigged with floats on one side and the purse line on the other, so (illustrating with a long envelope); that is the length. There are corks here, and rings on the bottom of a line rove there, and when it is set around the fish it goes around in a circle. The fish are in the center and the purse on the under side, and we haul in on the corks and gather the fish in.

Q. It closes at the bottom?—A. Yes, sir; hauls it all together—closes right up.

Q. How are they taken out?—A. They are taken out by steam. We keep gathering them together until they get into a compact mass, and then take a scoop-net and lift it by steam and take the fish alive into the hold of the vessel.

Q. The menhaden are a surface fish, are they not?—A. Yes, sir; the menhaden is a fish that runs for his life, and these other fish I am telling about run the other way; that is to say, they run on a line, the same as a wild goose flies through the air.

Q. The menhaden flees from a pursuer?—A. Yes; whenever they are in trouble, instead of running down to the rocks and eel grass to hide themselves, they run off.

Q. That is the life they lead, is it not?—A. Yes; rovers of the sea.

Q. Is it not true that when a school of menhaden is found there are food-fish pursuing them?—A. Yes; that is, to a certain extent; but here are two men who are just from the fishing ground and can tell you exactly.

Q. Then we will not go into that any farther with you. What amount of capital have you invested?—A. Nearly \$400,000.

Q. Alone or a company?—A. There are six of us in company.

Q. Have you never fished for menhaden further north than here?—A. Yes, sir; we have fished beyond the Penobscot. Menhaden left the eastern coast four years ago.

Q. You fish wherever you can find them, I suppose?—A. Yes, sir.

Q. If there is any suggestion or statement you wish to make, please do so. A. You asked me that question, and I was thinking it might have considerable bearing, in relation to food-fish. The boys have been out on this trip and they have been catching a good many fish; setting around a good many fish. The chief fish that seems to be following

them, as I understand from them, are sharks. As to the general argument, that I do not suppose amounts to anything here. All I have got to say is that in this menhaden fishery question the menhaden seem to come and go to suit themselves, and the idea that we drive them, or have any perceptible effect, I do not believe in, myself, at all. They came on this spring in large quantities, and were on the coast for a time, and the bluefish came on, and when the bluefish came the menhaden disappeared, and when the bluefish disappeared the menhaden made their appearance again, and there is an immense amount of them on the regular fishing ground, as many as we ever found in the business.

Q. But smaller in size, I think you said yesterday, when I visited your factory?—A. There has another set come in, but there is a very heavy body of big menhaden, and with them, all at once, has appeared this immense amount of small menhaden. Everybody is surprised at it and nobody can account for it. That is all I have got to say.

JOHN A. CARPENTER sworn and examined

By the CHAIRMAN:

Question. Where do you reside?—Answer. In Newport.

Q. How long have you lived here?—A. About a year, now.

Q. Where have you resided heretofore?—A. In Middletown.

Q. What has been the business of your life?—A. For the last twenty-five years, with the exception of two or three, I have followed menhaden fishing, with the trapping of food-fish every year in the season of it.

Q. Have you ever been a manufacturer from menhaden?—A. I have not.

Q. You have only been engaged in the capture of them?—A. Yes, sir.

Q. What net do you use in capturing food-fish?—A. We use the same kind that Mr. Church described.

Q. What do you use in capturing menhaden?—A. We use the purse-seine.

Q. Briefly describe it.—A. Our seine that we have now I think is about 200 fathoms long and about 90 feet deep.

Q. You mean the whole seine is drawn into a circle finally, and that is the length and depth of it?—A. Yes, sir; well, it varies a very little in the depth of it; the middle of it is a little the deepest, and then it tapers somewhat at the end.

Q. In capturing menhaden you surround a school of them?—A. Yes, sir.

Q. That is the only way to take them, run the net around the school?—A. Yes, sir. For instance that is a school of fish [illustrating]; here are two boats, half the seine in each boat, and they go around this way; that is the way we take them in.

Q. How far out from land have you ever caught menhaden?

The WITNESS. This year, do you mean?

The CHAIRMAN. Any year in your whole experience. How far out at sea?

A. I do not think I was ever off more than five miles, at the outside, where we have been fishing; we might have been eight.

Q. You think you have caught them as far as five miles from shore?—A. Not as a general thing.

Q. Where are they generally caught?—A. Well, generally pretty close to the shore.

Q. How close?—A. Well, within—some of them just without the breakers—along, I should say, half a mile or a mile; that is, the most of

them. Some of them more where I have been fishing—a mile or a mile and a half along there.

Q. In what depth of water do you take them?—A. We have been fishing a great deal right around Sandy Hook in very shoal water, right on the flats, sometimes in the channel; but most of them have been right along on the Hook.

Q. Do you find them in quantities there?—A. They are spread out a great deal over the top of the water and not very thick.

Q. What food-fish are following them there so far as you have discovered?—A. We have caught some Spanish mackerel, very few; we have caught a few sheephead and some weakfish, and some bluefish, but no great many anyway.

Q. What do you do with those when caught?—A. We generally take them to the market.

Q. What is the size of the mesh of your menhaden nets?—A. I think about $2\frac{1}{4}$ inches.

Q. In the menhaden nets?—A. Yes, sir; one is a pretty fine one. It is a finer one than most of them. Perhaps it is $2\frac{1}{2}$.

Q. What size fish would go through a net with $2\frac{1}{2}$ mesh?—A. I could not answer that question properly. I do not know. It would take a small fish to go through that. I should think it could not weigh more than half a pound. It would depend on its shape; but we caught some of these small fish and they did not appear to me to weigh half a pound.

Q. As a rule you think you catch all fish weighing over half a pound that get into your net?—A. I should think we could; yes, sir. We have caught considerable many sharks.

Q. In those nets?—A. Yes, sir; we hardly ever get a haul that we do not get more or less sharks.

Q. Has that always been so?—A. Ever since we have been up there this season.

Q. But in years gone by; are there not more sharks now than formerly?—A. There seems to be more now; yes, sir.

Q. What do they feed on?—A. They seem to be after these menhaden all the time. I guess they would take most any kind of fish they could.

Q. You never opened one to see what they fed on?—A. I have, and found menhaden in them.

Q. Did you find any other fish in them?—A. Nothing we could make out. It was so far digested we could not tell what it was.

Q. How long does it take from the time you discover a school of menhaden until you close around them and capture them; that is, get them within your power?—A. That depends on circumstances—how big it is and how many there are in it.

Q. Well, ordinarily?—A. Twenty minutes to half an hour, I should say.

Q. It depends a little upon the sea, I suppose, whether it is calm or rough?—A. Well, yes, sir.

Q. Can you capture them just as well in a heavy as in a calm sea?—A. No, sir; we could not work so well in a heavy sea.

Q. But you can capture them?—A. If it is not too rough, we can; if it is too rough we would not fish.

Q. What boats do you use in closing around them—hand power or steam power?—A. Hand power.

Q. Then you have a steamer with hand boats accompanying it with these seines?—A. Yes, sir.

Q. And when you discover a school of fish you surround them with the hand boats?—A. Yes, sir.

Q. Could you give any statement of the quantity of mackerel or blue-fish you have caught this season?—A. I could not, but it is very trifling.

Q. I did not know but you had some account of it. You say you market them; where do you sell them—where have you sold them this season?—A. Up around the Hook to different persons. We have not been to a regular market as I know of. We sent only one lot to a market. If a vessel would come along that wanted them we would sell them. We give them away sometimes.

Q. Have you ever sold any to Fulton market?—A. Never, but once.

Q. When was that?—A. About three weeks ago, I think; we sent some sheephead there.

Q. Who to?—A. There was a smack that took them there.

Q. You do not know who the purchaser was?—A. No, sir.

Q. Do you know Mr. Blackford?—A. I do not.

Q. Who are the proprietors of the boat you have been on?—A. The Church Brothers.

Q. Who is the captain?—A. Isaac Church.

Q. He sold the fish, I suppose. Now, is it not true that when you surround a school of menhaden that are being pursued by food fish, you capture more or less of food fish with them?—A. If they are there along side of them, we do.

Q. You necessarily take them, if they are there?—A. Certainly.

Q. If the menhaden have got far enough away before, you capture those alone, of course?—A. We never have been lucky enough to strike a haul of that kind yet. If the menhaden get away, the others generally go with them.

Mr. DANIEL CHURCH. I would like to ask Mr. Carpenter, how many pounds of food-fish you have caught, in your judgment, in this last six weeks?

The WITNESS. Well, everything we have caught outside of menhaden might be three hundred weight.

Mr. CHURCH. How many times, in your opinion, during the day have you set your nets?

The WITNESS. From five to thirteen times a day.

Mr. CHURCH. So you see, Mr. Chairman, the yield of food-fish is very trifling.

By the CHAIRMAN:

Q. [To the witness.] Have you fished for food-fish all this time, also?—

A. No, sir; not to make it a business.

Q. You have not set seines for the purpose of catching food-fish?—

A. No, sir.

Mr. CHURCH. Now, there is one thing, Mr. Chairman, if you will allow me, that Mr. Carpenter has put a little wrong. He did not see the point of your question. That is, for instance, a purse-seine, which is like this (illustrating); the floats are here and this purse-line is on here. The menhaden is a surface fish, and when they pull on this line and bottom of that line, instead of catching the food-fish the bottom of the seine comes from the bottom of the bay, and the food-fish run underneath. Now, there is no doubt they have set around hundreds of tons in that time, and that is the reason they have not caught them. These rings come right up to the surface, and as quick as you make any noise these food-fish run to the bottom.

Mr. CARPENTER. What I was coming at was the food-fish that were caught were in this school of menhaden.

The CHAIRMAN. Those that got inside of your net?

Mr. CARPENTER. Yes; mixed in with the other fish. That is all I meant to say about it.

NATHANIEL B. CHURCH sworn and examined.

By the CHAIRMAN :

Question. Where do you reside?—Answer. At Tiverton, R. I.

Q. Are you one of the firm of Church Brothers?—A. Yes, sir.

Q. You carry on business there?—A. Yes, sir.

Q. How long have you been in that business?—A. Sixteen years.

Q. Have you superintended the capture of menhaden?—A. Yes, sir.

Q. How much of the time?—A. I have been captain, I think, fourteen years.

Q. And are acting as such still?—A. Yes, sir.

Q. Where have you captured menhaden mainly this season?—A. From Montauk to Fenwick's Island.

Q. In what State is that?—A. It is very near the line between Delaware and Maryland, I think. I think the line comes very near there.

Q. This season, how long have you been engaged in the fishing?—A. I think we commenced fishing about the 10th of May.

Q. And kept it up to the present time?—A. Yes, sir.

Q. What quantity of fish, about, have you captured in that time?—A. We landed 33,000 barrels.

Q. Of menhaden?—A. Yes, sir.

Q. Now, if you have caught food-fish, state to what extent.—A. We have caught so very few that we have not caught enough to eat, really. On this trip of 2,000 barrels we brought in yesterday, we caught one bluefish; that is all in the whole lot. We caught probably a hundred sharks, and for the last six weeks we have been fishing off the capes of Delaware; there, in the body of menhaden, we have not caught fish enough to eat; nowhere near enough. We catch sometimes a bonita, half a dozen bluefish, a weak fish or two. We caught three Spanish mackerel for the year, and three sheepshead. We caught very few mackerel in the spring. We always make a point to pick out all the food-fish we can.

Q. What do you mean, throw them back?—A. No, sir; throw them on deck, to eat.

Q. You take in your fish by steam-power, do you not?—A. Yes, sir.

Q. I suppose it is impracticable to make any careful selection?—A. Yes, sir. The fish come in in quantities of five barrels in the net. They go down the same as on this floor, and they spread out. Of course you would not have time to see the whole.

Q. How are they deposited in the vessel?—A. In bulk.

Q. What in?—A. In a hold, made on purpose. The compartment holds anywhere from 500 to 1,600 and 1,700 barrels.

Q. And as the fish are brought in in the landing-net they are thrown into that?—A. They are dumped right down into the box; the same as this room, exactly.

Q. What is the depth of the hold?—A. The depth of my boat is about 8 feet.

Q. How much square?—A. It holds 1,600 barrels. It is 28 or 30 feet long, about 20 feet wide, and 8 feet deep, I think. I do not know the exact dimensions; that is as near as I can guess it.

Q. If you capture sufficient you throw them into that until you fill it?—A. Yes, sir.

Q. Do you use any preservatives?—A. Sometimes; not as a general rule.

Q. Salt, if anything?—A. Yes, sir.

Q. Do you manufacture the sharks into fertilizers?—A. Yes, sir; they have a liver that is quite oily—has quite a large yield of oil sometimes.

Q. Take one year with another, is the proportion of food-fish greater or less than you mentioned to have taken this year?—A. Well, as long as I have fished I do not notice much, if any, difference. When we used to fish in Maine we caught more mackerel, because they are another surface fish and mix with menhaden more than any other fish; but on this coast you take it in the spring of the year, when the bluefish come here, strike into the menhaden, we sometimes get quite a quantity of bluefish; but, as a general rule, in the summer time we get scarcely fish enough to eat aboard the vessel. That is my experience.

Q. In what months do the menhaden make their appearance, as a rule?—A. As a rule the 1st of May is a sure time to venture for them.

Q. And how long does the season continue?—A. About the middle of November.

Q. Have you fished any for food-fish separately?—A. Not within ten years, I think. That was my business when I was a boy—food-fishing, hook-fishing—and ten years ago I used to be engaged in this trap-fishing, before I went into the menhaden-fishing.

Q. Your brother yesterday spoke about your making all your preparations for fishing for food-fish by reason of the absence of menhaden; did you engage in it in fact?—A. I went on the coast of Maine to engage in it, but I did not succeed in anything. I did not have nets properly fitted for it.

Q. You gave it up?—A. Yes, sir.

Q. You went there for mackerel-fishing, I suppose?—A. Yes, sir.

Q. Some one was saying to me that the mackerel were more plenty this year than they have been before for thirty years.—A. That is what the mackerel captains report. We saw quite a quantity. I saw more this spring than I have ever seen in my life, and mackerel have been plenty for three years.

Q. They have been very scarce, I know, for years past.—A. Well, from five to ten years ago they were very scarce, but for the last three years they have been here in quantities.

Q. Do the food-fish nets close in the same way as the menhaden net?—A. O, no; the food-fish net is a net set on purpose; a stationary net. The menhaden net is a net worked by hand, as these men described.

Q. The food-fish get into that?—A. They use these nets around here, sweep-nets we call them, on the same principle as the purse-net; they draw them on the bottom.

Q. The same as we do our seines in the fresh-water lakes?—A. Just the same, exactly.

Q. Have you ever fished in the Potomac?—A. No, sir.

Q. Or the bays there?—A. No, sir. I have fished in Hampton Roads ten, twelve, or thirteen years ago.

Q. You are a member of the National Association, I suppose?—A. No, sir; only as a company. My brother represents the company; I have nothing to do with it at all; I am a member of the firm.

Q. If there is anything else you want to state please do so?—A. There is nothing I want to state, only there is one question you have not asked—as regards the quantity of menhaden to-day compared with what there was ten, fifteen, or twenty years ago.

Q. Well?—A. I think I saw more menhaden day before yesterday than I ever saw before in my life, by large odds, both large and small.

Q. Where were they?—A. They were from Cape Henlopen south to Fenwick's Island. The large fish were the same fish, as near as we could judge, that we used to catch in Maine; very large and oily.

Q. How large does the menhaden grow?—A. About twelve inches.

Q. What weight?—A. About a pound and a half.

Q. Ordinarily, what is the size of the menhaden you catch?—A. I should think about a pound.

Q. Your brother spoke of a smaller menhaden this year?—A. They were there right in the mouth of the Delaware, millions and millions of them. Last Wednesday morning we came out in the Delaware break-water, and there were schools as far as the eye could reach. There was no end to them—big fish.

By Mr. DANIEL CHURCH:

Q. When did these little fish make their appearance?—A. They made their appearance about the 10th of July, but not in such large quantities; that was the first appearance.

By the CHAIRMAN:

Q. They are smaller menhaden than you have ever seen before?—A. Oh, no.

Q. Only they are smaller than they ordinarily are?—A. Yes, sir; ten years ago this summer they were on the Narragansett coast here and vicinity; the same sized menhaden exactly.

GEORGE F. NICKERSON sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Tiverton, R. I.

Q. What is your business?—A. Menhaden fishing.

Q. How long have you followed it?—A. Twenty-one years.

Q. How are you interested in the business?—A. I have a part interest in William J. Brightman & Co., and run one of their boats.

Q. Where is their factory?—A. At Tiverton, right opposite Captain Church's.

Q. How long have you been in the factory business?—A. This is the fourth season.

Q. Are you captain of a boat?—A. Yes, sir.

Q. How long have you followed that?—A. Fourteen years.

Q. During the present season where have you been engaged?—A. From Montauk to Fenwick's Island.

Q. What coast is that?—A. Fenwick's Island is 20 miles south of Cape Henlopen.

Q. What State?—A. Delaware.

Q. How long have you been engaged there this season?—A. We have not been so far south as that but once. We have been down two or three times to the capes of the Delaware. We have done most of our fishing between here and Sandy Hook and Barnegat.

Q. In the sound?—A. In the sound some, but mostly outside.

Q. Outside of the sound what has been your catch?—A. I caught 15,000 barrels this season.

Q. During the whole season?—A. Yes, sir.

Q. You may state, if you have caught food-fish, what description of fish, and where.—A. They have caught but very few. We have a crew

of twenty-seven men, and, as a general thing, we do not get fish enough to eat; not near what we want.

Q. What description of fish have you caught?—A. We have caught three or four sheepshead and two Spanish mackerel; more bluefish than any other one kind. We have not caught any amount of any fish; not a great many.

Q. Did you catch any bluefish on the Delaware coast?—A. No, sir; we did not catch any.

Q. What food-fish did you catch there?—A. We have not caught any down there. I did not catch a food-fish on this trip.

Q. You mean you did not select out any?—A. I did not see any.

Q. Is not the menhaden a good fish to eat?—A. I like them; take them corned over night, and they taste very well.

Q. Have you fished any for food-fish separately this season?—No, sir.

Q. As far as you know, the same style of seine is used in menhaden fishing everywhere, is it not?—A. Yes, sir.

Q. What is the mesh, according to your recollection?—A. We use $2\frac{1}{2}$ or $2\frac{3}{4}$.

Q. What is the mesh used in fishing for food-fish?—A. About the same size.

Q. The size of the mesh is the same?—A. For the traps; yes, sir.

Q. The difference is in the form of the seine?—A. Well, they use the same nets for catching fish. They have a larger mesh, according to the fish they are going to catch. For bluefish they would have to have four or five inch mesh.

Q. You are not long enough in one place to put out nets for food-fish, I judge?—A. No, sir.

Q. Now, take the fourteen years you have fished, what distance from shore have you caught menhaden; what is the farthest out at sea that you ever caught them?—A. Well, I do not know. We used to fish down east; there we run from Mohegan outside 15 or 20 miles. We must have been 10 miles off this week at Fenwick's Island.

Q. Where is that?—A. Off Fenwick's Island.

Q. In the hauls you made were you out 10 miles from shore?—A. Yes, sir, this week.

Q. Did you go in shore?—A. Yes; we came out from Delaware breakwater in the morning.

Q. Were menhaden along shore?—A. There were boats quite a distance inside of us. They were fishing as far as you could see almost; every way.

Q. How many vessels in all did you see engaged there?—A. I guess there were twenty boats.

Q. Twenty steamers?—A. Yes, sir.

Q. How long were you there?—A. We were on the fishing ground all day.

Q. You were there one day?—A. Yes, sir.

Q. Do you know to whom those boats belonged?—A. Yes, sir; I know most of them. There were quite a number of Barren Island boats there. Church Company had four boats there.

Q. And how many had you?—A. Only one of our boats.

Q. Were all those boats taking fish that distance from shore?—A. No, sir; they were scattered around; they were not all as far off as we were.

Q. How near was the nearest to shore, as you recollect?—A. I should judge they were 3 or 4 miles.

Q. None you think nearer than 3 miles?—A. I should not think there was; no, sir.

Q. How near the shore are bluefish taken?—A. They are close to the shore and off to a distance. We saw them yesterday running across from Delaware breakwater to Montauk.

Q. How far off from land were those bluefish that you saw running across yesterday?—A. I should say abreast of Sandy Hook.

Q. How many miles from land?—A. I should judge 50 miles from Sandy Hook. There have been lots of them around New York Bay this season.

Mr. DANIEL CHURCH. How many pounds of food-fish do you think you have caught this year? Tell it exactly as you think.

The WITNESS. Very few.

Mr. CHURCH. Is it a ton?

The WITNESS. No.

Mr. CHURCH. Half a ton?

The WITNESS. No, I do not think it is. We have caught, perhaps, 500 pounds.

The CHAIRMAN. When you say "caught," I suppose you mean the fish you have selected out for use?

The WITNESS. Yes, sir.

Mr. CHURCH. No; I mean just what I say. How many have you caught, in your judgment? What I want is your honest judgment. Do you think you have caught half a ton?

The WITNESS. No, I do not think I have.

Mr. CHURCH. All the point I was coming at is, they charge us with depleting the sea, and here are two of the principal fishermen, and they have not caught half a ton apiece.

ATLANTIC CITY, N. J., *September 4, 1882.*

LOUIS C. D'HOMERGUE sworn and examined.

By the CHAIRMAN:

Question. Where is your residence?—Answer. Brooklyn, State of New York.

Q. Please give the title of your national association of which you are secretary.—A. The United States Menhaden Oil and Guano Association.

Q. Is that a corporation or joint stock company?—A. It is neither one nor the other. It is merely an association for mutual interchange of opinion and information.

Q. How long has it been in existence?—A. Since January 7, 1874.

Q. Have you any personal interest in the menhaden fisheries, and the manufacture of oils and fertilizers, and, if so, where, and to what extent?

—A. I have a personal and pecuniary interest in the same. My factory is located on Barren Island, county of Kings, State of New York. We have \$70,000 invested.

Q. How long have you been engaged in that business?—A. Eleven years.

Q. Does this association embrace, so far as you know, all the persons engaged in like business in the United States?—A. As far as I know; yes, sir. Here is the roll; some ninety.

Q. Well, you suppose it embraces all?—A. Yes, sir.

Q. Have you made annual statements of the extent of the business?—A. Yes, sir.

Q. When was the first made?—A. January, 1875; the fall of 1874.

Q. Is it printed?—A. Yes, sir.

Q. Have you a copy you can furnish?—A. I cannot. I was not an officer of the association then. Here is the financial record, however; I can furnish that.

Q. When was the last report made?—A. The 11th of January, 1882.

Q. Has that been published?—A. It was published in the papers at the time.

Q. Have you a copy?—A. I have not here, except the official record.

Q. In brief, what do those statements show?—A. They give the number of factories, the number of vessels employed, the number of steamers, number of men employed, the fish caught, the oil made, the tons of crude scrap made, the tons of dry scrap made, the oil gathered on hand at the time, the tons of crude scrap on hand, the tons of dry scrap, and the average yield of oil.

Q. Can you give the detail in that respect of the report of 1875, and also 1882?—A. Yes, sir. I desire to mention that the statistics of 1881 are not exactly correct as to the real quantity of fish caught, except by members of the association, while all those in Maine reporting in statistics of 1874 did not report at all in 1881. So that what fish are mentioned in 1881 was simply between Cape Cod and the capes of Virginia.

1874.		1881.	
Number of factories.....	64	Number of factories.....	97
men at factories.....	871	men at factories.....	2,805
fishermen.....	1,567	fishermen.....	2,406
sail vessels.....	283	sail vessels.....	286
steamers.....	25	steamers.....	73
Oil made (gallons).....	3,372,837	Oil made.....	1,266,549
Tons guano (wet).....	50,976	Tons guano (dry).....	33,619
Fish caught.....	492,878,000	Fish caught.....	454,192,000
Capital invested.....	\$2,500,000	Capital invested.....	\$4,750,000

The guano made in 1881 was was entirely dried, which takes two-thirds more than if it was wet. I gave the wet scrap in the other, for we did not dry it in 1875. There were, in 1881, 92 steamers in the fleet, but 73 in commission.

Q. What use is made of the oils?—A. The oil is used principally in the dressing of leather, also in rope factories—oiling the hemp in making the ropes.

Q. Is it used any in paints?—A. Yes, sir. When linseed oil was high, it was used largely in adulterating linseed oil, and also used in paints by itself; but linseed oil is now so cheap it does not pay to adulterate it, if it could be called an adulteration.

Q. What is the commercial price per gallon?—A. Forty cents this season.

Q. What is the price of the fertilizer per ton?—A. Thirty-five dollars. Some has been sold at \$40; but that was a special sale.

Q. Have you ever had any personal experience in catching the fish used in this commerce?—A. No more so than going aboard of my steamers and seeing them caught.

Q. Overseeing it; looking at it?—A. Yes, sir; that I have done very often.

Q. How are the fish taken aboard of your vessels from the seines?—A. After the seine is pursed so as to hold the fish in, they make a signal by raising up an oar, or some other signal understood, and the steamer comes alongside of the seine, forming a lee of the seine, going

to windward of the seine, which is made fast so as to keep it; then we have a large scoop, like the scoop you catch crabs in, only much larger; they are supposed to hold a thousand fish of 22 cubic inches each, which is the standard size. That has a long handle with drop-lines attached to the hoisting engine. It is sent down into the body of the net and raised up and dumped into the hold, and we keep raising up until the net is clear.

Q. Dumped into what?—A. Into the hold of the vessel.

Q. What size is the hold?—A. According to the size of the vessel.

Q. What is the average?—A. Well, my vessels' holds are 26 feet long, 20 feet wide, 8 feet deep. Some are larger and some are smaller. That is what we call the tanks in the hold of the vessel; they are calked perfectly tight so that the water from the fish cannot drain into the timbers of the vessel so as to make it objectionable.

Q. About what quantity of fish will that scoop, as you term it, take up at a time?—A. A thousand fish each time the scoop goes up.

Q. How many barrels will that make.—A. The eastern men count barrels and we count fish. Three barrels are counted as a thousand fish in the Eastern States; that is, $333\frac{1}{3}$ fish to the barrel.

Q. Do you have a person in this hold where the fish are put in while the fish are being thrown in?—A. No, sir.

Q. No person is in there?—A. No, sir.

Q. How long does it take to raise and empty one of those scoops?—A. We calculate we can bail 60,000 an hour; that is, a scoop a minute; sometimes faster and sometimes slower; but that is about the usual thing.

Q. The opportunities of seeing the variety of fish caught, then, are by looking at them as they are cast into the hold?—Yes, sir; they are slimy and spread all over, and we see anything that is there, and the appearance of the menhaden is so entirely distinct from any other fish that might be along with it we can detect it at once.

Q. Is any person kept on watch for that purpose?—A. No, sir; the captain and the bailer, as he is called. The captain counts the number of scoops that come in so as to see if his count tallies with the count at the factory, and he is looking down there, and in case there is any peculiar fish or food-fish they are very soon taken out.

Q. Now, what do you say as to whether, if you surround a school of menhaden among which are more or less food-fish, whether they are necessarily taken up in your nets or otherwise.—A. Well, sir; in my experience, eleven years in the business, probably going out a dozen times, more or less, during the fishing season, I have never seen enough food-fish taken up in the nets at any one time to constitute a decent meal for the crew of the boat.

Q. That was not exactly the question. What do you say as to whatever food-fish there may be among them being caught, necessarily?—A. Oh, they must be.

Q. You think they must be?—A. Oh, of course. If the net is pursed up, whatever fish are in there must remain there.

Q. And you take them all out?—A. Yes, sir.

Q. Do you empty it entirely with the scoop, or do you draw the net itself up at last?—A. When there is a little left the scoop would not take up; we lift up the net and throw it on deck.

Q. Now, the sailing vessels—how do they take the fish out of the nets?—A. It is done precisely the same way, except it is hand that they are bailed by, instead of the hoisting engine.

Q. That is less rapid, of course?—A. Of course.

Q. But the process is in every other way precisely the same, except the power?—A. Precisely.

Q. And they are thrown into bins the same way?—A. Yes, sir.

Q. The bins are not so large as on the steamers?—A. I should say not; but I have no experience on the sailing vessels.

Q. You have steamers only?—A. That is all.

Q. What distance from shore, as far as your observation goes, are menhaden usually taken; what range of distance?—A. Well, sir, within my own observation I have never seen menhaden taken in beyond, I will say the outside distance, 5 miles, but I think it was a great deal nearer.

Q. Five miles from shore?—A. Yes, sir; I feel in that answer that I am beyond the limit.

Q. Well, how near the shore?—A. Right in the breakers, so that when the net was pursed we would have to attach a rope and run it out to the steamer and haul the net towards the steamer.

Q. To keep the breakers from carrying it ashore?—A. Yes; and, besides, we could not get in there with our steamers. That is not frequent, however. I have seen that, but not frequently.

Q. In how shallow water can you put a net for the catching of menhaden?—A. That depends entirely on the size of the net.

Q. Take the ordinary size?—A. Well, some steamers sometimes carry two nets, a deep-sea net and a shallow net just for these shoal waters; my steamers carry them.

Q. How do they differ?—A. They are deeper in their mesh. They are the same in every respect, except one is deeper than the other.

Q. What is the depth of your deep-sea net?—A. Seven hundred meshes, about 145 feet deep.

Q. What is the depth of the shallow net?—A. Just about one-half, but you must not take from that answer that it is 145 feet depth of water, that that net being 145 feet deep goes to the bottom: we have it because it purses up. That would be for between 48 and 50 feet depth of water, and the other would be about 18 feet.

Q. What length are the nets?—A. The deep nets are hung 180 fathoms in length, and the small nets about 130. Of course, different factories have different ways. Each one has his own ideas about the length of his nets. Those are mine I am giving.

Q. What size mesh?—A. Two and a half inches; that is the standard mesh.

Q. Square?—A. Diamond-shape; they measure $2\frac{1}{2}$ inches the longest way.

Q. In bagging fish, the net is formed as nearly as practicable in a circle, I suppose?—A. Yes, sir.

Q. When you see a school of fish is there any difficulty in determining from the deck of a steamer or sailing vessel what kind of fish it is?—A. Not at all. Any one experienced would tell exactly what they are.

Q. Could tell whether they are menhaden or food-fish of any kind?—A. Yes, sir; there have been one or two occasions in my experience where a school of weakfish lying sluggish on the water on a calm day have been mistaken for menhaden, but that is seldom, because when they get up to them they can see what they are exactly.

Q. How small a fish will your nets take in the ordinary operation of the net?—A. We have the standard mesh. Our nets will not take anything less than the size of a menhaden, twenty-two cubic inches.

Q. What weight?—A. A full-grown menhaden weighs from a pound to a pound and a quarter.

Q. Do you mean that all fish below a pound will escape through a net?—A. Yes; they will escape or will gill and that would give us a great deal more trouble. For instance, supposing we go around a school of what we call mixed fish, that would be small and large together, the small fish would be crowded in the center and the big fish would be on the outside against the web. But it is almost an exception to the rule that any small fish are found with food-fish, because the large fish prey and drive off the small ones.

Q. Now, how small meshes do fishermen who catch food-fish use?—A. That I could not tell, because some use a great deal larger mesh than we do, and others smaller. Now, the mackerel is a smaller mesh, considerably smaller; I think it is an inch and a half, though I would not be certain, while for sea bass and for shad the mesh would be three to four inches. Some people buy these old menhaden nets to make pounds to catch these small fish that run along the edge of the shore. Our nets would not hold game fish.

Q. They are not strong enough?—A. No, sir; they would break the net. Last year and this year there was quite a number of nets destroyed by having a mixed body of bluefish and menhaden coming together just as they were schooling them, getting them in; the nets were destroyed in less than the twinkling of an eye by bluefish going right through them.

Q. I suppose if you should attempt to draw your seines out of water with the fish in them they would break through?—A. Oh, yes.

Q. At any time?—A. Oh, yes.

Q. They are kept in by being kept in the water?—A. Oh, yes; those seines they use as drag-seines are entirely a different thing.

Q. Where, principally, have you observed the taking of fish?—A. From Montauk Point to the capes of Delaware, down the coast of Long Island and the coast of New Jersey.

Q. Of course you can take bluefish with your nets?—A. We cannot hold any quantity of them.

Q. Could not you take them out with your process?—A. We could take them out if our nets would hold them.

Q. Would not they hold them sufficiently for that in the water?—A. No, sir; there is no net used in menhaden fishing that would hold bluefish; not such nets as we are using.

Q. Not strong enough?—A. Oh, no, sir.

Q. You mean by that the twine is not heavy enough?—A. The twine is not heavy enough; yes, sir.

Q. The menhaden, then, are weaker fish?—A. They are fish that do not struggle; they do not bite; they are a sucker fish, while the bluefish is a rapacious fish with teeth.

Q. Will menhaden bite a hook?—A. No, sir; I have never known menhaden to be caught with a hook in my life.

Q. Will they not bite at a hook?—A. No, sir; I have never known or heard of such a thing.

Q. Have you observed the habits of the menhaden in this present season?—A. Yes, sir; very closely, and for the last five or six years; made it a study.

Q. If they differ this year from previous years, please state what you have observed in reference to that; in their size or in their habits, or both; whether they are nearer or more remote from shore.—A. So far as their habits are concerned, my observation has tended to prove that

they are migratory fish; that they migrate up and down the coast, whether for spawning purposes or feeding purposes I do not know, and that their remoteness or nearness to the shore is determined by the wind and weather and by the amount of rapacious fish, such as sharks and bluefish that are in shore, and that I do not see any difference now than I ever did, so far as their habits are concerned. In fact, I think I know less about it now than I did five or six years ago. These observations of mine sometimes point to one result and another time they point to another. The size of the fish seems to be about the same—I am speaking now of the uniform fish that we catch; but I did observe this year a large quantity of young fish, small fish, fish anywhere from 3 inches to 5 or 6 inches long, but I have observed that these fish are always entirely in separate schools; that the small fish school by themselves and the large fish school by themselves at quite distances apart.

Q. How large a school of menhaden have you ever seen, as near as you could estimate?—A. I saw the week before Christmas of the year 1881, coming right along here and going to Barren Island, on a day very much like this, from the top of the mast, with the glass, as far as the eye could see, clean down to the horizon, nothing but fish.

Q. What distance was that?—A. Well, from the top of the mast I should suppose thirty miles; incredible the quantities.

Q. That was last fall?—A. Last fall a year ago. That was just previous to the Christmas of 1881; of course the fishing season was at an end then.

Q. What is the length of the fishing season ordinarily; when does it commence, and when terminate?—A. It generally commences, more or less modified by the season itself, about the 1st to the 15th of May, sometimes a little earlier, until the 15th to the 20th of November. That rule seems to hold good from Montauk down to the capes of Virginia; it seems to be about the same time; a little later down there, perhaps a week, not much more.

Q. What is the usual season for catching the fish?—A. About that time.

Q. And mackerel?—A. Well, mackerel are earlier in the spring and later in the fall. Sometimes they catch them in the season, too.

Q. But generally in the spring and fall?—A. Generally; yes, sir.

Q. Have you ever given any attention to the subject of legislation in respect to the fisheries?—A. Yes, sir; this last fall, when the bill to preserve menhaden on the coast of New Jersey was before the legislature, in my official capacity as secretary of the association I wrote an argument on the subject to be presented to the governor; that is about all.

Q. Is the communication you sent to the Committee on Foreign Relations of the Senate the one you refer to?—A. It embodies the same views. There were some subjects I touched upon which bore more directly to the interests of New Jersey in the fishery.

Q. Without going into that, is there any legislation which you would advise or recommend; and if so, what?—A. I have no recommendations to make in that matter, from the fact that I think the thing if let alone will regulate itself.

Q. How about a regulation in respect to the size of the mesh?—A. After a number of years' experience and experiments and determining the size of the fish, which is now determined at 22 cubic inches, we have found that the net which is most serviceable and practicable is the net of 2½-inch mesh. Experience has proven that that is about the best net we can have. Some think a little smaller, but the usual net used now

is $2\frac{1}{2}$, because when we tan them or tar them it shrinks them somewhat, and they are something a little less than $2\frac{1}{2}$. A 3-inch mesh would be practically the prohibition of the menhaden fishing, because the fish would go right through it.

Now, in reference to other matters, there is a large number of our people who think that if there should be any legislation it should be in reference to that matter of the net, and also as to the time when fishing should commence. I find, for instance, the difference between the salmon fisheries on the American coast and the salmon fisheries in the English Provinces, that while the fishing on the Columbia River, which started after the fishing of the Frazer, is diminishing for want of proper regulations, the fisheries of the Frazer and Mackenzie have increased. That holds good, also, in the herring fisheries on the coast of Scotland. They have regular times, just like the game laws in those countries, when those fisheries shall commence, and, of course, the season ends itself. The moment the water gets cold the fish disappear themselves. In olden times, that is previous to the steamers, we never thought of commencing to fish before about the 15th of May, and at our last meeting a very large number—I should almost say a majority, if it had been brought to a vote—of the most experienced men were in favor of not commencing fishing until the 1st of June, so as to allow the fish to come along the coast and school uninterruptedly. This is a mere matter of opinion. It is not a suggestion, because I do not wish to suggest anything, but for myself individually I am one of those who would like to see fishing not permitted before the 1st of June.

Q. Where do you suppose menhaden go when they disappear? Have you any idea on that subject?—A. Yes, sir. It has been found by the observations of the Meteorological Society of Scotland in examining that subject of the herring—and menhaden belongs to the family of the herring—that the temperature of the water the most congenial for the herring as well as for the menhaden is between 52° and 58° Fahrenheit, and that accounts in a measure for the migration of the fish up and down the coast. When the water is getting too warm in the southern latitudes the fish keep following up the coast; they used formerly to go up as far as Maine, and when the water would get too cold there they would keep following down this temperature of water. That I have determined from observation by deep-sea thermometers. Prof. Spencer F. Baird sent us thermometers for that purpose. While very few tried it, did not care anything at all about it, I was among the few who did try it, and made my report to Professor Baird on the subject.

Q. In what year was that report made?—A. Last year.

Q. Do you know whether that was printed?—A. No, sir, it has not been published yet. I presume it will be soon. The fish are of the sucker family, and the impression of Prof. Brown Goode, assistant to Professor Baird, is similar to mine. My idea is that they keep sinking and keep out of the cold all the time; sink down into the mud and lie sort of dormant. That is a mere matter of theory, of course.

Q. What is their spawning season?—A. That is undetermined, for we have caught fish with spawn at all seasons.

Q. Have you not any idea as to what their general spawning season is?—A. No, sir, I have not. I do not think any expert has, from the fact that experience seems to be the same with all of us. We have found fish with spawn in the spring, summer, and fall.

Q. Have you any idea of the spawning ground; to what localities they go?—A. No, sir, I have not.

Q. You have in regard to the bluefish, have you not?—A. No, sir; none in the least.

Q. Nor mackerel?—A. None in the least.

Q. I supposed their habits in that respect were known.—A. As to the herring I know particularly, because I had a long talk with Mr. Anderson, one of the most noted experts in the world. He is the Fish Commissioner of British Columbia, and he, speaking of that subject, told me he had investigated it for thirty years and had been in correspondence with all the leading ichthyologists in Europe, and, so far as the habits of the herring were concerned in that particular, they were not known.

Q. Have you ever engaged in catching food-fish as a business?—A. Not at all.

Q. Are your men under any restrictions not to catch food-fish?—A. Positive instructions not to catch them.

Q. If they strike a school of bluefish not to take them?—A. They could not take those if they wanted to.

Q. Or mackerel?—A. No, sir; we are never known to catch mackerel. But that is the positive instructions. It would not pay us. I would like, if I would be permitted, to show in that respect the official notice that I served upon every member of our association on hearing through the newspaper reports that we were catching food-fish. On the 13th day of May last I addressed the following:

GENTLEMEN: Newspaper clippings have been received complaining that the menhaden steamers are catching large quantities of mackerel—of every food-fish. I believe this is untrue, but I should urgently suggest that all members and owners positively forbid the catching of food-fish in quantities by their crews.

LOUIS C. D'HOMERGUE,

Secretary United States Menhaden Oil and Guano Association.

And on that subject I was interviewed by some reporters, and here is what I said to them:

Mr. d'Homergue said he had no faith in the stories that the menhaden fishermen are catching food-fish in large quantities. It is absurd to suppose that they might benefit themselves pecuniarily by catching such fish. They do not hunt mackerel, bluefish, or other game fish, and have no use for fish of that kind other than to eat them. Besides, the nets of the menhaden fishermen are destroyed by the food-fish. The fishermen take great pains to keep at a distance from such fish.

Professor Baird, to whom I wrote asking if he had heard of any such report, under date of July 22, of this year, writes me:

I am in receipt of yours of July 21, and beg to state that from the first statement of the intention of the menhaden fishermen to pursue mackerel for their oil and for conversion into fertilizers I insisted that the idea was preposterous on its face. That, in the first place, a sufficient quantity of mackerel could not be obtained to keep a factory running; and, secondly, that the high price of mackerel as an article of food would induce the greatest care in preserving them to send them to market, for the mackerel is worth \$3 to \$5 a barrel, and menhaden is worth about 65 cents a barrel.

Q. Is it, or not, true that if, either by design or accident, one of your vessels should take a quantity of food-fish they would put them upon the market instead of sending them to the factory?—A. Most decidedly; that occurred twice last season, in weak-fish, where a small quantity—about 30,000 or 40,000—were caught by mistake and went to the market very quickly.

Q. Where were they sold?—A. Fulton market.

Q. Do you remember the purchaser?—A. No, sir; I do not. I do not know anything at all about that. They were not my steamers. I know that quantity glutted the market.

Q. What fish was that?—A. The weak-fish.

Q. Have you observed sufficiently to be able to say whether the quantity of food-fish has diminished during the period you have been connected with the business; are you able to say anything upon that subject?—A. I have never heard anything said, one way or the other, on the subject.

Q. You have no means of forming an opinion upon the subject?—A. No, sir. All I judge is as a householder and housekeeper, that I do not see any difference in the price of fish for the last twenty years I have kept house.

Q. What is the price of Peruvian guano?—A. From \$45 to \$60 a ton, according to the amount of nitrates.

Q. What is linseed oil worth now?—A. I think the last quotation I heard was fifty cents; I am not positive, however.

Q. Does not that affect the sale of your oil somewhat?—A. Not in the slightest.

Q. The menhaden manufacturers find a ready market for all their oils?—A. Oh, yes.

Q. More so than their fertilizer?—A. No, sir. Oil is sold on the market with a slight fluctuation, just like cotton or anything; but as for guano itself, we cannot begin to supply the home demand.

Q. Is it preferred to the Peruvian guano?—A. Yes, sir. The nitrate beds are being run out, while the fish guano runs higher in ammonia than the present Peruvian guano.

Q. Is it higher than the phosphates they get in South Carolina?—A. That is a phosphate; this is an ammoniate matter. The phosphates would be of no use without there being a mixture of ammonia along with it.

Q. These phosphate beds are used for fertilizers, are they not?—A. Mixed with ammonias, yes sir; and then they are treated with sulphuric acid, because, taken from the bed itself, it is an inert matter.

Q. Now, what articles of commerce do you use in the manufacture of menhaden into fertilizer?—A. None at all; it is a pure article itself.

Q. In the process of manufacturing do not you use salt?—A. Oh, salt is merely for keeping our nets from being burned. Nothing enters into the manufacture. I use about 600 bushels of salt a month.

Q. Where do you get that?—A. In New York.

Q. It is Syracuse salt, is it not?—A. I suppose so. It is fine salt. It must be fine. We buy it by the cargo.

Q. The salt water, then, will not preserve your nets?—A. No, sir; it is not strong enough. You have got to make a strong pickle so as to get the fish slime off the twine, or else it would ferment the immense mass lying there. I have known nets to be destroyed in twenty-four hours by the nets heating.

Q. I do not care to multiply the inquiries in regard to this matter. If there is any topic you want to make any suggestion on, I hope you will feel free to do it.—A. Well, all I have to embody further is this letter I had the honor to send to the committee, and, in addition, to offer a few suggestions.

The witness submitted the following letter:

47 WILLOW STREET,
Brooklyn, L. I., June 15, 1882.

To United States Senator LAPHAM, of New York:

DEAR SIR: I understand that a bill introduced by Senator Sewell, of New Jersey, to prevent menhaden-fishing in the waters of the United States has been referred by the Senate to a subcommittee of which you are chairman, and that you have kindly deferred action thereon until the menhaden interest is heard. I do not know, except

in a general way, what are the allegations set up against the largest fishing interest of the country, involving about four millions of dollars, mostly owned in New York State, employing over 90 steamers, 250 sailing vessels, and some 5,000 men, and which is a subject-matter of treaty between England and the United States, of which Senator Sewell wrote on the 24th of last January, and read before the New Jersey senate, as follows:

“TRENTON, *January 24, 1882.*

“In the senate to-day an important communication was read from United States Senator Sewell in reference to the menhaden-fishing on the Jersey coast. Both houses, it is expected, will take vigorous action to prevent a continuance of that kind of fishing. The letter of Senator Sewell reads as follows:

“I have had for some time under consideration the matter of our fishing interest along the Jersey coast, and had about concluded to introduce a bill in Congress prohibiting the further destruction of our fish product by parties from other States. In a recent conversation, however, with Professor Baird, of the Smithsonian Institute, who is the recognized authority upon the subject, I learned a fact of which I was previously not aware—namely, that in the treaty with England on the fishery question the citizens of this country are privileged to fish anywhere in Canadian waters. The treaty, being reciprocal, grants the like courtesy to the people of Canada to fish anywhere along our coasts. It is therefore impossible to enact a law of the character I intended. It would give the Canadians a monopoly of the fisheries along our coast, and would likewise enable the present parties engaged in the destruction and damage of our fishing interests by the capture of menhaden for oil and fertilizing purposes to take out Canadian registers. We should not await the action of the national government, which cannot be successfully invoked in view of the treaty I have referred to. The evil is a crying one and must be suppressed by the best means at hand. The growing popular interest in the shore line of our State and its magnificent summer resorts has really brought the question up as one of the principal industries in New Jersey, from which we receive a revenue equal if not in excess of that from our manufacturing interests. The protection of fish for the use and amusement of a population of 250,000 during the summer months, and still increasing, is of so much importance that it behooves the State to give it the consideration it deserves.”

Does not the same objections exist now against the passage of this law, proposed by Senator Sewell, as he presented to the New Jersey Senate last January, and would not the United States Government have to terminate the said treaty with Great Britain before such an act could become a law of the land? This no doubt was amongst the reasons which actuated Governor Ludlow to withhold his signature from a similar enactment passed by the late legislature of Senator Sewell's State.

In reference, however, to the charge contained in the latter part of the letter, “damage of our fishing interests by the capture of menhaden for oil and fertilizing purposes,” &c., I will simply rejoin by stating that such a charge was exhaustively investigated by Professor Baird, and was thoroughly discussed by Prof. G. Brown Goode, at a meeting of the United States Oil and Guano Association on January 12, 1881, and as these scientists are specially employed by the government to determine by extended official observations such questions, I would respectfully suggest that these gentlemen be requested to present officially their views upon this matter to your committee.

A practical refutation to the charge that menhaden-fishing destroys other fishing interests is the fact that one of the largest single hauls of bluefish ever made on the coast of New Jersey was 6,000 pounds, off Deal Beach, New Jersey, in last October, at a time when a menhaden had not been seen in days. It is a patent fact that all game fish prey on menhaden, and when such fish as Spanish mackerel, bluefish, bonitos, and sea bass are plentiful along the coast they chase and drive to sea the menhaden. Last year these game fish were so numerous that we had great trouble to save our nets from being destroyed by them. The writer, last year, had a new net, costing \$900, destroyed in about three minutes by a school of bluefish. Perceiving a small haul of menhaden bunched up in the net, ready to be bailed out into the steamer, the bluefish made a rush for the menhaden, and in a twinkling went through net and fish. You can see by this how absurd are the charges made that we catch up large quantities of food or game fish in our nets with menhaden. I make this assertion without fear of contradiction, that never in the course of the business do we ever catch enough food-fish to supply our own employés. In truth, when there are plenty of menhaden nicely schooled, game fish are scarce, and when game fish are plenty along the coast, menhaden are scarce and far between. This season is another proof of this. Enormous schools of mackerel and bluefish are on the coast from Virginia to Cape Cod; where are the menhaden? And so I could multiply proofs upon proofs in refutation of the charges, which are made more in ignorance than in malice, against an industry producing, besides a valuable oil, a product which ton for ton is as valuable to the agricultural industry of the nation as the famed Peruvian guano, and has largely superseded it in this country. Why, sir, when parties are endeavor-

ing to stop this great industry, they are striking at one of the mighty resources of the land, which the following extract from the Brooklyn Eagle of 29th January, 1881, clearly demonstrates:

"If people fully desire to understand this menhaden question in all its breadth, with its direct bearing as a fertilizer on the growth of the great staples of the country, for instance, cotton, let them consider that the 71,000 tons of fish guano made this past season were used in the manufacture of 284,000 tons of fertilizers, and these fertilizers, at the rate of 250 pounds to the acre, are absolutely required to raise one bale of cotton per acre, or, in other words, 71,000 tons of fish guano was the most active ammoniacal agent in the gross production of 2,272,000 bales of cotton; this alone represents a vast sum of money, without counting the use of fertilizers needed for corn, wheat, other cereals, fruit, and vegetables, a want constantly increasing."

Such a law would be nothing more than class legislation to protect the unjust prejudices of so-called gentlemen anglers, ephemeral summer visitors, hotel-keepers, or land speculators along the sea coast (especially of New Jersey), and if enforced for one single season the results would be disastrous. It would be like the prohibition of the raising of corn and cattle, and in fact it could not exist on the statutes only as a dead letter. It would force the farmer and the planter to purchase foreign ammoniates; it would be in violation of treaty obligations, and give to aliens greater rights in American waters than Americans themselves would have. It would be substituting and giving precedence to the English flag on our fishing-grounds as it is already on the ocean. It would be a tyrannical attempt to destroy a great national resource and industry to satisfy a certain class of summer idlers, at the expense of thousand honest toilers who are now gaining an honest and useful living on God's highway. This bill is also striking at a vital interest of a large portion of the State of which you are one of its honored Senators.

Respectfully, yours,

LOUIS C. D'HOMERGUE,
*Secretary and Treasurer United States
Menhaden Oil and Guano Association.*

The proposed bill would be, I submit, a violation of the spirit of the treaty, as when said treaty was made there was no such limitation as is now proposed to be placed on menhaden-fishing; and, if so placed, would have a retroactive effect on the treaty.

2d. The menhaden, like the herring, is essentially an inshore fish, frequenting bays, inlets, and close along shallow waters of the coast, searching for food or congenial temperature of the waters; this temperature has been ascertained, both by the Meteorological Society of Scotland and our own Fishing Commission, to be between 52° to 58° Fah., so that any bill prohibiting fishing two miles from the coast would almost amount to a prohibition of the industry.

3d. It is well determined and proven, in the language of Prof. Spencer F. Baird, that menhaden migrate to and fro along the coast during their season, and therefore preventing the catching of same within two miles of the coast would not make them remain in any given locality, so that if the object of the Sewell bill is to keep them along the mosquito-bound coast of New Jersey as a bait for game or food fish, it would have about the same effect as the bull of the Pope against the comet.

4th. In point of fact, the catching of same interferes in nowise with game or food fish, because, in the first place, weakfish, sea bass, perch, sheepshead, porgies, blackfish, eels, shad, and codfish do not require menhaden for bait, while mackerel is mostly seined, and even bluefish afford the best sport in trolling for same without bait. But, sir, I claim most positively that the menhaden interest does not interfere with the sport or necessity of those who fish for pleasure or to supply markets, and in proof of this I desire to present the following statement, made in the New Jersey Coast Pilot, under date of September 2, 1882, a newspaper published in the interest of the summer residents of the coast of New Jersey, in which they give a tabulated account of the amount of fish caught by so-called sportsmen and residents of the place. Now, these are the localities where our greatest fishing has been this summer:

FISH.

KEYPORT.—William Tilton caught the boss sea bass of the season, weighing 11 pounds.

LONG BRANCH.—Five hundred and forty-three pounds of Spanish mackerel, 300 pounds of bonita, 200 pounds of bluefish, and more than 10,000 pounds of weakfish were caught in Capt. Frank Green's fish "pound" off this place one day recently. This is not, however, as large a "catch" as that made at Manahan & Joline's fishery at Seabright not long since, when 40,000 pounds of weakfish were found in the net one morning. It took two days to get their catch ashore.

TOMS RIVER.—On Saturday last quite a run of bluefish along the surf. One man caught one with his hand, weighing 5 pounds, they were so numerous.

WARETOWN.—Weakfish have been caught in greater quantity this summer than ever before. The late storm did not seem to affect their biting to any great extent. Fish have been caught in great numbers during the last two days within 200 yards of the bay shore, and still continue to be taken. The Hopkins House has had pleasure seekers for the past two weeks to a considerable extent, among whom we give the names of parties and number of fish in each boat.

Then follows a long list of names. Now, the most of these fish have been caught by pleasure seekers, &c., and in this enormous quantity, it does not give, except in one instance, at Long Branch, the fish that have been caught by the market fishermen.

BARNEGAT.—Owing to the late and severe northeast storm, the weakfish have not been biting in such large numbers, and are not running quite as large as they did before the storm, as it had a tendency and always does scatter the fish over the bay. Some of the yachts last Friday went outside the beach and struck the bluefish in great numbers, but the wind being light it prevented them from getting all they wanted.

So you see they were trolling for bluefish.

But as it was they got between twenty and thirty fine ones, averaging $8\frac{1}{2}$ pounds. Samuel Ridgway caught fifteen fine bass on Tuesday with pole and line, and the townsmen say in a few days, the bass, as well as the weakfish, will bite a streak, as the water near the points before the storm became sour and had a very offensive smell, but the high tides have sweetened the bay all up with the sea water.

This is a little party that went out Friday.

All the low meadows were all under water, and hundreds of tons of salt hay have been spoiled by the tide of Sunday and Monday. Then it goes just in this way:

TUCKERTON.—Alfred C. Painter, of Philadelphia, and W. S. Steelman took with hook and line, in Great Bay, during the week, 51 weakfish and sea bass; yacht Julia, Capt. E. A. Horner, jr.

David Scattergood and friends, of Philadelphia, took 30 large bluefish off at sea, opposite Little Egg Harbor light. The weight of the largest fish was 10 pounds; yacht Zelf, Capt. James T. Falkinburg.

Horace T. Kline, of Philadelphia, took with hook and line, in Tuckerton Bay, 61 weakfish and barb; yacht Golden Gate, Capt. A. Hiram.

A party of Philadelphia gentlemen took with hook and line, in Tuckerton Bay, near Long Point, during the week, 130 weakfish and bass; yacht N. King, Capt. John Marshall, jr.

James Holgate, esq., and Lafayette Horter, of Philadelphia, took with hook and line, during the week, near Bond's, in Little Egg Harbor Bay, 120 weakfish, barb, and bass; yacht J. S. Lee, Capt. William I. Brown.

Indications are that rock and white perch fishing will be excellent during the month of September.

ATLANTIC CITY.—Fishing has been good throughout the week. Croakers, blue and weak fish continue to be brought ashore in large quantities.

Now, you must remember that we have been fishing down in that district, with the exception of two weeks alongshore in Long Island, and a gentleman informed me on the car yesterday that food fish has never been so abundant as it has been along the shore of New Jersey this season, and I think if I could get the back files of this paper it would carry out his assertion.

Another important consideration I desire to call the attention of the committee to is that the menhaden fisheries furnish to the agricultural

interests of the country an article equal in value to the far-famed Peruvian guano. This article enters into the manufacture of superphosphate as an ammoniacal ingredient. Why, sir, fish guano was one of the active ingredients which helped to produce over 2,000,000 bales of cotton in 1881, which, at 450 pounds to the bale, at 10 cents per pound, realized to the country \$90,000,000 per season, without counting the value of grain, fruit, and vegetables in which this fertilizer helps to mature; and this great adjunct to the fertility of the farm and plantation is proposed to be practically legislated out of existence because some summer sojourners erroneously believe that they are deprived of a few kinds of fish during their temporary stay along the coast of New Jersey. I particularize New Jersey, as the opposition to menhaden fisheries seems to be largely from that State.

OSCAR O. FRIEDLANDER sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. I reside in New York.

Q. How long have you resided there?—A. Since the 1st of April, 1879. Previous to that I lived in New Jersey.

Q. At what point in New Jersey?—A. In Hoboken.

Q. How many years did you live there?—A. Thirteen years.

Q. So that, in all, you have been in this country how many years?—A. Sixteen years.

Q. Are you connected with the menhaden fisheries?—A. Yes, sir.

Q. How long have you been in the business?—A. This is the seventh year.

Q. Since 1875, then?—A. Since 1876.

Q. Where are your factories?—A. At Barren Island.

Q. Have you ever had any practical experience in taking menhaden?—A. To a certain extent. I go out about once a month to see for myself how things are going.

Q. During the season?—A. During the season.

Q. What is the usual season for catching them?—A. From the 1st of May until, generally, Thanksgiving day.

Q. Until the cold weather drives them away, I suppose.—A. Until the frost drives them away.

Q. They leave when the cold weather comes?—A. Yes, sir.

Q. Have you any opinion as to the spawning season of the menhaden?—A. My impression is they spawn in winter in the Chesapeake Bay, and they may spawn in summer in the creeks and rivers; but that is something that is not tested.

Q. Well, the general spawning season you think is in the winter?—A. In the South, I think.

Q. By winter do you mean to exclude March and April?—A. I think these big fish going South in December go down to spawn either on the Gulf Stream or the Chesapeake Bay—somewhere around there—because in summer the fish come up from the South, so they must come from the spawning ground.

Q. What is the usual weight of full-grown menhaden?—A. A full-grown menhaden, I should think, weighs about a pound.

Q. About what is the average weight of those you catch?—A. This year they are extraordinarily large. I should think this year they weigh an average of fully three-quarters of a pound.

Q. Are they a fish that can be used as an article of food or cured to

be used?—A. Well, that depends on the eater's taste. The public at large would not, in my opinion, eat them.

Q. Either fresh or cured?—A. Either fresh or cured.

Q. They would not be cured like the herring, I suppose?—A. No, sir. In the first place, the fish has too many bones, and, in the second place, there is too much of this fish oil, which gives it a very obnoxious taste.

Q. A strong taste, I suppose?—A. Yes, sir.

Q. A fishy taste?—A. Yes, sir. It is like cod-liver oil; people drink it if they are compelled to.

Q. Do you know any fish in the salt waters that have as much oil in proportion to their size as the menhaden?—A. The porpoise has more oil, I think.

Q. Do you ever take any of those?—A. We would like to, but cannot get them.

Q. Where are they caught?—A. They are not caught at all; they are too smart.

Q. Well, where are they found?—A. They are found right here. Sometimes they are all along the coast; they come in large bodies and prey on menhaden.

Q. What size fish are they?—A. It is a fish that is probably from six to ten feet long. You see them sometimes jumping out of the water here in the bay by the thousands, and they drive the menhaden in schools and then go for them; they feed on them.

Q. And they are an oily fish?—A. That is a specific oily fish, yes, sir.

Q. But they are too large to take in the seines you use?—A. They jump out. They are a powerful fish; they will jump through a sail. It has been tried here in Rockaway; they laid the boat across and the tide ran out and the fish jumped through the sails.

Q. That class of fish?—A. That class of fish.

Q. How is the bluefish as to strength?—A. Well, the bluefish is a strong fish.

Q. Could you take and hold a school of bluefish in the seines you use to catch menhaden?—A. Well, they would hold some of them; those that do not escape.

Q. But I mean hold a body of them securely?—A. I do not think they could hold anything like a school of menhaden.

Q. Now, in the ordinary catch of menhaden, in the mode in which you catch them, what proportion of what are termed food-fish, if any, do you take, as far as your observation goes?—A. As a general rule they do not catch fish enough to supply their own table.

Q. You mean the table of the boatmen?—A. Of the boatmen. Sometimes they catch more, and then they bring them to the factories and give them to the men, and they eat them at the boarding houses; but we have to buy fish. It is a positive fact that we have to buy dried cod-fish for the men at the works because they have not enough fresh fish there.

Q. Do not your men eat menhaden at all?—A. No, sir. I have seen them sometimes take them out of the tanks and eat one or two, but they do not take them at the table.

Q. They do not like them?—A. No, sir.

Q. They are not unhealthy, are they?—A. No, I should rather think they are healthy.

Q. Simply unpalatable?—A. They are unpalatable, yes, sir.

Q. What have you an idea the menhaden feed on?—A. Well, on an insect. Professor Baird showed it, but, of course, it is only guess-work on our part. It is an insect you cannot see with your naked eye. It

goes in schools—that is what Professor Baird says—the same as the menhaden itself.

Q. Insects in the water?—A. Yes, sir.

Q. What is the usual size of the bluefish?—A. The bluefish varies from a foot—

Q. Give weight.—A. In weight from half a pound to twelve pounds, and the largest fish come in the fall of the year.

Q. How late in the year?—A. In October.

Q. Before your season of fishing closes?—A. Before our season of fishing closes.

Q. Have you ever seen bluefish as large as that caught in your seines?—A. An odd one here and there, yes, sir; a straggler.

Q. The seine is unloaded into the hold of your ship pretty rapidly, is it not?—A. Yes; they unload about a thousand a minute; quicker than that even. They have steam hoisters on board the steamer and hoist them out.

Q. And the opportunity to see what kind of fish they are is to see them as they are thrown out into the bins?—A. Yes, sir.

Q. They are never examined afterwards, are they?—A. Well, we see them at the factory as they come in.

Q. I thought they were carried on rattles over the bins?—A. No, they scoop them out with forks; shovel them in.

Q. Shovel them into what?—A. Into barrels; half a barrel which hangs on an iron.

Q. That runs up to your rattles, your conveyors, that carry them over the vats?—A. Yes, sir; they are hoisted out of the boats into a box and dumped there; then they are dropped into a railroad car, and this railroad car is taken into the works. If there are any food-fish they are in the first place seen down below by the pitchers, and then they are seen again by the man who levels the car. You see these fish are counted by cars; there are five thousand in a car, and the captain gets credit for so many fish that he brings in.

Q. That is not an actual count, it is an estimate?—A. It is a car that measures five thousand times twenty-one cubic inches; they figure a normal fish twenty-one cubic inches.

Q. That you call one fish?—A. One fish.

Q. That is the rating at which you pay the captain and men who capture them?—A. Yes, sir.

Q. You furnish the vessels?—A. Yes, sir.

Q. And seines?—A. And seines.

Q. And they get so much a thousand for catching?—A. Well, that has been altered this year to some extent. We have to pay the men their wages whether they catch or not. The captain is on shares; the mate gets wages and a share. We pay the men principally forty dollars a month and everything free of course.

Q. Do you find a ready market for your oils and fertilizers?—A. Yes, sir; I have sold all our product for this year in the way of fertilizers; one house in Boston bought everything we make this year. That I think will probably reach \$100,000 or more. For oil there is a ready sale continually, either for export or for the home trade.

Q. What length of time have you had any men employed in your factories?—A. The foreman has been there now for ten years; there are other men who come back readily every year. I suppose we have got old hands there to the number of twenty or twenty-five.

Q. They work from the 1st of May until the close of the season?—A.

We generally engage them about the 15th of March to fix up, and we keep them until the 1st of December.

Q. Has there ever been any sickness among your men?—A. No, sir; that is, they get diarrhea from bad water down there; but there is no fever or any other disease.

Q. No malady that you attribute to the effect of the business?—A. O, no; temperate men are very healthy.

Q. I do not care, Mr. Friedlander, to repeat in detail what we have gone over with so many witnesses. If there is any suggestion you want to make in addition to what I have inquired, please do so.—A. I have set up the theory that the fish have left poorer feeding grounds to exchange them for better ones. It is a natural habit, in fact, for men as well as beasts. Now you take those Dutchmen who come over from the other side, they leave poorer feeding grounds and come over to this country for better ones, and so, I think, it is with the menhaden. I ascribe their departure from the east end of Long Island and from Maine to the leaving of the food, because there is no scarcity of fish. If there was a scarcity of fish I would say they have gone away or have been destroyed by the elements; but there is no scarcity of fish. Captain Wilcox last night told you he never saw so many fish as long as he has been in the business as he saw last week out one day off Fenwick's Island; that shows there are fish somewhere. So there is no scarcity of fish, and Professor Baird seems to agree with my view that the fish have left poorer feeding grounds for better ones. It is one of the conclusions that they must be on good feeding grounds. We had last year an average of oil of probably two gallons to the thousand; we have this year an average of five and a half or five and three-quarters, and sometimes six gallons.

Q. To the same number of fish?—A. To a thousand fish. So it is *prima facie* evidence that the fish must be on better feeding grounds. The fish are going south now. Our boats loaded up on Monday off Fire Island with fish that came from the east somewhere. They have not been on the eastern coast, but they must have come probably from off-shore; there was last Monday a large body of fish off Fire Island. Mr. d'Homergue got 500,000 on Monday, and these fish are not half as good as those caught south; so it is evident the south is where the best feed is, and all our theory about where the fish are or might be is all guess-work, without any facts.

As far as catching food-fish is concerned, our men are sometimes mistaken. The indications are for a school of menhaden, and they set for them and find they are weakfish. Sometimes they catch bluefish, but then they do not destroy them, for they are not like these sporting fishermen, who the more they catch the happier they are, and take a few home and destroy the rest. They sell them to the smackmen; take them to the market; they are sold. If they are not sold for \$2 a basket they are sold for 50 cents. Last year it happened that three boats were mistaken the same way, and they caught over a hundred tons of weakfish. They all came to the market.

Q. What market?—A. Fulton market. They tried to sell them there; it broke the prices down to almost nothing; the Fulton marketmen took all they could. We sold first at \$2; that broke the price to \$1.50; then to \$1, then to 50 cents, then to 25 cents, and finally we told the captain: "We do not want it said that we destroy fish; give every one the fish they want for nothing." And after that staid an hour giving away all the fish we could; and said, "You take the rest to the factory." As far as this destruction is concerned, there is a great quantity de-

stroyed in Fulton market every day; the health commissioners condemn them and they are brought here to the island, where the dead horses are brought.

Q. What do they do with them?—A. They make fertilizer out of them, a very great quantity every day, destroyed by the board of health.

But I beg to be understood that the fishermen do not want food-fish at all. They only take them by mistake, and they always suffer by it, because it is no gain to them to catch them. On the other hand, I should think that the menhaden fishermen, carrying on the business as a business and not sport, have a perfect right to fish for whatever fish they want. If they are food-fish they have a right to sell; if they are menhaden they have a right to bring them to the factory. But they have a right to catch whatever they want to, and I do not think that right should be curtailed.

The CHAIRMAN. So far as that is concerned, the only question is, whether legislation may not restrict the means by which you shall capture food-fish. That is the only point. Of course your right to take food-fish must be universal with all the rest of the people; but the point is, whether you ought to be permitted to take them with the particular structure of seine you use. We in New York State, for instance, prohibit the capture of fish by certain descriptions of seines—any other way than by hook and line. In other respects we absolutely prohibit the taking of fish at certain seasons of the year in any way whatever; brook trout, for instance, during the spawning season, and lake trout. We absolutely prohibit the taking of lake trout from the time the spawning season commences until it is over. Then we limit it so that they shall not be caught with seines or gill-nets. Now, the question presented is, whether you may not be restrained from taking food-fish with the kind of nets you use to capture menhaden.

The WITNESS. Now, the idea is to catch these fish for food only, and not make fertilizer of them. As long as the people have the benefit of them it would seem to make no difference who catches them. Our men never catch food-fish purposely. As I said before, they do not want to catch them, but if they do catch them, and bring them to the market, it seems to me the people have the benefit of it, and it does not make a particle of difference to the fish on this coast whether a hundred tons of fish are caught, more or less.

Q. What is the difference, if any, in productiveness, in your business, between a thousand menhaden and a thousand bluefish of the same size; which produces the most?—A. The menhaden are worth twice the value, at least.

Q. Of the bluefish?—A. Twice the value of the bluefish. A bluefish has no oil, while the menhaden has about $2\frac{1}{4}$ gallons to a thousand.

Q. You get 5 or 6 gallons of oil now where last year you got but 2; do you account for this quantity of oil in any way except the fish are in better condition?—A. They are on better feeding-ground.

Q. That is the reason for it, is it not?—A. Yes, sir.

Q. Have you ever known that difference before?—A. Never; I have never known the difference before.

Q. Have they ever produced as much to you in any season as they do this year?—A. Never in summer. We generally fish on the summer yield about a gallon and a half; that is a very fair average. We have produced this year, I think, over 110,000 gallons on 20,000,000 fish.

Q. The menhaden are poor when you begin to catch them in the spring?—A. Yes, sir.

Q. That indicates they have just left the spawning place?—A. I think so.

Q. And they grow better to the close of the season?—A. They grow better every day.

Q. How is it with the bluefish?—A. Well, the bluefish for our business has no oil at all.

Q. No; but as to their condition?—A. It is the same condition; they are poor in spring and fat in fall.

Now, as far as the seine is concerned, I wish to say that it is my view that to employ nothing smaller than $2\frac{1}{4}$ -inch mesh would promote production to a large extent—not only that these small fish get better and more valuable, but when they grow up they help to produce again, to spawn.

Q. Suppose you were limited in the catching of menhaden from the 1st of July to the close of the season; do you think it would materially diminish the product of your business?—A. It would, to a large extent. Our season itself is short.

Q. How many had you caught this year up to the 1st of July?—A. We have caught in June probably three and a half millions.

Q. How many vessels have you?—A. We had, in June, four steamers.

Q. No sailing vessels?—A. No sailing vessels at all.

Q. Just four steamers?—A. Four steamers. We have now a good many more; we have all of thirty steamers here.

Q. In which you are interested, I mean.—A. Mr. Church brings us the fish, because it is too far for those boats to go home, and I made an arrangement with him to take the fish he brings us. We have got from Mr. Church this summer probably \$30,000 worth.

Q. Mr. Church of Tiverton?—A. Yes, sir.

Q. That is, it was deemed more profitable to take them and manufacture them here than to carry them clear there?—A. Yes, sir.

Q. So as to keep the vessels employed in catching?—A. Keep the vessels continually employed in catching, instead of going home.

Q. Are there menhaden works on the coast of Maine?—A. Yes, sir.

Q. Lying idle now?—A. They are idle now.

Q. Have been idle how long?—A. Since 1879.

Q. When were the first works built on Barren Island?—A. I believe they had works there in 1865, or previous to that.

Q. Before you came to the country?—A. Yes, sir.

Q. How far south are there any menhaden factories?—A. There are large works down on the Chesapeake, and they are catching those very little fish there.

Q. Any south of there that you know?—A. I think not.

Q. You think the farthest south is on the Chesapeake?—A. Yes, sir.

Q. Where are they located?—A. On the Virginia side. Now there they are catching these small fish.

Q. Who is the proprietor of those works?—A. Oh, there are probably ten factories there.

Q. Owned by different parties?—A. By different parties. They are using a small-mesh seine, an inch and a half; about half the size we are using here. They are catching fish about six inches long. Now, I for one ascribe to the catch of these fish down there of late years the comparative scarcity north here.

Q. What do they do with the oil and fertilizer manufactured there at Chesapeake Bay?—A. They ship it to Baltimore, principally.

Q. Is not all of it used in the South among the agricultural regions?

—A. It is manufactured in Baltimore and sent South. Fish manure is one of the principal factors in the growth of cotton.

Q. Can it be used with the phosphates they get in South Carolina?

—A. Yes, sir; they mix them.

Q. How do you estimate the value of your fertilizer compared with the Peruvian guano?—A. Well, there are different views on that. I, for one, taking an analysis of the fish, think it ought to be more productive than the Peruvian guano; and it seems to me that the fishery will develop the value of the fish a great deal more. I think we are only in our infancy.

Q. On what kind of bottom, as a rule, as far as you have observed, do the bluefish run?—A. The bluefish generally keep on rocky bottom.

Q. Can you use your seines on that bottom?—A. No, sir. We have lost many a seine where a captain has been tempted to set right off the Highlands. Between the Highlands and Long Branch there is quite a distance of rocky bottom, and it is sometimes the place where the menhaden stop. Now, they have tried to set there, and invariably lost the seines.

Q. Why is that?—A. The seines get stuck on the rocks, and are torn to pieces. We lost a seine here three weeks ago that cost over \$300, and the captain has been laid up for two weeks waiting for a new seine. The menhaden is very seldom found with the bluefish. The bluefish is the greatest enemy of the menhaden. He seldom feeds on them, but he destroys them. You will sometimes see a school of bluefish going for a school of menhaden, and you will see the water all red with blood. They go for them and kill them and bite them, and leave them half smothered.

Q. Leave them to float on the surface?—A. Yes, sir; you see the water all red with blood. That is what these men tell me. The bluefish does not feed in summer on the menhaden; it feeds more on the fish called the shiney, a narrow white fish. They find these fish principally in its stomach. It is found in very large bodies.

Q. On bluefish grounds?—A. Yes, sir.

Q. And on the same grounds with the menhaden; do you ever take them?—A. No, they go through our seines.

Q. Your seines would not hold them?—A. No, sir.

CONEY ISLAND, N. Y., *September 5, 1882.*

EDWARD WILCOX sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Providence, R. I.

Q. How long have you lived there?—A. I have lived in Providence about five years.

Q. What is your occupation?—A. Fisherman.

Q. How long have you followed that business?—A. As a master for twelve years, and as a hand about three years, I think, previous to that.

Q. Master of a steamer or sailing vessel?—A. Steamer. I have been master of a steamer and sailing vessel both. I have been about eleven years master of a steamer and three years, I think, master of a sailing vessel.

Q. Engaged in the menhaden fisheries?—A. Yes, sir.

Q. Exclusively?—A. Yes, sir, exclusively; that was our business.

Q. Have you ever gone into the business at all of taking food-fish exclusively?—A. No, sir.

Q. As an article for market, I mean?—A. No, sir. I will modify that a little; with the exception of off Charleston, S. C., I did one winter on a snack take food-fish; made that a business one winter; hook and line.

Q. When was that?—A. That was in 1865.

Q. What size seine have you used during this time?—A. I have used them 290 fathoms long and from 100 to 110 feet deep in the middle; those we used on the coast of Maine; we never used a seine as large as that off this coast.

Q. What is a fathom in your understanding?—A. Six feet.

Q. And when the term "fathom" is used in relation to your measurement, 6 feet is what you mean?—A. Yes, sir.

Q. How deep at the ends is the seine? You speak of the depth in the middle.—A. Various captains have different ideas in regard to that. Now, with me, I have what we call the straight; that is, within ten feet as deep on the end as in the middle.

Q. Are your seines whole or in two pieces?—A. Whole.

Q. And go at the end around a school of fish and bag at the bottom? I suppose that is the process.—A. Well, we go around and gather them up in the middle of the twine.

Q. How many menhaden, or how many fish of any kind, can you take at a single haul, as you call it, with such a net as you have described?—A. The most that I have ever taken at one set was 1,032 barrels; that would be about 310,000 fish.

Q. What size mesh do you use?—A. On the coast of Maine we used a 3-inch mesh and on this coast we use 2½.

Q. Two and five-eighths when made or when shrunk?—A. Two and five-eighths when it is made.

Q. They shrink somewhat, I suppose?—A. Not but a very little; they shrink very little.

Q. How long is it since you have fished on the coast of Maine?—A. Four years ago.

Q. Do you know of any menhaden fishing on the coast of Maine since that?—A. No, sir.

Q. They have disappeared from there?—A. They have disappeared wholly. I think the next year after they disappeared so that we did not take them, there were about two hundred barrels taken; that is all there was taken to my knowledge.

Q. As a rule the menhaden on that coast were larger than the menhaden you are taking in New Jersey, were they not?—A. Sometimes we used to have small fish down there; that is, fish that would gill in our seines. We used to see very often schools of those fish that would compare very favorably with the same we are taking here.

Q. With that large mesh did you have a stronger twine?—A. No, sir.

Q. The same size twine?—A. We used rather a smaller twine than we use here, because the seines were so much larger that if we used the same sized twine it would make them very heavy and make them hard to handle.

Q. Could you take a school of bluefish with one of your seines that you are using now—could you capture them and take them to your boat?—A. We might take part of them, but could not take the whole.

Q. Why not?—A. Because they would eat the seine all to pieces.

Q. The seine is not strong enough to hold them?—A. No, sir; not to hold any body of them. Of course, if there was a few scattering ones it would be stout enough to hold them.

Q. If they had peaceable neighbors?—A. Yes, sir.

Q. Where, during the last four years, have you taken fish?—A. On

the coast here, from Newport to Fenwick's Island; that is about thirty miles below Cape Henlopen.

Q. Where the present season?—A. Along the Jersey coast and the Long Island coast.

Q. The Long Island coast; in the sound or outside?—A. Outside.

Q. What is the size of the menhaden you are taking this year?—A. They are very large compared to previous years, as an average.

Q. That has been so through the season?—A. Yes, sir.

Q. How far south have you taken any fish here?—A. I have taken them about 5 miles below Fenwick's Island.

Q. Where is that?—A. It is 30 miles below Cape Henlopen. I do not know whether it is on the coast of Delaware or whether Virginia strikes in there. I do not know the exact distance. I have never noticed on the chart.

Q. Do you find the menhaden more or less numerous than previous years?—A. The past two weeks, in fact, last week, I think I saw more menhaden in one day than I ever saw in any one day before in my life.

Q. Where was that?—A. That was down below the capes of the Delaware, from Cape May to Fenwick's Island.

Q. How were they as to size?—A. They were large fish, but not as large as our Maine fish—not equal in size to those we used to take on the coast of Maine; those were very large fish.

Q. Do you ever see any small fish?—A. Oh, yes. Now, the captain of my second gang yesterday made a mistake and run the boat on to a school. They were so near the large-sized fish that he run a boat right on to them and supposed they were large fish; but they proved to be fish about two-thirds grown, I think, and we went right to work and let the boats go apart and poured them all out.

Q. Now how is the fact? Do you or not take more or less food-fish in catching menhaden?—A. Very few; we do not take enough to eat on the table—not as many as we would like to have aboard the boat to eat.

Q. Have you found that so during the whole period you have fished?—A. Yes, sir.

Q. I suppose in the process of gathering them into the boat with your scoop or shovel, whatever you term it, some fish of that description might be thrown in and escape observation?—A. It very rarely occurs; it does occasionally. I have known of cases where they would get in that way, but whenever it has been that way, when they get to the factory the factory men take them all out; but it very rarely happens.

Q. How many menhaden have you taken this season?—A. My best catch was a little over 29,000 barrels; 30,000 barrels one season.

Q. But this season, so far?—A. About 24,000 barrels.

Q. Now how many food-fish do you think you have caught this year? The WITNESS. In weight?

Q. Yes, or in number either.—A. Well, we may have taken a hundred possibly.

Q. What fish?—A. Bluefish principally. We get cod occasionally; one or two cod, but principally bluefish.

Q. Off this coast?—A. Yes, sir.

Q. I did not suppose cod ever came here?—A. Oh, yes; we get them quite often, take it along in the fall. Maybe in the course of the fall we get a dozen or so when they are plenty.

Q. When, according to your observation, do menhaden spawn; what month?—A. I think they spawn principally in the winter. I think there

are some that spawn in the summer; a very few, but I think there are some.

Q. By what month do they get through spawning as a general rule?—

A. I have not examined that closely enough to understand. All the reason why I think some spawn in the summer is, a few years ago down in Narragansett Bay we saw little fish, and I think they must have spawned there—fish half as long as your finger—but I have never seen any of the fish that appeared to be very heavy with spawn except in the fall. Along late in the fall, when we used to fish in Provincetown—that is, when we first commenced this steam fishery on the coast of Maine—we would go down there about the 12th of June and fish there until the last of September, then go back and stop at Provincetown, and fish there until about the 20th of October, and there once in a while we used to take a school that were quite heavy with spawn. I think those were the heaviest with spawn I ever examined.

Q. What time do you commence fishing?—A. From the 18th or 20th of April until the 1st of May, whenever we can get ready.

Q. The last quarter of April, then?—A. Yes, sir.

Q. In what condition are the menhaden at that season?—A. They are poor.

Q. And they continue to improve how long?—A. As long as we take them, until they disappear. We always consider the last that is taken the fattest; it is most always the case.

Q. That is why you think they spawn earlier; that is what makes them poor, I suppose?—A. I am inclined to think so; yes, sir.

Q. Where do they spawn; have you any idea about that?—A. I do not know; that is something I never made a study.

Q. Whether they run into shoals to spawn or bays?—A. I think they spawn at sea, and my opinion is that they spawn on one side of the Gulf Stream, south, along Hatteras.

Q. You think they go there to lay their eggs?—A. I think so.

Q. At what season do the bluefish spawn?—A. I do not know; I think, though, the summer months, because we take small bluefish on the coast here. We usually see them in September and October; little bluefish, say six inches long, perhaps.

Q. When are the bluefish in best condition?—A. In the fall.

Q. They are poor in the spring?—A. Poor in the spring, very. Many fishermen do not consider a bluefish fit to eat until along the last of August or the first of September.

Q. Where are your works?—A. Barren Island.

Q. What amount of capital have you invested; you and your company?—A. We have got six steamers and one factory; we have just had one built which cost \$30,000, and I suppose the others would average \$15,000; I suppose about \$150,000; somewhere near that. The six steamers I should think are worth \$150,000, probably; and the factory I do not know much about.

Q. Do you find a ready market for your oil and scrap?—A. Yes, sir.

Q. There is a demand for all you can produce?—A. For all that can be manufactured, yes, sir. They are very eager for it, too.

Q. How do you think it compares with the Peruvian guano?—A. I think it is superior, and amongst our Rhode Island farmers they think there is nothing equal to it.

Q. They prefer it?—A. They prefer it, especially for early potatoes; they think there is nothing equal to it.

Q. Now, if there is anything you want to suggest you can do so. I have asked all the questions that occur to me that are essential to the

inquiry we are making.—A. Well, this great trouble has been started, in my opinion, principally by sporting men. Now, the view I take of this thing is this: They claim that we, as menhaden fishers, are catching up what they call "the grass of the ocean"; that is, what food-fish live upon. They claim, as I say, that we are catching up these fish that the food-fish would live upon. Now, they cannot produce any evidence that will prove such is the case. I admit that bluefish feed on menhaden; they do feed on them when they are around, but they feed on other fish, too. Now, in 1877 was when we had our last season in Maine. We had good fishing on the coast of Maine, as good as I ever saw, about. Our catch was as good as the average catch of any year, and the menhaden disappeared as though they had been swept off by a broom. Years heretofore it has been very rare that bluefish were at the northward of Cape Cod, and the year that the menhaden disappeared from the coast of Maine, there never was such a body as was that year in the Gulf of Maine. There was not a menhaden around there anywhere. Now, I have talked with the hook and line fishermen and these bluefish fishermen, and they tell me that they never saw a better year for bluefish than the present year. That is their statement, and they come off very frequently to us for bait. There has been quite a number of boats come to me, and my first question has been, "Did you sign a petition to stop us fishing last year"? They say, "No, sir." I say, "We have come to the conclusion as fishermen that if you are disposed to try to deprive us of the right to take menhaden, you must stand on your own bottom and we will stand on ours. You say you did not sign the petition—who did?" They say, "The farmers and men up back here who did not know anything about what they were signing." The Jersey fishermen say they would rather we would fish than not, because they can get bait from us when they could not get it any other way.

Now, in regard to the disappearance of the menhaden from the coast of Maine, no one knows the cause, not even Professor Baird. As far as the study of menhaden goes, I think it is in its infancy. Of course I have my theories and others may have theirs; but, as far as knowing, I do not know any more than you do. My theory is it was either the feed or the temperature of the water that kept them away from the coast of Maine; nothing else. This year I saw, a short time ago, a piece in a paper in regard to a gentleman fishing at Newport for bass, in which he says: "We cannot catch bass because these pesky steamers have caught all the menhaden," while at the same time there was a notice that they were taking them at Cuttyhunk, and yet there had not been a menhaden there for two years. There are times when menhaden are scarce, but when it is that way you are sure to find them somewhere else, in another location; but they raise this cry; and there are times when there is a little scarcity of food-fish, and they will turn right around and attribute it to the first thing that comes in their mind.

Now, as far as taking food-fish in our nets is concerned, it is something we never try to do; we do not want to do it, especially bluefish; they are the worst things we can have. I know one night in Narragansett Bay—we used to go out near Gould Island to fish at night; we had landed 4,800 barrels that week—one night we supposed that we had menhaden the same as before, but the result was we caught sixty barrels of bluefish, and they ruined the seine so that we could not use it. It was all done by mistake. Such things as that will occur. There are times when bluefish will play the same as menhaden, but as a general thing we shun them the same as sheep would wolves.

So far as taking bluefish is concerned, these men will go off the Jersey shore to catch a mess of fish to eat; they do not want them; the neighbors do not want them; there are more fish left right in their boats and thrown away than we would catch. They destroy more in one year than we would in ten; that is, as far as my judgment goes. Bluefish do feed on menhaden when they are around, and a school of menhaden is just the same as a flock of sheep would be with a flock of wolves around them; they drive them out of water; drive them anywheres.

Q. The blue-fish will not injure your nets as bad as sharks, will they?
—A. A great deal worse; we would rather have sharks. A shark will go up and take a piece of twine right out, averaging about as large as my hat, brim and all, and we can see that hole right off; but bluefish will bite and will make a hole about 6 inches square; but they mangle the twine all up; cut it so that you mend the seine all over and think it is right after they have bitten it, and you go over it and find it just as bad as it was in the first place; but a shark makes a hole large enough to see, and we can mend it right away.

Now I have some affidavits here, if you would like to have them, signed by different captains, who went before a notary public.

The witness submitted the following affidavits:

To Capt. CHARLES D. REEVES:

Will you please answer the following questions and make oath to the same, and return it to me and oblige,

Yours, truly,

S. S. HAWKINS, *Jamesport, N. Y.*

1. How long have you been engaged in the menhaden fishery as a captain? One and one-half years.

2. Assuming that menhaden are not edible fish, do you ordinarily, taking the season through, get edible fish enough to supply the table on your vessel? We do not.

3. Do you ever look for, or set your seines for, edible fish? We do not.

4. How often has it occurred that you have found edible fish in your seines, more than sufficient to supply your table on the vessel; and when it has so occurred, what have you done with them? Do not remember of finding more than enough to supply table.

5. Have you ever found bluefish with menhaden, except as they are chasing or worrying the menhaden? I think not.

6. Do you ever set your seines except you see a school of menhaden to surround? No.

SUFFOLK COUNTY, ss:

Capt. Charles D. Reeves, being duly sworn, says that the foregoing statements subscribed by him are true to the best of his knowledge and belief.

CHARLES D. REEVES.

Sworn before me this 30th day of July, 1882.

S. B. HORTON,
Justice of the Peace.

To Capt. JEREMIAH S. BIGGS:

Will you please answer the following questions and make oath to the same, and return it to me and oblige,

Yours, truly,

S. S. HAWKINS, *Jamesport, N. Y.*

1. How long have you been engaged in the menhaden fishery as a captain? Seventeen years.

2. Assuming that menhaden are not edible fish, do you ordinarily, taking the season through, get edible fish enough to supply the table on your vessel? No.

3. Do you ever look for, or set your seines for, edible fish? No.

4. How often has it occurred that you have found edible fish in your seines, more than sufficient to supply your table on the vessel, and when it has so occurred, what have you done with them? Very seldom, when occurring have—

5. Have you ever found bluefish with menhaden except as they are chasing or worrying the menhaden? No.

6. Do you ever set your seine except you see a school of menhaden to surround? Do not intend to.

SUFFOLK COUNTY, ss:

Jeremiah S. Biggs, being duly sworn, says that the foregoing statements subscribed by him are true to the best of his knowledge and belief.

JEREMIAH S. BIGGS.

Sworn before me this 3d day of July, 1882.

S. B. HORTON,
Justice of the Peace.

To Capt. SAMUEL G. BAILEY:

Will you please answer the following questions and make oath to the same, and return it to me and oblige,

Yours, truly,

S. S. HAWKINS, *Jamesport, N. Y.*

1. How long have you been engaged in the menhaden fishery as a captain? Ten years.

2. Assuming that menhaden are not edible fish, do you ordinarily, taking the season through, get edible fish enough to supply the table on your vessel? We do not.

3. Do you ever look for, or set your seines for, edible fish? No.

4. How often has it occurred that you have found edible fish in your seines, more than sufficient to supply your table on the vessel, and when it has so occurred, what have you done with them? Not very often. When it has occurred we have salted them down.

5. Have you ever found bluefish with menhaden except as they are chasing or worrying the menhaden? I have not.

6. Do you ever set your seine except you see a school of menhaden to surround? Do not intend to.

SUFFOLK COUNTY, ss:

Samuel G. Bailey, being duly sworn, says that the foregoing statements subscribed by him are true to the best of his knowledge and belief.

SAMUEL G. BAILEY.

Sworn before me this 3d day of July, 1882.

S. B. HORTON,
Justice of the Peace.

To Capt. EVERETT JONES:

Will you please answer the following questions and make oath to the same, and return it to me and oblige,

Yours, truly,

S. S. HAWKINS, *Jamesport, N. Y.*

1. How long have you been engaged in the menhaden fishery as a captain? Seven years.

2. Assuming that menhaden are not edible fish, do you ordinarily, taking the season through, get edible fish enough to supply the table on your vessel? We do not.

3. Do you ever look for, or set your seines for, edible fish? I never do.

4. How often has it occurred that you have found edible fish in your seines, more than sufficient to supply your table on the vessel, and when it has so occurred, what have you done with them? Very seldom.

5. Have you ever found bluefish with menhaden except as they are chasing or worrying the menhaden? Never.

6. Do you ever set your seine except you see a school of menhaden to surround? We do not.

KINGS COUNTY, ss:

Everett Jones, being duly sworn, says that the foregoing statements subscribed by him are true to the best of his knowledge and belief.

EVERETT JONES.

Sworn before me this 3d day of July, 1882.

JACQUES S. STRYKER,
Notary Public, Kings County.

To Capt. CHARLES L. SIMMONS:

Will you please answer the following questions and make oath to the same, and return it to me and oblige,

Yours, truly,

S. S. HAWKINS, *Jamesport, N. Y.*

1. How long have you been engaged in the menhaden fishery as a captain? One year.

2. Assuming that menhaden are not edible fish, do you ordinarily, taking the season through, get edible fish enough to supply the table on your vessel? We do not.

3. Do you ever look for, or set your seines for, edible fish? No.

4. How often has it occurred that you have found edible fish in your seines, more than sufficient to supply your table on the vessel, and when it has so occurred, what have you done with them? Have not taken any.

5. Have you ever found bluefish with menhaden except as they are chasing or worrying the menhaden? No.

6. Do you ever set your seine except you see a school of menhaden to surround? No.

CHARLES L. SIMMONS.

HUDSON COUNTY, NEW JERSEY, ss:

Charles L. Simmons, being duly sworn, says that the foregoing statements subscribed by him are true to the best of his knowledge and belief.

CHARLES L. SIMMONS.

Sworn before me this 1st day of July, A. D. 1882.

[SEAL.]

JOHN T. EDWARDS,
Notary Public of New Jersey.

To Capt. C. A. EASTERBROOK:

Will you please answer the following questions and make oath to the same, and return it to me and oblige,

Yours, truly,

S. S. HAWKINS, *Jamesport, N. Y.*

1. How long have you been engaged in the menhaden fishery as a captain? Thirteen years.

2. Assuming that menhaden are not edible fish, do you ordinarily, taking the season through, get edible fish enough to supply the table on your vessel? I do not.

3. Do you ever look for, or set your seines for, edible fish? No; we look to keep clear of them.

4. How often has it occurred that you have found edible fish in your seines, more than sufficient to supply your table on the vessel, and when it has so occurred, what have you done with them? Very seldom more than we want, and when we do we give them to our friends.

5. Have you ever found bluefish with menhaden except as they are chasing or worrying the menhaden? No.

6. Do you ever set your seine except you see a school of menhaden to surround? No.

COOMER A. EASTERBROOKS.

STATE OF NEW JERSEY:

Hudson County, ss:

Coomer A. Easterbrook, being duly sworn, says that the foregoing statements subscribed by him are true to the best of his knowledge and belief.

COOMER A. EASTERBROOKS.

Sworn and subscribed before me this first day of July, 1882.

[SEAL.]

WILLIAM A. LANE,
Notary Public of New Jersey.

To Capt. HENRY FISH:

Will you please answer the following questions and make oath to the same, and return it to me and oblige,

Yours, truly,

S. S. HAWKINS, *Jamesport, N. Y.*

1. How long have you been engaged in the menhaden fishery as a captain? Thirteen years.

2. Assuming that menhaden are not edible fish, do you ordinarily, taking the season through, get edible fish enough to supply the table on your vessel? I do not.

3. Do you ever look for, or set your seines for, edible fish? No; but avoid them.

4. How often has it occurred that you have found edible fish in your seines, more

than sufficient to supply your table on the vessel, and when it has so occurred, what have you done with them? Very seldom; and when it has occurred, put them in market or gave them to friends.

5. Have you ever found bluefish with menhaden except as they are chasing or worrying the menhaden? No.

6. Do you ever set your seine except you see a school of menhaden to surround? No.
HENRY C. FISH.

STATE OF NEW JERSEY,

Hudson County, ss:

Henry C. Fish, being duly sworn, says that the foregoing statements subscribed by him are true to the best of his knowledge and belief.

HENRY C. FISH.

Sworn and subscribed before me this 1st day of July, 1882.

[SEAL.]

WILLIAM A. LANE,
Notary Public of New Jersey.

CONEY ISLAND, N. Y., *September 6, 1882.*

SAMUEL B. MILLER sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Ninety-three Henry street, Brooklyn.

Q. What is your occupation?—A. The fish business.

Q. How many years have you been engaged in it?—A. Forty-nine past.

Q. As a dealer?—A. As a dealer since I was of age; I went there when I was thirteen years old.

Q. Have you ever had any experience in the catching of fish?—A. No more than fitting out for fishing; nets, boats, &c.

Q. You supply nets and boats for catching what description of fish?—A. The weakfish, bass, and river fish.

Q. Any bluefish?—A. Yes, sir; smacks.

Q. Have you any acquaintance with the system of menhaden fishing?—A. Well not much, some. As they catch them now in purse-nets, I have very little knowledge of it.

Q. What description of seine do you use?—A. We use mostly pounds.

Q. What size mesh?—A. About an inch—an inch and a half.

Q. What is the depth and length of your seines?—A. I cannot tell you. I furnish to the men who handle them, do the fishing, what they require, at my expense.

Q. What description of twine do you use?—A. Sixteen-thread and twelve-thread, cotton.

Q. Can you tell whether you can hold a bluefish in a seine with an inch mesh of that description of twine?—A. I could answer that, about as well as you could handle a runaway horse. That is the way with bluefish. If a bluefish attempted to go through a seine he would go through it; undertook to eat through it.

Q. Cut it, bite it?—A. Yes, sir.

Q. Are you troubled any with sharks?—A. Some, no great deal. We fish inside mostly.

Q. Now you may state what you know, if anything, about the effect of the menhaden fishing upon the quantities and catch of food-fish; what views you have in reference to that question.—A. I believe that it is injurious to the food fish to catch them the way they catch them now. We all know that fish follow the bait. If there is no bait on our coast you will find but very little fish there, and fishing in shore as far as

they fish, it is rather ruinous to food-fish. I had the other day, I suppose, not less than 70,000 pounds of weakfish consigned to me. I took out 10,000 pounds and the rest went to Barren Island. There was enough after the 10,000 pounds were taken out to get, the captain told me, over \$300 at 90 cents a barrel.

Q. What fish were they?—A. They were weakfish; very fine indeed, but there was no way to take care of them. When I had taken out 10,000 pounds here, the balance of them I had no way to take care of; they were heated. Fish will heat lying in bulk without ice.

Q. I suppose you send more or less refuse fish to the factories?—A. We send but a very little. We have some refuse fish we send up to the head dock that comes down into Barren Island. They sometimes arrive in bad order; then they have to be sent to the head dock. But I have noticed when I was some years younger than I am now the fall fishing for bass along the coast was very large, surf bass; we get very few now.

Q. How long has that been so?—A. It has been growing less for the last ten or twelve years. Gardiner's Bay used to be one of our great fisheries; they all claim there that menhaden fishing is done now; bunker fishing we call it. The people engaged in this oil business have a great deal of money invested.

The CHAIRMAN. Yes; we have obtained a very fair account, undoubtedly, of the extent of that business.

The WITNESS. But there is a great deal of money invested in nets and boats that do not pay now; they have had to give it up.

Q. They have had to change their factories. The factories on the Maine coast are lying idle; at least they have not had any fish there for three or four years. So they testify to us. The menhaden seem to be working south. Have you any idea of the spawning season of the menhaden?—A. I have not; I have never studied that up. I suppose Mr. Blackford is better posted in that.

Q. What season do the bass spawn?—A. I take it, in the fall.

Q. And the bluefish?—A. I cannot answer that.

Q. With your seines an inch mesh, how small a fish can you catch?—

A. We catch fish of half a pound, or perhaps less.

Q. Is any of your fishing done with steamers?—A. No, sir.

Q. Nor sail boats?—A. Sail boats, yes, sir; by pounds. All the fishing we do now or have done for the last five or six years has been in Shrewsbury River. That is about done. It has not paid but once for the last five years the expense of fishing.

Q. Have you any opinion as to whether the quantity of bluefish is less or greater now than previous years?—A. It has been less this year; I think considerably less. I do not remember about last year. We were keeping an account of our sales for a number of years. By the wish of Professor Baird we kept the quantities we sold at our market of all kinds of fish; but this year has been very slight so far.

Q. Of bluefish?—A. Yes, sir. The demand for bluefish is very great. Well, it is not very many years since the bluefish became a permanent article of food. They have been increasing, of course, but I can remember when I do not think that 2,000 pounds of bluefish could be sold in the city of New York any day at 2 cents a pound. When we first began to get these large bluefish there were hardly any people knew what they were. We used to sell them for a dollar a dozen, 8 cents apiece, and that was but very little over a cent a pound; the small ones we would sell for 50 cents a dozen.

Q. What do they bring now?—A. If there is a short supply they will bring anywhere from 8 to 12 cents a pound.

Q. What is the ordinary market price through the season?—A. About 5 or 6 cents; 5 cents, we will say, the average.

Q. The captains of four or five of the menhaden fish steamers have testified that they rarely catch food-fish of any kind; it is an exceptional fact if they take them. Have you any knowledge in regard to that?—A. I have knowledge that I received 70,000 pounds from one of Daniel Church's steamers within the last thirty days.

Q. What fish?—A. Weakfish.

Q. Do you remember the name of the captain?—A. His name is Church. I think he is one of the brothers.

Q. Which brother?—A. I do not know any by name except Daniel.

Q. Well, Daniel does not fish.—A. He does not now; has not for a number of years. I have been acquainted with them since they were very young; they are very nice men. He claimed that they thought they were a school of bunkers.

Q. That is, menhaden; they claimed to have taken them by mistake?—A. Yes, sir.

Q. And they were put on the market?—A. There were 10,000 pounds of them put on the market.

Q. What was done with the balance?—A. Barren Island. That is the load I spoke of. I should think there was 70,000 pounds weight.

Q. Do you recollect how long ago it was?—A. It was within thirty days. It is not much more than two weeks ago. I sent a check to Daniel at Tiverton for what he sold here.

Q. With that exception what knowledge have you, if any, as to their taking food-fish?—A. I have no knowledge of their taking any food-fish other than they have sent to market. They have had mackerel and sent them up to market to be sold in the market.

Q. What market?—A. Fulton Market; but I have no knowledge of their taking any that they sent to be tried out, except those that were unfit for sale. They sent these to market, but they could not be disposed of there.

Q. They describe the hold of the ship as a bin 20 feet wide, 25 or 30 feet in length, and 8 feet in depth; and I should judge from their description that they put fish in there at the rate of about a thousand a minute; they estimate their scoop will take a thousand, and say they can throw a scoopful every minute into the hold of a vessel in that way. I suppose food-fish, if thrown in in that way, would not preserve long in a condition fit to use?—A. They throw them right into the hold of the vessel. It is heated. The whole steamer is heated. Then they turn water in on them to cover them.

Q. That is new to me.—A. And when it has lain there some time, they blow it out.

Q. Blow the water out?—A. Yes, sir. If he catches any food-fish, which he does in the spring, fine mackerel, he generally sends them up to me, and we dispose of them.

Q. What captain do you speak of?—A. Daniel; all his captains. These fish were very fine indeed; some they dressed on deck coming up. I took out enough to make 10,000 pounds. It was night; too late to take care of them; and those down in the hold were heated. Next morning there were none taken out; they were unfit for sale; the captain came up to see me, and I told him to haul right out.

Q. I want to inquire, to be general, if food fish are caught with menhaden in their mode of taking fish, whether they would be kept in condition for use as food-fish?—A. Put in the way they put in menhaden,

I do not think those that were 8 inches below the surface would be fit in three hours. I think they would heat in less time than that.

Q. The extent to which they take food-fish, if they take them at all, is not, I suppose, within your means of knowledge?—A. No, sir.

Q. How many have you purchased of menhaden boats this season?—A. I had a smack come up with a load that she took from one of the menhaden steamers, dressed them and put them below and iced them. She was down there and had her ice in; they were brought for market.

Q. Give an estimate, if you can, of the cargoes you have purchased this season?—A. She must have had 15,000 pounds.

Q. From the menhaden boats?—A. Yes, sir; they were in pretty good condition.

Q. Do you mean in addition to the 70,000 pounds you mentioned?—A. Yes, sir.

Q. What description of fish?—A. Weakfish.

Q. Any bluefish?—A. I do not think there were any in that boat. In the 70,000 pounds there were some bluefish; perhaps there might have been 500 pounds. That is all I know of coming to our market this season from any of these menhaden fishermen.

Q. By that you mean the whole of the market?—A. I mean the whole of the Fulton Market.

Q. What is the season of catching bluefish?—A. From the last of July, the most of them, until along in November.

Q. Until cold weather; I suppose they disappear in cold weather, do they not?—A. Yes, sir. We get them sometimes from Virginia later, but none caught along our coast here up North.

Q. I suppose the menhaden disappear about the same season?—A. I cannot exactly say, for I have not kept the run of the menhaden.

Q. You do not know enough of their habits to speak of them?—A. No, sir; something we never handled, and never think anything about them.

Q. The Messrs. Church, Daniel Church and his brother, testify that they had not seen so many menhaden in, I think, twelve or fifteen years as they have seen this season, but that they are smaller and farther south than they have ever known them before; as far south as South Carolina; very numerous along the Delaware coast.—A. He told me some few weeks ago that they were away behind; they had lost a good deal of money so far this season; but I asked his captain when he was there with those weakfish how he was making out, and he said they had done a great deal better lately.

Q. I understand the catch within the last week or ten days has been largely increased; a larger class of fish?—A. What I have seen in New York I thought were very nice.

Q. Do you know or have you any opinion upon what description of fish the bluefish feed?—A. I think they feed mostly on menhaden.

Q. One witness has stated to us that there is a shiney, I think is the name he gave the fish, a bright, silvery fish, which is often found in the bluefish, and he thinks they feed largely on them. Do you know that description of fish?—A. I am not acquainted with the shiney. I think if bluefish are hard run for food they will feed on one another. It has been for a number of years my opinion that when a school of bluefish strike a school of menhaden they gorge themselves with food and settle down. Why I think so is, we will frequently find plenty of bluefish on the coast, any quantity, and a day or two from that there are none to be seen. I think they settle away until they get rid of them, which

may be a day or a couple of days, and come up and go in again. There is no better bait than ever I found for food-fish than menhaden.

Q. I understand that fishermen, as a rule, want the menhaden for bait?—A. For almost any fish; codfish. About all our bluefish fishermen out here at the Hook have to get menhaden for bait.

Q. They get it from the menhaden vessels, I suppose?—A. Yes, sir; or from the net fishermen, alongshore fishermen.

Q. Can you catch menhaden anyway except with the seine?—A. Oh, you catch them with set-nets.

Q. Yes, but will they bite a hook?—A. I think not.

Q. They are not a fish that can be caught with a hook?—A. Most any fish can be caught with a hook. It was my idea for a great many years that shad could not be caught with a hook.

Q. Well, it takes a pretty ingenious man to catch them.—A. I know; but Mr. Green says he has caught many.

Q. Yes, and he can catch whitefish in our lake; but the mass of fishermen do not do it; ordinarily you cannot catch shad or whitefish with a hook and line, as far as I have seen, and I did not suppose the menhaden or herring could be caught with a hook and line.—A. I have never known of any being caught with a hook and line.

Q. How are herring taken?—A. In seines, nets, pounds.

Q. Have you done anything at that?—A. No, sir; most of the herring are caught south.

Q. Mackerel are caught with nets?—A. Mackerel are caught off here about the same as menhaden; for a great many years they caught them all with a hook and line.

Q. They can be caught with a hook and line?—A. Oh, yes; you can catch them about as fast as you can take them off the hook.

Q. They are now taken with seines, are they not?—A. All taken with seines now; that is around here. They catch them some east with hook and line.

Q. The menhaden fishermen stated this: that a shark will go through a net, make a simple hole, and they can see and mend it without trouble, whereas if they catch bluefish in the net they chew it up and practically ruin it.—A. I suppose that if they catch a shark they catch one fish, and where he attempts to go through he goes through; but when they attempt to catch a bluefish there may be three or four hundred, and they bite here and snap there.

Q. And weaken the nets in that way?—A. Oh, it ruins the nets.

Q. They stated another thing, that the bluefish are ordinarily found on rocky bottoms as a rule, and that they cannot use their nets on those bottoms; they cannot gather them; cannot bag them, as they term it?—A. I do not think that a bluefish is found in any one spot any great while. He is not like a codfish or blackfish.

Q. Now in our lakes, as a rule, bass are found on rocky bottoms; how is that here?—A. It is so here.

Q. But you think it is not so with bluefish?—A. I think a bluefish is a good deal like mackerel, he keeps right along.

Q. Hunting for bait?—A. Yes, sir.

The CHAIRMAN. Mr. Blackford, if you have any suggestions to make as to questions to this witness, I would be glad to have you do so. I would like you to address the questions yourself.

Mr. EUGENE G. BLACKFORD. Mr. Miller, do you recollect a very large catch of weakfish that was brought by two or more steamers into Fulton Market slip about a year ago.

The WITNESS. Yes, sir; I remember.

Mr. BLACKFORD. Can you give any idea as to the total quantity?

The WITNESS. I cannot.

Mr. BLACKFORD. Approximately?

The WITNESS. I took no interest in them whatever.

Mr. BLACKFORD. Do you recollect how many loads came to Fulton Market slip?

The WITNESS. I do not.

Mr. BLACKFORD. But you knew of an immense quantity?

The WITNESS. Yes; on one occasion I knew of an immense quantity.

By the CHAIRMAN:

Q. What season of the year was it?—A. In the fall.

Q. Last fall?—A. I think it was in the month of either August or September.

Q. 1881?—A. 1881. We have had these fish before. I think two or three years ago, on one occasion, we had a load of weakfish in very good order. We took them right out as soon as they arrived. There was not so many of them, but they were in very nice order.

Mr. BLACKFORD. Do you know of a large proportion of those fish being sent away from the slip on account of their being unfit for food?

The WITNESS. The last season?

Mr. BLACKFORD. Yes.

The WITNESS. No, sir; I know very little about them. I did not get down there to see them, but this year I know all about this load. It was something I had to know about.

Mr. BLACKFORD (to the chairman.) Has Mr. Miller expressed his own individual opinion as to the effect of the menhaden fishery as carried on at present upon the supply of food-fish for market; has that question been put?

The CHAIRMAN. I think it has, substantially. Perhaps it is better to repeat the inquiry to make sure of it.

Mr. BLACKFORD. I would like Mr. Miller to give his opinion as to the effect of the menhaden fishery, as at present carried on, upon the supply of food-fish for market; whether it has been to largely diminish the catch or not.

The WITNESS. I think I have stated that. I will state my opinion again.

Mr. BLACKFORD. I would like to have it more clearly done.

The WITNESS. I think it has injured our fall bass-fishing very much. That is only my opinion. I base that upon what I have seen from the last fifteen years down to the present time.

Mr. BLACKFORD. Is it not a fact that the striped bass are scarcer during the present season than ever before in your knowledge?

The WITNESS. Than ever before in my knowledge; and we used to have a fall bass; expected a great catch, but they grow less every season.

By the CHAIRMAN:

Q. They are a very desirable fish, are they not?—A. They are a very desirable fish.

Q. More so than the bluefish?—A. Yes, sir; the demand is not so great for them, but they are something extra; an extra fish. They would stand a better price than bluefish.

Q. What is the range of the price?—A. This year what we call boiling bass have ranged from 15 to 20 cents a pound wholesale.

Mr. BLACKFORD. Speaking about the fish not being so desirable, you

mean by that that the supply is not so great, and the price is so high that it puts it out of the reach of a large class of people?

The WITNESS. Not only that; but I think that if the same quantity of bass was thrown on the market that there is of bluefish they would not fetch any more than bluefish. The same with salmon. You could not throw the same amount of salmon on our market and get the same price that bluefish brings, except for the purpose of preserving.

By the CHAIRMAN:

Q. What is the ruling price of salmon this season?

The WITNESS. Frozen or fresh?

The CHAIRMAN. Fresh salmon.—A. They have been sold all the way from a dollar a pound down, I think, as low as 15 or 16 cents.

Q. The general price through the season is higher than bluefish or striped bass?—A. Oh, yes.

Q. The striped bass is a fall fish, is it not?—A. Yes, sir; a fall and winter fish, we consider it.

Q. What is the range of price of fresh mackerel?—A. It would be pretty hard to answer that question except you go into the sizes; all the way from 40 cents a hundred up to \$12.

Q. They are sold by the piece?—A. Yes, sir. There are a dozen sizes of mackerel, perhaps, or half a dozen.

Q. About what do they average a pound?—A. I should suppose about 6 cents a pound, take the season through; 5 cents, perhaps, would be as much as they would average.

Q. Now you speak of the menhaden fishery and the effect it has had in your judgment upon the catch of striped bass; what do you think as to its effect upon the catch of bluefish?—A. I think it injures the catch. I think it drives them off. It breaks up the schools of menhaden which these same schools of bluefish are following.

Q. How about its influence upon the catch of mackerel?

The WITNESS. Fresh mackerel?

The CHAIRMAN. Yes.—A. I do not think it affects them much here in the spring. It may in the East very much indeed, but we get no mackerel here at all after the menhaden get to running.

Q. They are caught earlier?—A. Yes, sir; we get our mackerel here from April up until along in June. Then they get east further; we lose them here.

Q. These fish are dressed, more or less, at your market, are they not?—A. Not at the market. They are brought there dressed. The vessels dress them before they are iced down in the vessel.

Mr. BLACKFORD. Allow me to explain as to dressing; it is merely eviscerated.

The CHAIRMAN. I was about to ask if he ever observed the food that is found in them when they are opened; in bluefish, for instance. Of course, I suppose, opening a bluefish would indicate what it has been feeding on.

The WITNESS. I think I have opened bluefish that I have found menhaden in; half a menhaden; sometimes more; two or three chunks; but there are very few bluefish dressed at our markets. The vessels dress them and put them right below.

CALEB HALEY sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. I am in Brooklyn part of the time, but my residence, I claim, is Groton, Conn.

Q. Where is your place of business?—A. Fulton market.

Q. How long have you been engaged there?—A. I have been engaged in business myself since 1859; that will be twenty-three years.

Q. In the purchase and sale of fish, I suppose?—A. Yes, sir.

Q. Have you ever had any experience in catching?—A. No, sir.

Q. No description of fish?—A. Nothing more than catching a few fresh-water fish when I was a boy.

Q. Have you any knowledge of the menhaden fishing?—A. I have no knowledge except what we hear and see of them.

Q. What you see and what you learn?—A. Yes, sir.

Q. Did you ever eat a menhaden?—A. I think I have.

Q. Did you like it?—A. Well, I cannot say I do.

Q. The object of my inquiry is to ascertain whether you think they are a desirable food-fish, or a proper fish is perhaps the better question; a fish that if it was put upon the market the public would buy at all.—A. It would depend very much on circumstances about their being an article of food. I was South at that time that I ate one of them. This was salt, and it is a very common thing for them to salt them.

Q. My inquiry was rather addressed to the point of whether they are a proper fish for sale as fresh fish.—A. I should think they were. I should think they were a proper fish to be classed as food-fish.

Q. What are the principal fish in which you have dealt for this period of time?—A. All salt-water fish and fresh-water fish.

Q. Name the leading kinds of fish in which you have dealt; instead of saying "all kinds" give the names.—A. Halibut, codfish, bluefish, haddock, striped bass, sea bass, black bass, what we call white bass or speckled bass, the eel, lobster, salmon, smelts, porgies, weakfish, blackfish, mackerel, Spanish mackerel, flounders, suckers; we have a whitefish; I do not think I have mentioned that; the cisco, pickerel, pike, salmon-trout.

Q. Do you get brook trout for your market at all?—A. Oh, yes.

Q. What is your judgment with reference to the supply of bluefish for the purposes of market now or for the past half dozen years, say, as compared with the supply when you first began business?—A. When we first began business there were some kinds of fish—

Q. I am speaking of bluefish alone. I address my question to that kind of fish alone first.—A. I do not think it is up to what it was even five years ago in quantity.

Q. At the present time?—A. No, sir; and some years there has been very much less.

Q. How many years is it since you began to deal generally in bluefish as a market fish?—A. It has been since I commenced in business mostly; there were not a great many bluefish when I first began; bluefish were not very popular.

Q. How many years is it since they began to rule in the market as a desirable fish?—A. I should say ten years.

Q. How is the supply now as compared with the supply at that time, greater or less?—A. It is less, for the simple reason that vessels that went south to seine them have not found them.

Q. Are they caught in seines?—A. Very much have been. A few years ago when vessels first introduced it, going down with seines, there appeared to be a good supply.

Q. Do you know what description of seine they use to catch bluefish?—A. They use from four to six inch mesh; it is stout cord.

Q. What size twine?—A. I could describe the size but—

Q. It is a much heavier twine than is used in menhaden or mackerel, I suppose?—A. Oh, yes.

Q. A net adapted to catch that kind of fish?—A. Yes sir.

Q. I supposed they were only taken with hook and line; I never heard before of catching with seines.—A. Oh, yes.

Mr. SAMUEL B. MILLER. I would like to ask whether these fish are meshed or gilled. I have always been under the impression they were caught the same as shad.

The CHAIRMAN. In what we term "gill nets."

Mr. MILLER. Gill nets. There is certainly no 4-inch mesh unless it is a gill net.

The WITNESS. I recollect ordering the seines. I know some of them discovered, after they had got them, that some had them too small and some had them too large.

By the CHAIRMAN:

Q. Were they seines or gill nets in fact?—A. I do not think I could say. Perhaps Mr. Miller is right.

Mr. MILLER. I am under the impression they were gill nets; they certainly were if they were four or six inch mesh.

By the CHAIRMAN:

Q. What is the shape of the bluefish?

The WITNESS. They are long.

Q. As to the size of the head?—A. They are pretty large.

Mr. BLACKFORD. It is a well proportioned fish; head not excessively large or small; probably the same proportion of head you will find on a shad.

The CHAIRMAN. Then a gill net would not want a 4-inch mesh to catch them, would it?

Mr. MILLER. Yes. For shad we fish with $5\frac{1}{2}$ now— $5\frac{1}{8}$. We used to fish with a 6-inch mesh for shad. Their head is not as flat as a shad. We measure the mesh when it is drawn out. The bulk of his head, the thickness of it, would take up the mesh.

The CHAIRMAN. By the size of the mesh, you speak of the longest way?

Mr. MILLER. Drawing out from knot to knot.

The CHAIRMAN. All meshes are diamond shape, are they not?

Mr. MILLER. Yes, sir.

The CHAIRMAN. And you speak of the longest way?

Mr. MILLER. Yes, sir.

The WITNESS. I should think four or five years those vessels went South seining.

Mr. MILLER. Why I speak of this is, I have seen those nets hung up to dry, and I took them to be drift gill-nets.

The CHAIRMAN. They could not with safety draw a seine on rocky bottoms, could they?

Mr. MILLER. Not well; and another thing is, if they fished with seines they would not allow them to land in Maryland or Virginia; the law would prohibit them landing there.

The WITNESS. Well, they just surround them.

By the CHAIRMAN:

Q. They fish the same as for menhaden then—take them up in purse-nets? Were they made to gather at the bottom—these nets you ordered?—A. That is the way.

Q. Are they still caught in that way, as you understand it?—A. They

have not found enough there to go after them; they have abandoned that way of fishing for them.

Q. How are they caught now?—A. These vessels are catching them with hook and line.

Mr. MILLER. They raise them the same as they do mackerel, by what they call "chumming"; they grind up these menhaden and just throw it on the water and raise a school of bluefish, and then they will bite.

The CHAIRMAN. They will bite at the naked hook just as well as anything, will they not?

Mr. MILLER. I do not know. I should not be surprised.

The CHAIRMAN. I am told they will—anything that is shining.

The WITNESS. There are times when bluefish will not bite. They get right out of schools and will not bite. Now the bluefish that come from Cape Cod are caught in what they call weirs.

By the CHAIRMAN:

Q. What do you say as to the quantity of fresh mackerel that comes to market; whether that is greater or less now than in former years?—A. I do not know that you can regulate that. Some seasons there appears to be more on the coast than there are at others. This year there was a fair supply.

Q. There is a much larger demand for fresh fish than in former years?—A. Oh, yes.

Q. I mean a demand more than proportionate to the increase of population.—A. I think there is.

Q. That is, people more generally use fish than when you first began?—A. Yes, sir.

Q. Do you get an adequate supply for your market of any of these descriptions of fish?—A. We do sometimes.

Q. Have you had an adequate supply of bluefish this season?—A. Yes, sir.

Q. How has it been generally this season?—A. We have had a fair supply compared with the past three years.

Q. What do you know about whether the menhaden fishers take food-fish?—A. I have heard them say they take more or less in hauling the menhaden.

Q. Aside from their statements, what knowledge have you?—A. I do not know, only we have had these cargoes come in occasionally—weak-fish from the menhaden boat; we had one last year.

Q. What quantity last year?—A. I should say there were from 25,000 to 30,000 pounds in the load.

Q. Were they in condition for market?—A. There was a certain part of them were; the rest were not.

Q. Is it not pretty difficult to determine whether a fish has passed the turning point between being fit to eat and not?—A. No, sir.

Q. By what do you tell?—A. We can tell by the soundness, firmness of the fish, and the looks.

Q. Are the gills left in?—A. Generally they are left in.

Q. Do not they afford a test?—A. They can; some claim to go by the gills, but I do not think it is any test. Often the gills will be perfectly white and the fish perfectly good; the ice turns the gills.

Q. The texture of the fish is what you judge by?—A. Yes; the feel of it.

Q. You spoke of this one occasion last year; what other occasions have you knoweldge of?—A. I should say for the past five or six years,

during the summer, there would be from one to two or three loads come on the market.

Q. From the menhaden boats?—A. Yes, sir.

Q. What description of fish?—A. Usually weakfish. We have had bluefish, but in not large quantities.

Q. Do you get any mackerel from them?—A. We never have, no, sir; but they have often caught them in the fall—the Eastern boats.

Q. I saw a statement the other day, if I remember right, that this is the thirty-third year since the quantity of mackerel was so great as found this year; have you seen anything of it?

Mr. BLACKFORD. That is a fact. The catch this year, up to the present time, has been greater than ever before for about thirty years.

The WITNESS. There is no fish that has disappeared latterly more rapidly than porgies.

By the CHAIRMAN:

Q. How are they caught?—A. They are usually caught in these pounds.

Q. Do you think the menhaden fishing interferes with them?—A. I could not say. The small weakfish have disappeared from the Jersey coast, almost, in the fall of the year. We used to have tons of them up every day. For the last three or four falls there have not been any.

Q. Is not something possibly due to this fact, that so many more persons are engaged in menhaden fishing in the summer and fall than formerly that the fishing for food-fish is not so much cared for?—A. No, not in this part; they have fished for these fish.

Q. You think the effort to catch them continues?—A. Yes, sir.

Q. If you have any opinion as to what the effect of the menhaden fishing is upon the quantity of food-fish upon the coast you may state it.—A. My opinion is they have a tendency to diminish the quantity of other fish.

Q. To what cause would you attribute that?—A. Well, to the vessels, whether they catch those smaller fish, or it is the driving them off the coast; the running of the steamers, where they do run them, around the mouths of those small harbors, inlets, and places.

Q. And it may be caused by diminishing the quantity of food, I suppose.—A. Yes, sir.

Q. Both causes, perhaps, operate.—A. Yes, sir.

EUGENE G. BLACKFORD sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. In Brooklyn.

Q. What is your business?—A. Fish dealer.

Q. How long have you been engaged in the business?—A. Sixteen years.

Q. At what market?—A. Fulton Market.

Q. Have you ever been the superintendent of the market; is not there such an officer?—A. No, sir; there is such an office, but I have never filled it.

Q. You are a member of the State commission of fish and fisheries, are you not?—A. I am one of the commissioners of fisheries of the State of New York.

Q. How long have you held that office?—A. Three years.

Q. You have given some attention, I suppose, to this question of the quantities and habits of fish?—A. It has been a source of study to me ever since I have been in the business.

Q. Please state in your own way what your judgment is as to the effect of the menhaden industry upon the quantity of food-fishes and the reasons for it; I would like to get your theory about it.—A. My attention was called to this fact from parties calling upon me to make complaint to me, as commissioner of fisheries, that the menhaden fishermen were catching food-fishes and carrying them to their factories to be made into oil and scrap. I replied to all those parties that my position as commissioner of fisheries gave me no authority whatever; that there was no law to prohibit that, and no interference would be made with the business. I have noticed, of course, as I have with everything connected with the fish questions coming up from time to time, that the menhaden interest up to within two years was a growing and expanding interest; that the number of boats was increasing year by year; that our coast was fished from Maine to North Carolina persistently from the time the menhaden made their appearance until the cold weather; that those points where the fisheries were commenced and most actively prosecuted seemed to be exhausted after a few years—I speak more particularly of the coast of Maine, where it is called porgy fishery. They call them porgy, which is a different fish from what we know as porgies. It is the menhaden there—and that, from my own knowledge, every year those fishes which feed upon menhaden grow more scarce. The quantity diminishes most notably in the striped bass, and the present year has been one of very marked scarcity in this, one of our choicest fishes. It is not scarce in one particular point, but it is scarce all along the coast where it is usually found. There have been several instances which have been spoken of here, of my own knowledge, where the menhaden vessels have taken large schools of food-fish and have brought them to market. This very large catch of 1881, about a year ago, just about this time of the year, was principally of weakfish. Some four or more vessels came up to Fulton Market with a cargo, a quantity of at least 200,000 pounds, nearly all weakfish, and out of that 200,000 pounds about one-fourth of it was marketed.

Q. Where had they been taken?—A. They had been taken probably not over five miles from where we sit, right along this coast here, the coast of Long Island.

Q. The outer coast of Long Island?—A. As I recollect, it was right in the vicinity of Rockaway they were taken. About one-fourth of those fish were in good condition, fit for food. These are the fish that were lying upon the top layers, so to speak. The fish had been taken and dumped into the holds of the vessels, and, it being very warm weather, heated of course, where they lay packed in underneath with the weight of those on top, and men were put to work discharging the fish, distributing them to every dealer who would take them on consignment to sell. They were sold as low as one cent a pound. There was an effort for immediate distribution of the fish because of the warm weather, and they needed immediate attention to keep them any time. The balance of those cargoes were sent to the factories. The vessels steamed away with them, and they were rendered into oil and scrap.

Q. Do you know to whose factory they went?—A. No, sir. That is the most notable instance. That all the menhaden fishermen would rather bring their food-fish to market than to put them into oil and scrap is a self-evident fact, if they were provided with proper facilities for the care of the fish; if they were fitted for market fish.

Q. Yes, I understand that they are not a desirable fish to manufacture?—A. No, but you take a bluefish in the fall of the year, and it is very fat.

Q. Mr. Friedlander testified that in former seasons they had rarely obtained over two gallons of oil to the thousand fish, while this year they get five to six gallons. How do you account for that, manufactured by the same process?

The WITNESS. With no improvements in the process for extracting any larger percentage of oil?

The CHAIRMAN. None whatever.

The WITNESS. In other words, they get treble the amount of oil?

The CHAIRMAN. Yes, treble the amount of oil they got past years, and he says it has been the rule this season.

The WITNESS. Of course there is only one explanation to that; of course those fish have been where the food has been abundant; the natural food has been abundant.

Q. It simply proves that their condition is better than previously?—A. Yes, sir; you take a bluefish caught in the month of July, it is very poor; you take a bluefish caught now along the coast of Massachusetts, and it is white, hard, and thick; you can preserve that fish in ice two weeks and have good fish, while the early fish would spoil in a night.

Q. Do you know on what the menhaden feed?—A. Well, so far as investigated, their food had been found to be mostly jelly fishes.

Q. Some one has testified that there is a water insect upon which they feed?—A. Mr. J. Carson Brevoort, of Brooklyn, after whom the name of the fish is called the *Brevoort Tyrrannis*, made considerable investigation into their food, and in a number of conversations I have had with him he has often spoken about his finding their stomachs full of these jellyfish.

Q. Do you know what their spawning season is?—A. I know that the fish appear upon our Long Island shore somewhere between the first of April and the first of May, apparently running up close to the shore, and that they are then with spawn in bodies apparently in ripe condition, indicating close to the spawning time.

Q. As we would say, full of spawn?—A. Yes, the stomach distended with spawn, and, unlike many spawning fishes, the fish is not fat at that time,—destitute of oil. The early fish give a very small percentage of oil, I understand, and in about two months after that occurs we find large schools of very small menhaden, of about an inch long. That would seem to indicate that somewhere between the first of April and the first of July is the spawning season for the menhaden upon this immediate coast.

Q. Have you ever seen menhaden as they were caught in the early part of the season in their vessels?—A. I have seen stray specimens—not any quantity.

Q. Do you know whether they had spawned or not?—A. I only found that their spawn was largely developed.

Q. They had spawn in them then?—A. Yes, sir.

Q. Caught how late?—A. I think this was in the vicinity of the 1st of May; about the 1st of May.

Q. What is the spawning season of the bluefish?—A. That is another fish about which we have very little information as to their exact time. We get at it approximately from the appearance of the roe or spawn in the female fish, and from the first appearance on our coast of what are called the little snappers, which are young bluefish two to three inches long. The young bluefish or snappers are just at that time making their appearance on our coast, just showing themselves among the small fish that are brought to market. From what we see in that respect I

should say that bluefish spawn somewhere between the 1st of July and the 5th of August.

Q. Are bluefish caught earlier in the season than that?—A. Yes, sir.

Q. And they have spawn in them?—A. The spawn is not developed in the early bluefish. We find a little string or oversack, as they call it.

Q. How long after a blue fish has shed its spawn would the fish an inch long appear?—A. I cannot answer that accurately, but, approximately, within sixty days we find young bluefish about two to three inches long.

Q. Hatched from spawn?—A. From the time that we noticed this ripest spawn.

Q. You have not experimented with the spawn, then, of the bluefish?—A. No, sir; the bluefish, from its peculiar activity in the water, is a very difficult fish to handle. You cannot keep them confined long.

Q. There has been no effort to propagate those fish I suppose?—A. No, sir; in fact there has been very little effort in the propagation of what are termed sea-fishes.

Q. There has of the shad, has there not?—A. Well, that is what you call an anadromous fish, that runs up the river to spawn.

Q. How soon will the shad spawn run after it is shed?—A. The young shad will hatch out within forty-eight hours after the egg is impregnated.

Q. What is their spawning season?—A. They make their appearance in the Hudson River about the 20th of March, and are found ripe, ready for spawning by the latter part of May in the vicinity of Catskill—north of Catskill.

Q. Now the other part of my question, as to the effect of the menhaden fishery upon the food-fish and the reasons for it; can you state that?—A. In my opinion the effect of the great amount of fishing that is carried on for menhaden all along the coast breaks up the schools of fish which are followed by the striped bass and bluefish, and has a tendency to make those fish seek other feeding grounds. I speak more particularly with regard to the striped bass, as that is a voracious fish on the menhaden. The striped bass ten years ago were found in more or less quantities nearly the entire summer and late in the fall. Very large catches were taken on the Long Island coast, as many as 20,000 pounds per day coming to Fulton Market. That quantity has been steadily diminishing year by year, and this year the scarcity is more marked than ever before. I have my own views as to the proper legislation that should be had for the protection of this particular branch of fisheries, and, if proper, I will speak of that.

Q. I will be glad to have you give it.—A. That would be to make a closed time for the catching of menhaden, extending from the 1st of April to the 1st day of July, or such other dates as this committee might find, after full investigation, to be the time that would cover the spawning season of the menhaden. I have been led to this view of the matter from conversations more particularly with the menhaden men themselves.

Q. You mean to prohibit the taking of menhaden?—A. Yes, to prohibit the taking of the menhaden from the 1st of April until the 1st of July. I think this would be a measure which would do the least injury to the menhaden interests, which we are bound to consider, the large amount of capital and the number of men employed.

Q. And their products are valuable?—A. And their products are valuable, but we believe that the food product for the people should have the first consideration; that that is of more vital importance. Of

the menhaden men with whom I have conversed, there is one particularly, a Mr. Green, who used to own a large number of factories near where I have large fishery interests; that is on the east end of Long Island—Montauk. We used to sell them our menhaden that we caught in our nets there, and he has had to abandon those works and has now gone to North Carolina, because of the unprofitable seasons that they have had for several years past. Mr. Green is a very intelligent man, and has given it as his opinion that such a measure as I speak of would be of benefit, not only to the general fishing interests of the coast, but to the menhaden interest also, as it would allow the fish an opportunity to propagate their species naturally, and would largely repair the waste caused by this over-fishing for the past few years.

The CHAIRMAN. Some of the menhaden fisherymen have stated that the spawning season of menhaden was earlier; was in the winter, before they begin to catch them, as they thought. Their theories are not very harmonious. One of them testified there was nothing known as to the habits of the menhaden in that respect, any more than there was with reference to the habits of the herring as to when or where they spawn. They do not seem to have any very definite theory about it.

Mr. BLACKFORD. Well, I suppose if you see a young child three or four days old, you would form the conclusion that that child had been born recently.

The CHAIRMAN. I take it for granted that it is a subject to which you have given some attention, and speak advisedly.

Mr. BLACKFORD. Yes, sir. The exact months, the exact localities of spawning are not determined.

Q. Whether it is parents or babies does not make so much difference to them so that they get oil?—A. Of course not. We have the young herring sold in our markets, as it is in England, for white bait, and that is the way I came particularly to notice the young mossbunkers, because a lot of them were sent me from Great South Bay to be sold as white bait.

Q. Have you ever seen any of those fish opened to an extent to know what they feed on?—A. Yes, sir; we would often find mackerel in bluefish.

Q. Do you know the shiny, as it is termed?—A. Never heard of it by that name.

Q. It is described as a silvery fish, smaller than the menhaden; about the size of a herring I should judge.—A. Our fishermen along the coast have a certain name which they give to certain varieties of fish, and the word "shiny," of course, is applied indiscriminately to a large variety of fish.

Q. I suppose the bluefish or any other fish would be apt to feed upon such a fish as that if they are to be found in the water?—A. Yes, sir.

Q. What is the color of the menhaden?—A. A bright pale gold with a silvery belly.

Q. A shiny belly?—A. Yes. When first taken from the water the colors are very handsome—beautiful.

Q. What do you think as to their being fit for food?—A. Well, I have eaten menhaden, but I do not like them.

Q. They would not be a marketable fish, I suppose?—A. No, sir; only in the event of all our food-fishes becoming very expensive. They are brought to market and sold to a limited extent, but only to a limited extent.

Q. What is your observation in respect to the quantity of bluefish now as compared with former years?—A. My own opinion, based upon the

quantity that I have observed and the prices that have ruled, is that there has been a slight diminution in quantity, but not in a very marked degree.

Q. How as to the supply of mackerel?—A. The fresh mackerel is a fish that is caught in the same manner a good deal as the menhaden, in these large purse-nets. A great deal of attention has been given to the collection of statistics of the catch of mackerel covering a period of a great many years, and all the figures that have been obtained up to the present time indicate a larger catch of the common mackerel this year than for a period of thirty years before.

Q. The most marked diminution, I think you said, is in the striped bass?—A. Yes, sir;

Q. I suppose the striped bass is among the most desirable fish for market?—A. Next to the salmon, it is the most desirable fish.

Q. Do they feed on the menhaden?—A. Yes, sir; the most taking bait for striped bass is menhaden.

Q. What bait is used in catching bluefish?—A. Largely menhaden.

Q. And mackerel, where they are caught by the line?—A. Well, for mackerel hardly any bait except a little rag tied to a hook; some bright color attached to the hook where they are caught by hand lines, but the largest takes of mackerel, of course are in these seines. You were speaking of bluefish biting at the naked hook. I suppose you got that impression from the fact that the hooks for catching bluefish are loaded with lead which is kept bright, and the fish jump for that piece of shining lead and take the hook in. The menhaden fisheries, in my opinion, have had no effect whatever upon the mackerel fisheries, the mackerel not feeding upon the menhaden.

Q. Upon what do they feed?—A. Well, we find a large proportion of these smaller jellyfish, and then there are certain seasons of the year that we find them very full of a very red sea vegetation, some plant. It is called by the fishermen cayenne, and it is as hot as cayenne. When we get a large lot of fish that have been feeding upon that, they have to be eviscerated at once, as it will burn right through the fish. But the mackerel, of course, from its size and the character of the fish, is not capable of taking the menhaden.

Q. What is the spawning time of the striped bass?—A. Late in the fall is when we find the striped bass. Last fall, about the latter part of October, I had from Montauk Point several tons of striped bass weighing from 40 to 60 pounds and the spawn in the female bass was very near ripe. Montauk Point is the east end of Long Island where I have men fish for me. I have leased for five years the fisheries on the north side of Montauk, and one of our sources of revenue is the bass fishing, and these large schools of bass make their appearance in the fall.

Q. So that early in the spring they are in a condition to be caught for food?—A. They are in good condition even when they are full of spawn. Then again, speaking of striped bass, of course the season that is past varies very much with the quantity which I have caught. In the early spring we get bass, with the roe very forward, from the Chesapeake Bay, the vicinity of Norfolk. Large quantities are caught there and shipped here.

Q. What is the range of size of the striped bass?—A. The law of the State of New York prohibits the taking of striped bass of less than half a pound weight, and the size brought to market is from half a pound up to what they catch. The largest that was ever taken weighed 104 pounds; but it is a very common thing for a person to have a bass weighing 60 to 70 pounds.

Q. So that they can be cut into steaks like haddock or salmon?—A. Yes, sir; there is a great demand for that size of fish at our large hotels to boil up for the table d'hôte dinner.

Q. In regard to the grounds where bluefish are ordinarily found, what is your observation, whether it is upon rocky or sandy bottom, or whether there is any distinction in that respect?—A. I think there is no discrimination. I think they are found equally plenty upon every bottom; they are the rovers of the sea.

Q. Do you use purse-nets in your business?—A. No, sir; we fish mostly with the pound or trap nets, and then we have a large hauling seine in which we take the striped bass.

Q. That is hauled to the shore?—A. Yes, sir.

Q. What size mesh do you use?—A. In that bass seine we use a four-inch mesh.

Q. I should think a striped bass weighing 50 or 100 pounds would go right through any seine. You must have heavier twine.—A. Oh, we have extra heavy twine for that. I do not know exactly how many thread it is; it is a detail I have not posted myself upon. In the spring of the year there is usually a very large catch of bass on this coast, within 25 miles, on the coast of Long Island.

Q. In your judgment, would a law prohibiting the catching of menhaden to the first of July every year materially impair the value of the menhaden industry?—A. From what information I have had on that point, I think it would not.

Q. The increased supply would make up for the shortness of the season?—A. Yes, sir. I think that in less than two years the very much increased quantities which they would take during the open season would more than compensate for the time they would lose during this closed season. A very small percentage of oil is obtained from the early menhaden.

Q. Yes, all the proof shows that.—A. The dates that I have suggested to you are, of course, open to modification in localities. I do not give those dates because they would be applicable for every point on the coast, but for our vicinity, here on Long Island and as far east as Massachusetts, those would be the proper dates in my opinion.

Q. To all distances east of here I suppose the same rule would apply?—A. Yes, sir.

Q. Further south the habits of the fish are probably changed to some extent. Do you think of anything else you care to have appear in your testimony?—A. No, sir; I do not think of anything else.

The CHAIRMAN. Upon one side we make the simple inquiry upon the question whether in their operations they catch any food-fish, and it so to what extent; that is all there is of the inquiry of the menhaden men.

Mr. BLACKFORD. Well, I do not know that that question has been asked me in connection with this matter.

The CHAIRMAN. If you have any knowledge upon that subject please give it.

Mr. BLACKFORD. I have testified to my experience as a dealer and as commissioner of fish and fisheries, and as fisherman, as proprietor of nets and fishing privileges. I would say that I have noticed a marked diminution in the quantity of menhaden, as in our nets at Montauk we have caught more or less menhaden which we have sold to factories along with our food-fish, and with the decreased supply of menhaden we have also found a decreased supply of food-fish.

Q. Especially of the striped bass?—A. Yes, sir; more particularly

with regard to the striped bass. Your inquiry under the resolution is not limited to any particular kind of fish.

The CHAIRMAN. No, sir. The bill upon which the inquiry arose is a bill containing an absolute prohibition against the catching of menhaden with the kind of nets now used within two miles of the shore upon the Atlantic coast; that is the bill, without mentioning any other fish than the menhaden. The object is to stop the use of those purse-nets within two miles of the shore everywhere.

The WITNESS. There will be a difficulty with regard to the prohibiting of purse-nets, that you would interfere with the mackerel fishery.

The CHAIRMAN. It is the catching of menhaden in purse-nets that the bill specifies.

The WITNESS. If you specify the kind of fish——

The CHAIRMAN. It does.

The WITNESS. There are a great many difficulties with regard to any legislation of that kind.

The CHAIRMAN. The bill does not prohibit the use of nets at all except to catch menhaden.

The WITNESS. The difficulty with regard to legislation of that kind is that a man can get his net around a fish that looks like menhaden and it may turn out to be mackerel, and *vice versa*. But from my experience in regard to all kinds of fish, and protection of fish, there is no doubt but the protection of the fish during its spawning season would give greater results and be most effective.

The CHAIRMAN. The same policy as in our State legislation.

The WITNESS. Exactly.

The CHAIRMAN. We do not allow brook-trout or bass to be caught during the spawning season.

The WITNESS. Yes, and the same provision with regard to sea-fishing will give us good results.

Now, there is one question that will demand national legislation probably at your coming session, and I do not know but what this inquiry might take that in; that is the lobsters. The lobsters are growing more scarce every year. Different States have enacted different laws. Maine has its laws; Massachusetts and New York have their laws which prohibit the sale of lobsters less than 10½ inches, measured from the end of the nose to the extreme end of the tail, while Connecticut and New Jersey have no such law, and of course it does not stop the catching of small lobsters, because it merely throws it into another market.

The CHAIRMAN. There is no doubt that any State legislation that seeks to prohibit the catching or undertakes to regulate the catching of lobsters or anything else below low-water mark in the sea proper, except within the limits of the State, within the *faucibus terre*, as the expression is, is absolutely void. This question arose in this way: The legislature of New Jersey passed three bills upon the subject of fishing within three miles of the shore of New Jersey, and the governor submitted the question to the attorney-general of that State—Attorney-General Stockton—who wrote a very elaborate opinion and a very able one, in which he proves that, while the three-mile observance is a rule resting in the comity of nations to prevent the vessels of any other government from interfering with the rights of our fishermen within three miles of the shore, either in time of peace or time of war, while that rule is a rule relating only to the comity of nations, the rule as to where Federal authority begins and State authority ends is low-water mark. By an absolute provision of the Constitution, the protection of the sea below low-water mark is given to the general government and does not belong to

the States. That is what led to the introduction of this bill, and that is what leads to this inquiry.

THE WITNESS. The laws with reference to the lobster do not prohibit the catching, but it is worded in this way: "You shall not have in your possession any lobster."

THE CHAIRMAN. What right has the State of New York to prohibit the sale of it, if it is lawful to catch it? That cannot be so.

THE WITNESS. You might say the same with regard to brook-trout.

THE CHAIRMAN. Brook-trout go within the boundaries of the State.

THE WITNESS. How is it in New Jersey, where the law is different from ours? The date there is different; the season begins there two weeks earlier than it does here, but you cannot bring a brook-trout over from New Jersey and sell it in New York. If you do you are liable to a penalty of ten dollars for each fish.

THE CHAIRMAN. There would be a necessary conflict growing out of legislation of the States upon subjects over which the States have control; but the lobster, you know, is taken mostly in waters which are entirely under national jurisdiction.

THE WITNESS. I suppose so. And different States enacting different laws brings about a conflict and does not attain the object aimed at, because certain States have no laws, and, consequently, the young lobster, which it is aimed to protect, is not protected.

THE CHAIRMAN. If the State of New York may lawfully prohibit the sale of the lobster at any time, Federal legislation cannot remedy that difficulty.

THE WITNESS. No, sir; not at all.

THE CHAIRMAN. The State law is aimed at the taking of the lobster, is it not?

THE WITNESS. That is the design of it, but of course it cannot reach the man who catches the lobster in Maine, but it reaches the man who exposes it for sale in New York city or New York State.

THE CHAIRMAN. I think that is beyond anything that is germane to the subject of the inquiry.

THE WITNESS. Of course, from your statement, I see it is more particularly in regard to this question of menhaden fisheries, as affecting the food fisheries on the coast.

THE CHAIRMAN. Of course, as to the bays and arms of the sea; you take a bay of the sea across which a man can see with the naked eye, and it may run up a hundred miles into a State; the State has complete jurisdiction over that.

THE WITNESS. Exactly.

THE CHAIRMAN. It is within what is termed the *fauces terræ*. It is only where the sea is so broad as to be beyond the reach of vision from one point to another that it remains the sea. In other respects the general course of the ocean beach is to be observed, and lines are drawn across those bays; and low-water mark is the beginning of Federal authority and the end of State authority. For example, right here we have Sandy Hook, visible off here, and standing here and drawing a line from here to Sandy Hook, there is no question that all the waters within that line are subject to State control.

THE WITNESS. I suppose that is so.

THE CHAIRMAN. You have a law to prohibit the throwing of garbage out here.

THE WITNESS. Yes, sir.

THE CHAIRMAN. That is undoubtedly a law the legislature may pass.

SIMEON S. HAWKINS sworn and examined.

By the CHAIRMAN :

Question. Where do you reside ?—Answer. At River Head, Suffolk County.

Q. How long have you lived there ?—A. About thirty years.

Q. What is your business ?—A. I am engaged in the menhaden fishery.

Q. How long have you been engaged in that ?—A. About twelve or thirteen years.

Q. Where are your factories ?—A. We have a factory at Shelter Island, and also one at Barren Island.

Q. Now, we have been all over the details of the menhaden business with other witnesses, giving the amount of capital employed in your vessels and everything, in accordance with the annual report of your association. Without repeating any inquiries upon that subject, I want to come directly to what is the real question at issue on this subject, and I will ask what practical experience, if any, you have had in the catching of menhaden ?—A. Very little as to that. I have sometimes been out in our boats simply to look on, as I have been to-day.

Q. Simply to see how it is done ?—A. Yes, sir.

Q. You have never commanded a vessel or taken an active part in the catch ?—A. No, sir.

Q. Do you see the menhaden as they are brought to the factories ?—A. Yes, sir.

Q. Do you devote your time to the factory ?—A. The principal part ; yes, sir.

Q. In the management of the business ?—A. Yes, sir ; that is my entire business at present.

Q. Working up the fish into oil and fertilizers ?—A. Yes, sir.

Q. How do you unload the fish from the steamers ?—A. We hoist them by steam into boxes and run into cars, and so draw them into the factory.

Q. Into vats ?—A. Yes, dumped into vats.

Q. How are they taken out of the hold of the ship ?—A. In tubs, elevated by steam.

Q. How are they put into tubs ?—A. By men bailing them, as they call it ; sometimes they use forks, sometimes scrap-nets.

Q. They are not handled with the hands then ?—A. No, sir.

Q. How is the supply of menhaden this year as compared with prior years since you have been in the business ?—A. It is thought not quite up. We have had more fish at our Barren Island factory than we have ever had so early in the season ; but we have used our whole fleet this way. We have fished more to the south than ever heretofore.

Q. How are they as to size ?—A. Large principally. There seems to be a very large patch, if you can call it so, of small fish ; more than has been seen since about six years ago.

Q. Where are they ?—A. They are from Montauk as far south as we, have been along the coast.

Q. How far south ?—A. They are more plenty about as far south as Cape Henlopen, I believe. About as far south as our boats have been is Fenwick's Island, that is, about 10 or 12 miles to the south of Cape Henlopen.

Q. So far as your observation goes, what is the fact as to whether, in catching menhaden, more or less food-fish are taken also ?—A. I have taken pains to secure affidavits on this subject, and I have a copy of

one that was given to Captain Wilcox. I could not get over last night, and I gave him some that we had prepared, and that will answer that question. This is the affidavit of Captain Dayton, who has been in our employ some twelve years or more:

To Capt. EDWIN DAYTON:

Will you please answer the following questions and make oath to the same, and return it to me, and oblige,

Yours, truly,

S. S. HAWKINS,
Jamesport, N. Y.

1. How long have you been engaged in the menhaden fishery as a captain? Twenty-three years.

2. Assuming that menhaden are not edible fish, do you ordinarily, taking the season through, get edible fish enough to supply the table on your vessel? I do not.

3. Do you ever look for or set your seines for edible fish? No.

4. How often has it occurred that you have found edible fish in your seines more than sufficient to supply your table on the vessel; and when it has so occurred, what have you done with them? Twice; once I sent them to market, and once went myself in my own vessel to Fulton Market.

5. Have you ever found bluefish with menhaden, except as they are chasing or worrying the menhaden? No, never.

6. Do you ever set your seine except you see a school of menhaden to surround? I do not.

EDWIN DAYTON.

SUFFOLK COUNTY, ss:

Edwin Dayton, being duly sworn, says that the foregoing statements subscribed by him are true to the best of his knowledge and belief.

EDWIN DAYTON.

Sworn before me this 15th day of July, 1882.

[SEAL.]

E. T. MOORE,
Notary Public.

Q. What I inquired for is your own observation and experience as to whether you do take more or less food-fish; and, if so, to what extent?—

A. We have not, to get a supply of fish for the factory, with the exception of once or twice, and those have been through mistake and taken to the market. Of course we cannot afford to render food-fish. Our menhaden fish cost us about \$1 or \$1.50, and those food-fish are worth \$10 to \$20. Of course we would carry those where they would be worth the most. We might as well put our nets into the fire as to put them around a school of bluefish; they eat them up and destroy them entirely.

Q. What description of food-fish do you take, if any?—A. I would say, and I think I would speak within bounds, that out of a catch we have had at our factory at Barren Island, twenty-one millions, I presume to say we have not had a ton of food-fish out of that twenty-one millions, and those have been consumed aboard the vessel. We get a mess once in a while.

Q. In regard to the habits of the menhaden, do you know anything about their spawning season?—A. I do not; no, sir.

Q. Have you ever examined to see whether they had spawn when caught?—A. Well, in the fall fish, returning from the south, we find a good many spawn fish.

Q. Caught late in the fall?—A. Yes, sir.

Q. Those you catch in the early spring have no spawn?—A. They do some, yes, sir; to some extent.

Q. Have you ever engaged in the catching of food-fish to any extent?—A. No, sir; nothing more than recreation.

Q. What do you know as to the supply of food-fish upon your coast?—

A. We think it is fully equal to what it ever has been. The demand for fish now, I suppose, is a hundred times greater than it was ten years ago. I suppose the quantity taken last year exceeds that of any previous year.

Q. I suppose the increase of the class of persons who use food-fish has been very great in late years?—A. Yes; go inland and you would not see a bluefish. Now you find them all over the country; they are sent in ice all over the country. You find them in all the hotels where you would hardly see one twenty-five years ago.

Q. How is it with the striped bass?—A. We do not see as many of them in our neighborhood as we used to before we had the railroad. I should think they are not as plenty as they used to be. If they are caught I do not know it.

Q. How is the mackerel supply?—A. We never have known them to be as plenty in my day as they have been this year.

Q. I saw a statement in some paper, I think, that it is thirty-three years since the catch of mackerel was equal to the present year.—A. Yes, sir.

Q. And there were some theories about their going and returning at intervals?—A. Yes, sir. If you will allow me, speaking of the menhaden fishery, somewhere about twelve years ago up to the 1st day of July we had not a barrel of oil made at our factories; we sailed for six weeks and not a fish caught. Since then they have returned, and so they have been at intervals. At Peconic Bay the farmers in times past depended upon their nets in a great measure for manuring the land. Now they have given it up, and of course buy of the menhaden fishermen. They cannot afford to spend the time. I think four years ago it reached the highest catch. We had at that time at our two factories some forty-two millions, and it has been rather falling off for the last three or four years.

Q. How is the supply of oil from the menhaden this year?—A. The supply per thousand is the best we have ever had.

Q. How do you account for that?—A. The feed of the fish.

Q. Do you know upon what the menhaden feed?—A. Only from Professor Goode. He made a statement and produced the water where the menhaden were found, full of an insect something similar to a lobster; and where the menhaden were found last year in the greatest number was the greatest quantity of that in the water. Up to within about three years the yield at the east factory at the end of the season has been from a gallon to two better than the west factory. Now the yield at the west factory is the best, and the farther south, apparently, we get the fish, the better they are.

Q. Would any of the food-fish be profitable for you to manufacture?—A. No, sir; we could not afford to. They are not an oily fish that I know of.

Q. It would not be profitable to manufacture them for fertilizers alone?—A. No, sir; could not think of such a thing. No; three thousand of these menhaden make a ton, and that three thousand we buy for about from \$3 to \$4, while a ton of food-fish probably would be worth in the market \$60 or \$70—bluefish.

Q. That would make the menhaden something less than a pound each; that is, 3,000 would weigh 2,000 pounds; about two-thirds of a pound each?—A. Yes, sir; we take the 22 cubic inches for a menhaden.

Q. That is, in your dealing between you and your fishermen?—A. Yes, sir; that is the arrangement we have made.

Q. The diminution in striped bass is greater than in any other fish, is

it?—A. That I do not speak understandingly about. So far as I have seen I think so.

Q. That is the result of your observation?—A. Yes, sir.

Q. What is the range of size of striped bass as they are taken?—A. I have seen them from a pound to 40 pounds. Forty pounds is as large as I have ever seen them.

Q. They are a very desirable fish, are they not?—A. Yes, sir.

Q. Does any fish sell higher in the market than striped bass?—A. Yes, I think the Spanish mackerel.

Q. And salmon, I suppose?—A. Yes, sir.

Q. Salmon sells the highest, does it not?—A. Well, I have known the Spanish mackerel bring fabulous prices; a fish weighing two pounds for \$1 and \$1.50. They are sometimes sold for 25 cents, but when they are scarce they are high.

Q. If there is any other fact you desire to state, you may do so. The point to which we are directing our inquiries is as to what effect your industry has, if any, upon the quantity of food-fish, the different varieties.—A. We never attempt to set our seine at random. These fish make up schools separate, and in those sometimes we take occasionally some food-fish, but we never attempt to set a seine unless they are seen at the top of the water, and set the net for them and them only.

Q. If by accident or otherwise you take food-fish, it is better for you to put them upon the market than to undertake to manufacture them?—A. Have done so invariably. Once or twice the seine has been set on seeing a spattering in the water. My brother last year had been in-shore, set his seine and caught a school of menhaden, and then ran off-shore, saw the whipping of fish and surrounded them, and then saw they were weakfish. He loaded them and went right to Fulton Market and sold them.

Q. How many did he take?—A. I think he took in bulk what would measure 20,000 menhaden. They were all sold. Of course it had a tendency to make cheap fish there that day, but they were all used.

Q. Is there any fish market nearer to you than Fulton Market?—A. No, sir. Of course the business has changed within a few years. We have found it to our advantage to change from sail to steamers, on account of getting the fish regular. The business has, I should think, increased tenfold within probably as many years.

The CHAIRMAN. We have got a full statement of that; we have your annual reports showing it exactly.

The WITNESS. I did not know those facts had been brought out. It has been laid to the fishermen that they drove the fish south. Now, the season before they left the coast of Maine was one of the most successful seasons they had there. The fish came from there in the greatest numbers. The fish went to Maine, came back very fat. Those fish went on and the next season did not return, and have not been there to any extent since.

Q. Where did the manufacture of menhaden into oil and fertilizer commence first, if you have any knowledge?—A. I think in Gardiner's Bay.

Q. Where is that?—A. That is in Suffolk County, the east end of Long Island.

Q. And the menhaden were caught further northeast; they were caught east and north of that?—A. Yes; the fish at that time were confined principally to the bay, and they fished with sail vessels, small vessels.

Q. Do you find a ready sale for all your oil and fertilizers?—A. Yes,

sir; the scrap has increased in value. We used to render it into a crude—well, it was what we called a nuisance; but now it is rendered and dried, put into shape, and it has increased the value, probably, I should say, two-thirds.

Q. What is its relative value to the Peruvian guano, in your judgment?—A. Fully equal.

Q. For general agricultural purposes?—A. Yes, sir.

Q. For what is the oil used mainly?—A. I am told for rope-making and tanning.

Q. Tanning leather?—A. Yes, sir; and, I suppose, to some extent, in adulterating other oil.

Q. That depends upon the price of linseed oil, I presume?—A. Yes, sir; it makes a very excellent paint oil itself.

Q. A durable paint oil?—A. Yes, sir; I have used it on my own buildings since we have been in the business, and before, and prefer it to linseed oil.

Q. For painting?—A. Yes, sir.

Q. Why do you think it better?—A. I think it more lasting.

Q. Tougher?—A. Yes, sir. Referring to one of the questions you asked me, I would say that the general catch on the coast is not up to the catch of former years, but at this point it is larger than ever.

Q. You think the general catch of menhaden is not as large?—A. Not as large.

Q. Not as large as in any previous year?—A. Yes, larger than in many previous years.

Q. You spoke of one year when no oil had been made up to July, did you not?—A. Yes, sir; about twelve years ago, I think.

Q. To what cause do you attribute that?—A. Well, we follow up and take the opinions of others; we believe now it is entirely in the feed.

Q. What is the condition of the menhaden when you first begin to take them in the spring?—A. Not as good; they fatten afterwards.

Q. They are poor?—A. Yes, sir. Now this year we started with fish making a gallon of oil to the thousand, and the fish we are taking now are making six and seven gallons, about.

Q. That is solely attributable to the improved condition of the fish?—A. Yes, sir.

Q. What time in the season do you begin to catch them ordinarily?—A. The 1st of May; from the 25th of April to the 1st of May.

Q. And continue it until they disappear?—A. Yes, sir.

Q. Which disappear first, the menhaden or the bluefish?—A. We find the bluefish as long as we find the menhaden; that is, in some quantity. I think the greater quantity of bluefish are gone, but we do find them.

Q. But they disappear substantially the same season?—A. Yes, sir.

Q. They disappear with the coming of cold weather, I suppose?—A. Yes, sir; no, sir; there are flights of fish even as late as December, but of course the weather gets rough.

Q. Have you ever undertaken to follow them south late in the season, to see whether you can take them there?—A. No, sir.

Q. You never have tried that?—A. No, sir.

Q. How far south have your vessels ever gone?—A. The farthest is, I think, Fenwick's Island, twelve miles below Cape Henlopen.

Q. What county are you in?—A. Suffolk County; we are both in Suffolk and Kings.

Q. You may state how near to the shore and how far from the shore you have made catches of menhaden?—A. The catch of menhaden is,

as you may say, right on the shore, and probably within a mile and a half from the shore; they are seldom found where the water is deep; that is, they are generally found in shallow water; that is, there are places where the shore slopes off gradually, deepens gradually, and we find them further off.

Q. You never have caught them out at sea, then?—A. No, sir.

Q. One of the Mr. Church's, of Tiverton, testified that they have caught menhaden, I think he said, 50 miles from shore.—A. That is on the east coast. We do not work in that way along here. It is possible they have been caught, but I do not think any of our vessels ever caught any out of sight of land.

Q. As a rule, your catch is within two miles of shore?—A. Yes, sir. There is this fact that I wish to state, as to the difference between their coming on the coast and returning. I have never seen any one to distinguish the difference as to quantity in their flight to the north, and on returning back after the millions have been caught.

Q. The bluefish live on menhaden principally do they not?—A. They live on them to a great extent, I should judge. They are fish that seem to be fighting everything.

Q. Menhaden is the bait used in catching bluefish, is it not?—A. That is it principally. I have seen them come among a school and fight them for fun, eat them and spew them out, destroy all, seemingly, that they could. I have seen them on the Jersey coast here, running them up on shore, laying them in rows; they did that one spring, from Sandy Hook down.

Q. The bluefish chased them up so that they were left on land?—A. Yes, sir; left on land.

Q. Suppose the menhaden were blotted from the ocean, and you had nothing left but the food-fish to subsist at your industry, could you afford to carry it on?—A. No, sir; not at the present prices we get for our material manufactured.

Q. You could not make oil and fertilizers enough to pay you for doing it?—A. No, sir.

Q. So that in no event, whether food-fish are caught by design or accident, can you afford to work them in your factories?—A. No, sir; it has been charged that the menhaden fishermen had taken a quantity. There was an instance reported in one of our papers—I think the Sun—there was a vessel named, but there was no such vessel in existence. It was said there were some hundreds of thousands taken in there and ground up. Those mackerel were worth, I suppose, at least \$10 a barrel, while the menhaden were not worth over 60 or 70 cents. There was no vessel of the name, and no fish taken in any quantity at that time.

Q. Do you know what is done with the refuse fish from Fulton market; those that become unmarketable?—A. I do not; no, sir.

Q. Do you know where what is termed "the horse factory" is?—A. Yes, sir; we are neighbors.

Q. Do you know whether fish is taken there?—A. I have seen them there, yes, sir; but where they come from I cannot say.

Q. What use is made of them?—A. They make fertilizer.

Q. They do not make any oil?—A. No, sir.

Q. They simply convert them into fertilizers?—A. Yes, sir.

Q. With the animals, I suppose?—A. I suppose so; they manufacture phosphates at the horse factory, and at times buy fish to mix with their phosphates.

Q. Do your fertilizers work well with the phosphates of South Caro-

lina?—A. I understand it is the practice now. It is one of the greatest factors in the manufacture of fertilizer.

Q. Is it used with the Peruvian guano too?—A. I do not know. It is used quite extensively with us on Long Island, in its natural state.

Q. You used to fertilize land with raw fish, did you not?—A. Yes, sir; before this business started up they were used on the land.

Q. You referred to your brother making a large capture of fish; you said that when he set his seine and supposed he had surrounded a school of bluefish, he attempted to take it up again; why?—A. Just at the moment he took it out of the water he found they were weak fish and they were not as destructive.

Q. Then the reason he attempted to take up his seine was, because if they were bluefish, they would destroy his seine?—A. Yes, sir.

Q. What size mesh do you use in your net?—A. $2\frac{1}{2}$ to $2\frac{3}{4}$.

Q. That is the long way?—A. Yes, sir.

Q. What size twine?—A. Well, we call it, what we are using now, the 20-12.

Q. Could you capture a school of bluefish in such a net?—A. You could take part of the school; there have been instances. A good many let themselves out, of course. We have captured them in those nets. That is an instance where it was not intentional. I do not know an instance, in my experience, where there has been an attempt.

Q. My inquiry is directly to this point, whether if your men designed to do it, and undertook to do it, it is practicable to take in a school of bluefish with the kind of seine you use in capturing menhaden?—A. We could; yes, sir.

Q. But not without injury to your nets, I suppose?—A. Yes, sir.

Q. How is that?—A. That is it, of course. Probably nine chances out of ten it would ruin the best of our seines.

Q. Do you catch many shark?—A. Yes; quite a good many.

Q. More or less than in former years?—A. I do not know that there has been much difference in that respect.

Q. Some of the witnesses said there was an increase in the catch of sharks.—A. I recollect of hearing one of our captains say they surrounded a school and took in twenty sharks out of the seine. I recollect that this year. As to what he did before or any other time, I do not know. That is quite a large number, I think, for one haul.

Q. Twenty sharks in one haul?—A. Yes, sir.

Q. What size?—A. I should say 50 pounds to 300.

Q. Last month?—A. Yes, sir.

Q. Do not they keep alive where they are put into the hold of your vessel in the way you put the fish in?—A. They live longer than the other fish.

Q. They smother, I suppose?—A. Yes, sir.

Q. Would it pay to manufacture sharks?—A. Well, when we are not too busy we put them in.

Q. I mean as to the oil?—A. There is no oil, that I know of, except the liver; the liver is quite oily.

Q. Is there any fish that you know of furnishing more oil than the menhaden?—A. Not that I know of. I have been told that the herring does in some parts, but I do not know as to the fact.

Mr. BLACKFORD. Have you any idea of the cause of the disappearance of the menhaden from the coast of Maine?

The WITNESS. No, sir; only this: We find fish where the feed is plenty. It is the feed; that is all.

The CHAIRMAN. Mr. Hawkins agrees with you, Mr. Blackford, as to

the disappearance of the striped bass; that is, the diminution is greater in proportion than any other fish.

Mr. BLACKFORD. You speak of the feed of menhaden; what do you think they feed on principally?

The WITNESS. I have no opinion myself, except what I got from Professor Baird.

Mr. BLACKFORD. You have never noticed what the contents of their stomachs were?

The WITNESS. Yes; we always find a green substance.

By the CHAIRMAN:

Q. In the stomach of the fish?—A. Yes, sir.

Q. Are the menhaden good for anything for food-fish?—A. If you have patience to eat them, they are one of the sweetest fish we catch.

Q. Patience on account of what?—A. They are full of bones.

Mr. BLACKFORD. You think the flavor of them is good, do you?

The WITNESS. Yes, I think they are the sweetest fish—I would not put them beside a Spanish mackerel.

By the CHAIRMAN:

Q. Cannot you fry the bones crisp?—A. Yes, sir; I have done that.

Q. Are they worse than shad?—A. Yes, sir; I think they have more bones than shad.

Mr. BLACKFORD. It is a characteristic of all the herring family to be intensely bony. The shad, herring, mossbunker or menhaden, are all different varieties of the herring family.

By the CHAIRMAN:

Q. The present standpoint I believe is, it would be confiscation to the entire business; that is, it would be ruinous to prohibit the catch until July?—A. The catch has been made sometimes at one season, sometimes at another. It has varied. Sometimes we get it in the spring, sometimes in the summer. It is very uneven. When they appear, as I have already said, they appear in vast numbers; there is no enumerating them. Then they disappear as quick. You may, as I said, see untold millions of them to-day, and probably you go there to-morrow and will not see one, and sometimes that happens for five or six days and weeks.

Q. There has been a fish described here as the "shiney"; do you know what fish it is?—A. Well, we call it, I suppose, "shiner" or "butter-fish."

Q. Some one has stated that the bluefish feed on those?—A. I presume they do; I have no doubt they do.

Q. How do they differ from the menhaden in color?—A. I should think they are rather a more silvery color than menhaden.

Q. The menhaden are described as yellowish with a silvery belly; shining belly.—A. Yes.

Q. An attractive fish in the water; and the shiney is more silvery you think?—A. Yes, sir; whiter.

Q. Have they scales?—A. They are very fine if they have any. The bluefish must feed on something besides menhaden, or else they are a long-lived fish without food. They are seen sometimes to guard the coast; the coast is lined with bluefish, untold millions of them, and probably there will not be a menhaden within hundreds of miles of them, and, of course, there must be something else they feed on.

WASHINGTON, D. C., *January 3, 1883.*

WILLIAM T. STEVENS sworn and examined.

By the CHAIRMAN:

Question. Please state your residence.—Answer. I reside at Cape May City, N. J.

Q. How long have you lived there?—A. I have resided there during all my natural life—forty-one years.

Q. What is your occupation?—A. My occupation at present is that of a member of the United States Life-Saving Service. I have been connected with that for ten years, and fishing together, with the exception of five years that I was a member of my State legislature.

Q. I will ask you first your opinion as to the effect of the menhaden fisheries upon the supply of food fish along the coast of New Jersey; the result of your observation. Have you ever given it any attention?—A. Yes, sir; I have to some extent. I regard the taking of the menhaden as now practiced by these steam fishermen on our coast as very injurious and tending very largely to the destruction of food fishes that subsist on the menhaden. My reason for that is, that where we have been in the habit of taking large quantities of red drum, bluefish, and other fish that feed upon the menhaden, they have become very much scarcer, and I can attribute it to no other cause than because of the wholesale destruction of the menhaden, which is their food. I have observed as many as nine or ten of these steam fishermen at a time within a radius of three miles, perhaps, of our place, fishing for menhaden, taking from 3 to 20 tons of those fish per haul, with their purse nets, and they have taken them to such an extent that we have observed a very great scarcity of them this year and during the last fall, the fishing season.

Q. A scarcity of what varieties of fish?—A. A very great scarcity of the menhaden to what there had been formerly, and of course a corresponding scarcity of food fishes, which followed them up and obtained their feed from the menhaden—the red drum and bluefish more particularly. Where a man would take from 12 to 20 in one day's fishing, now he would not get perhaps more than 2 or 3, or did not last year, and the bluefish are almost driven away entirely from our coast. We have had no opportunity to catch any scarcely.

Q. How is it with striped bass?—A. It interferes with them too very seriously. They are scarcer, and we attribute that to the fact that they also feed on the menhaden after they have been destroyed by the sharks and bluefish—they destroy a great many menhaden which they do not eat themselves.

Q. Kill them, you mean?—A. Yes, sir; kill them, and there are other fish following up behind them which eat them. They feed on them also. It is plainly evident that if this wholesale taking of menhaden is allowed to go on as it has, the past year especially, it will destroy the fish entirely in a very short time.

Q. What is your theory in regard to the subject; that it should be prohibited entirely, or for a season?—A. My idea is that they should not be allowed to fish within 9 miles or 3 leagues of the land with their purse nets.

Q. At any time of the year?—A. At any time. I think they should be prohibited fishing within that distance of the land.

The CHAIRMAN. The bill only asks to restrict it within 3 miles.

The WITNESS. That is the bill as it is now?

The CHAIRMAN. Yes.

The WITNESS. I have not seen the bill, and do not know what the nature of it is at all. But last year—this fall a year ago—I went in a boat where three of us took 27 red drums within two hours. We always take them right in the rear of a school of menhaden. They follow the schools of menhaden up; the menhaden always go in schools, and you seldom if ever find them scattered, and then the red drum and bluefish follow them up.

Q. Have you any idea of where the menhaden spawn?—A. I have no knowledge of where the menhaden spawn; I cannot say.

Q. Or at what time of the year?—A. Or at what time of the year. I think they spawn north of us. I do not think they spawn much in our waters here, although they may; but they do not generally come here in large quantities until the weather gets cold on our coast.

Q. As far as you have observed, do the men who use these purse nets in catching the menhaden catch any quantity of food fish?—A. Yes, sir; they catch large quantities of food fish with their menhaden. We laid near a steamer this fall a year ago, and they made a haul with their purse net, and they took out in the neighborhood of 46 red drums out of one haul. The red drum were shooting right through these moss bunkers all the time—right among them and also a large number of sharks, but of course they were no good; we don't care how many of them they catch. But they had sharks, menhaden, red drum, and blue fish; they catch them by purse nets. We catch bluefish in purse nets ourselves—not exactly purse nets but nets similar to purse nets.

By Professor BAIRD:

Q. Do you use a purse net?—A. Yes, we go off and get around a school of them and catch them in that way with a net. Of course, at the same time we take menhaden with them but we do not make a business of catching the menhaden as these steamers do.

By the CHAIRMAN:

Q. Is the menhaden good for anything as a food fish?—A. They are an extraordinarily sweet-flavored fish—a good fish to eat, but we do not use them as food fish because they are so full of bones.

Q. Do those who catch the menhaden use them for food?—A. Seldom if ever. They make a very good fish salted—salt fish—but we do not often catch them. We catch better fish with less bones in them, and that is the reason we do not use the menhaden.

Q. Is the quantity of menhaden growing less and less on your shore?—A. Yes, sir; I think it is diminishing very largely. Where we saw acres and acres of them three or four years ago in schools, last year when you found a school it would be a very small affair.

Q. Some of the witnesses we have examined have stated that there was a very large quantity of them on the south New Jersey coast this season, rather late in the season, and very small menhaden.

The WITNESS. What part of our coast?

The CHAIRMAN. On the southern portion of your coast and on the coast of North and South Carolina, too. They have been clear to South Carolina with their boats this year.

The WITNESS. I was off fishing a great many days during the latter part of the fishing season, from the 15th of September to the 15th of November, say—between those days—and we never were able to find any menhaden within a radius of 3 or 4 miles of our place of any consequence. Of course we would find a few small schools, but nothing like what we have seen. We have seen acres and acres of them just outside of the break, and bluefish following them and driving them ashore, and

actually driving them on shore so that we could load up wagon loads of them on the beach. But we were unable to find them in that way this last year, although the menhaden steamers have never fished to a very great extent off our coast until the last two years.

The CHAIRMAN. They used to catch them on the coast of Maine, but they have disappeared from there entirely, at least they so testify; that they do not catch any menhaden there on that coast now, and they catch very few in Narragansett Bay; very small quantities.

The WITNESS. It is the general opinion of fishermen, which is the best authority we can obtain, that it is only a question of a little time if they are allowed to continue in this wholesale way before they are all driven off.

Q. How long is it since they commenced the manufacture of menhaden; how many years is it since that industry was started?—A. I do not know how many years they have been manufacturing them into fertilizers, but they have been fishing for them on our coast only for the last two years with steamers. There was scarcely a day during the last season (and up even into November they were fishing) that you would not count from six to ten and twelve of these steamers that would carry an average of probably 300 or 400 tons each—250 to 300 tons any way, to put it at a low figure. They were fishing off our coast with these large nets, catching 25 to 30 tons of these fish at one haul. With such wholesale destruction as that, it must necessarily take them all off. It cannot help it. Then they also caught mackerel. There was one steamer there which reported to some of our fishermen who were close by and offered to give them fresh mackerel, and I think they said they had taken 4,000 fresh mackerel and they could not get them to New York to market (it was in warm weather) and they had no way to keep them, and they just dumped them in with the menhaden and made fertilizers of them.

Q. Mackerel have been more plenty this year than usual?—A. Yes, sir; on the eastern coast, but not plenty with us. There has been no outside fishing that has been plenty with us this year, and we attribute it to that fishing with those purse nets.

Q. If there is any statement which you desire to make on any subject to which we have not called your attention, I will give you an opportunity. The object of this investigation is to see what, if any, legislation we should adopt.—A. I do not know that I could make any further statement as to the habits of the fish. The spawning I do not profess to know much about—their habits in that direction. We find schools of small menhaden—small fish, but whether they spawn there or not I cannot say. The striped bass do, and weak fish; they spawn in our waters.

Q. What time do the bluefish spawn?—A. I cannot state as to the exact time. I think they spawn more generally north of us than they do in our waters, because they come from north of us; but weak fish spawn very extensively with us.

By Professor BAIRD:

Q. Which would you rather have on your coast, an abundance of bluefish or an abundance of porgies, weak fish, and sheepshead, if you had to make your choice?—A. We never have been able to take the weak fish much outside of our section like they do at Atlantic City and above us. The main fish we have been able to take by what we call outside or off shore fishing has been bluefish and red drum, black drum, and that species of fish. Weak fish don't seem to be and never have been plentiful.

Q. Do you call them weak fish at Cape May; is that the name you use to designate what they call weak fish in New York?—A. I don't know what they call weak-fish in New York.

Q. Do you call the bluefish bluefish, or horse-mackerel?—A. We call them horse-mackerel sometimes and sometimes bluefish. Nearly all of us call them bluefish, but many of our people call them horse-mackerel.

Professor BAIRD. I spent a summer at Beesley's Point nearly thirty years ago, and then what they call weak fish was bluefish.

The WITNESS. Yes; our people do that also. Some people call them salt water trout also. In different localities they have different names for these things.

Q. Do you still call in New York the king fish hake?—A. Yes, sir; we call that hake in our waters. They are a very good fish.

Q. Don't you think two years is rather a short time for the extermination of menhaden on your coast by the use of these purse nets? You say two years ago your fish were very plenty and you could take 25 or 30 drum fish, but since the steamers came you can only catch two or three?—A. I am connected with the life-saving station, and have been for ten years, and we do a good deal of fishing, and I have had an opportunity of observing the fish on our coast. Of course we do not make a business of fishing like the regular fishermen, but we go very often. We have a good deal of time on our hands which we are not required to use in our duties as life-saving men, and we go fishing. The government prefers that we do that in order to keep our hands in. This fall a year ago, say from the 15th of September till the middle of November, I think on our station we caught in the neighborhood of 140 red drum, between 140 and 150 red drum, and we caught just as many bluefish as we wanted; that is, we got all we wanted. We would go whenever we felt disposed, and catch half a boat load with hook and line and catch them in nets also, in schools, and we salted a great many of them down. But this past fall, using the same appliances and going in the same way, we have been unable to take as many fish as we wanted for our own use and without having any to dispose of.

Q. Has there not been an alternation of abundance in former years; have you had the same amount of fish each year?—A. I have never noticed in any other season except this but what there were plenty of menhaden.

Q. But I am now talking about the drum and trout. Have you noticed before at any stage, five, ten, or fifteen years ago, any difference, year by year, in the quantities?—A. I say it has only been within the last three or four years that we could go off and take these red drum with a hook and line. I suppose they have been there, but we didn't know we could take them. I have been taking bluefish for ten years.

Q. Is it your idea that the drum feeds on the menhaden?—A. We know that they do, because they will bite at menhaden bait when they will not touch anything else. We use that bait altogether.

Q. Do you find menhaden in their stomachs when you open them?—A. Yes, sir; when you open them you will find them full of menhaden. They will feed on other small fish; they will feed on this sunfish, as we call them, and goodies.

Q. Are they surface or bottom feeders?—A. They feed on the surface of the water; no, I think the drum are bottom feeders, but the bluefish are surface feeders.

Q. If they are at the bottom, how do they catch menhaden down there; the menhaden are not a bottom fish?—A. But they settle to the

bottom oftentimes. They are driven to the bottom oftentimes by other fish. If you go over a school of menhaden in two fathoms of water they will settle down right away the same as mackerel, although they are usually found on the surface, it is true; in a majority of cases they are on the surface. I suppose the drum fish come up under them to feed, but we fish at the bottom for drum fish.

Q. What kind of bait does the clam make for drum?—A. The clam makes a very good bait for black drum, but poor for the red drum.

Q. What do you mean by red drum?—A. It is a fish that is much more symmetrical in proportion than the black drum, and has a red back. They are a longer fish; the black drum is shorter.

Q. Has it a black spot on the side of the tail?—A. Yes, sir.

Professor BAIRD. That is a very different fish from the drum. It is called red drum, but it is not a drum.

The WITNESS. That is the name we call it by. We know it to be a very good fish.

Professor BAIRD. It is one of the best fishes on the coast, although very abundant. Have you always caught them there in any quantity—the red drum?

The WITNESS. We have not known that we could catch them, I say, until the last three or four years on our coast.

Q. Do you think they existed on the coast; did anybody catch them on the coast?—A. I don't recollect.

Q. Isn't it a new thing their coming on the coast at all?—A. I think it is a new thing their coming on the coast.

Q. You know that is a Southern fish; it has no business to be on your coast; it is out of its latitude. It has no business to come up into New Jersey waters.—A. Well, they have been there for the last three seasons. There were some this season, but not near as many as for the past two seasons.

Q. How was it with the Spanish mackerel; were they at all plenty this year?—A. No, sir; they are similar to the bluefish. When we catch bluefish we usually catch Spanish mackerel, but they have been scarce, too. They were plenty formerly, but very few of them have been caught this year.

Q. Do you ever get any pompino?—A. I do not know it by that name.

Professor BAIRD. I used to catch numbers of them at Beesley's Point. It is the most costly fish in America, and brings \$1 a pound.

The WITNESS. I do not know the fish by that name; perhaps I may know it by some other name.

Professor BAIRD. I do not think it has any other name.

EDWARD J. ANDERSON sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Trenton, N. J.

Q. How long have you lived there?—A. I have lived in Trenton about twelve years.

Q. Have you ever lived any nearer the coast than Trenton?—A. No, sir. Allow me to say that my presence here was suggested by Senator Sewell, because I am commissioner of fisheries of the State.

Q. I was aware of that. You have given the subject some attention, I suppose?—A. Yes, sir.

Q. How long have you occupied that position?—A. Nearly five years.

Q. The first question for our consideration is as to the effect of the

catching of menhaden by the proprietors of the fish factories upon the supply of food fish. Please state in your own way what your views are with reference to that.—A. The information I have upon that subject, of course, is what I get in my official capacity from those who have opportunities to observe, from my fishwardens, and from fishermen; and my belief, based upon that kind of information, is that the wholesale catching, destruction of menhaden, or the use of them for the manufacture of oil and fertilizers has had a very serious detrimental effect upon the food fishes along the coast. The supply of the food fish has been gradually decreasing for several years and the catch of menhaden has been increasing.

Q. Was the supply of food fish uniform before they began catching menhaden so largely, or did it vary in different years?—A. Of course it varied, as the supply of fish always does. Take several years in any waters where the fish population of the water is of a migratory character, it varies according to the seasons and other conditions. Of course the supply is greater some years and less some years.

Q. Could not this diminution in food fish be attributed to that cause?—A. I think not so great a diminution nor one of so long continuance. I think one year and perhaps two might be attributed to influences of water and other things, but when it continues for a number of years, I think it may be set down to some permanent cause.

Q. Have they been gradually diminishing?—A. Yes, so far as I have any information.

Q. What varieties of food fish?—A. Chiefly bluefish and striped bass. There has been considerable diminution in them.

Q. Mr. Blackford testified that striped bass had nearly disappeared.—A. It has been so along the coast of New Jersey. A few years ago there used to be quite a large catch of striped bass, and now they have almost disappeared.

Q. There used to be a great many in the sound, Mr. Blackford said, and along the shore of Long Island, and they rarely get one now?—A. We used to catch great quantities of them in Barnegat Bay.

Q. Do they feed on menhaden?—A. I think they do.

Q. Striped bass are, I suppose, the most valuable fish you take except the salmon, are they not?—A. Yes; they and the bluefish. They are more valuable than the bluefish, although I do not think the catch of striped bass along our coast has ever been so great, under favorable circumstances, as that of the bluefish, but they are a more valuable fish.

Q. The price is higher?—A. Yes, sir.

Q. What is your opinion as to whether in the use of these purse nets more or less of food fish are taken, and to what extent?—A. Well, I could not make a statement including any figures. My information is that a great many food fish are taken in the nets, a great many edible fish. I have known of some cases where whole ship loads of drum fish have been taken.

Q. I do not see how it could well be otherwise, because of course the food fish are pursuing the menhaden wherever they are. If a school is surrounded, of course they must be taken?—A. They undoubtedly are, and of course those food fish which are taken, while they are of very little value to the menhaden fishermen in the manufacture of oil, yet they cannot market them as food fish, and they all go into oil. We have very stringent laws in New Jersey against the catching of blackfish out of season, and I get reports —

Q. Now that is the precise point to which I want to direct your attention. When should we interfere with the catch of menhaden to protect

them in their procreation, their spawning; what is their season?—A. That I do not know. The only information I have upon that subject is information which I get through the United States Commissioner. There are so many opinions among fishermen along shore as to the time of spawning of menhaden that I have not been able to get enough information upon which to base an opinion.

Q. Is it not certain that they do not spawn during the summer season when they are present on your shores?—A. I do not like to give an expression of an opinion about it. I know too little about it to express an opinion, but I do not think that that fact seriously affects the question of the damage done by catching them, because if these purse nets take up all which come along the shore, it is of very little importance whether they spawn there or somewhere else.

Q. Yes, but in analogy to our State legislation, if they are prohibited from catching them during the spawning season, it might remedy the evil to a great extent.—A. Well, it might to some extent, but I should think it would prove a very inadequate remedy.

Q. It is an important industry, and, of course, it ought not to be destroyed by legislation if it is practicable to preserve it?—A. It is becoming a very important industry, and, of course, as you say, it ought to be protected by legislation unless it is injuring some other industry to a greater extent. We are damaged along the New Jersey coast, as we think, by this industry very largely in this way. Our coast, as you are no doubt aware, is becoming very popular as a place of summer residence. Little towns are springing up and gradually becoming large towns all along the coast, and one of the chief attractions, one of the great attractions, is the fishing; that is, not only for sport, but the facilities for having fresh fish right out of the water all the time, and supplied as an article of food, and the complaint has been very general for several years past that the people who are attracted there by the fish-catching and fish-eating facilities are discouraged by the fact that the fish are not there.

Q. How long is it since the menhaden steamers came upon your coast?—A. The first complaints I heard in my official capacity were, I think, three years ago. I do not know whether there were any before that or not.

Q. The evidence we have taken is that when this industry commenced they caught the menhaden on the coast of Maine, from which they have disappeared entirely, or have been destroyed, one or the other, until they do not catch any there now. They very rarely catch any in that vicinity. They used to catch a great many in Narragansett Bay. Now they take none to speak of, and this season they have caught more south of your State than they have on your coast or north of it. They caught as far south as South Carolina.—A. The belief of the people of Maine, as far as I have been able to ascertain, is that the fish disappeared from there by reason of this kind of fishing; that they have either been exhausted or driven away. In New Jersey I collected all the statistics I could for the year 1881, and the oil and guano factories caught and used about twenty million fish that season.

Q. On your coast alone?—A. Yes, sir; the people who have factories in the State, and that was a very small portion, very insignificant compared with the number of fish that were taken by the steamers from other States which come to fish along the coast. Some parties told me that as many as forty vessels from other States were within sight at one time in Princes Bay and Raritan Bay, fishing for menhaden; so that there must have been enormous quantities of them taken.

Q. If there is any statement you desire to make, as you are familiar with the subject, you may have the opportunity to do so.—A. I do not think there is anything more that I can say. I feel entirely satisfied that damage is done to our fishing interest and to the value of property along our coast by this fishing.

Q. It is information rather than practical knowledge with you?—A. O, yes; of course. I only get it in my official capacity from those who have charge under me of the operations, and of those who are interested in it. I am not a practical fisherman, and do not live along the coast. I merely make my inspection and gather what information I can and sift it.

Q. Your State laws prohibit the taking of fish during the spawning season, do they not?—A. Yes, sir; our State laws do with regard to fresh-water fish, but they do not with respect to sea fish.

Q. Well, you have the right to regulate the sea fishing within the *fauces terrae*?—A. Yes; we do that under the law as it exists now. We have laws forbidding fishing with seines in our bays, which is the long stretch of water lying within a strip of land which forms their boundary, and we regulate that in such a way as to forbid fishing with seines during the summer season; but our laws, by reason of local influences, vary with regard to different counties; so that they are not uniform by any means.

Hon. J. H. BREWER, M. C. Mr. Chairman, I would like to ask the witness a question.

The CHAIRMAN. Certainly.

Mr. BREWER. Has not there been more bluefish on the shore this season than last season? Has there not been a pretty fair supply this season, good fishing?

The WITNESS. Well, that depends upon a person's idea about a fair supply. I do not think there is any fair supply, or such a supply as we used to have years ago.

Mr. BREWER. I ask that question because I have been along the shore a good deal, and the shore men almost universally agree that there has been good fishing this season.

The WITNESS. There has been a greater supply of bluefish along our coast this season than for several years.

By the CHAIRMAN:

Q. How do you account for that?—A. I do not account for it except upon the basis of what I said a while ago, that the run of fish everywhere, I have found in my experience, will vary greatly. Some years we will have an enormous run, and find in the Delaware an uncommon run of shad. There is nothing you can attribute it to. Of course we form our theories. We find one season that we can catch fish anywhere with any kind of bait, and another season the fishing is poor. Now, I do not know how to account for it excepting that one season there is ice which scares the young fish out, and another season the season is late and the spawning late, and perhaps there may have been some causes operating to decrease the supply of food, and things of that sort, and I do not think we have sufficient data to form an intelligent belief as to why these runs of fish vary. I do not know whether Professor Baird has or not. I certainly have not.

Professor BAIRD. There are a great many points to be taken into consideration, too long to be considered now.

The WITNESS. Yes, I have been requested to account for the difference in the catch of black bass in the Delaware, and I have watched

the seasons, and I have attributed it to these different reasons, that one season was a severe one that perhaps did not destroy the bass, but did destroy great quantities of the smaller inhabitants of the water or their larvæ upon which the fish feed; and another season was a favorable one, but there was any quantity of food, so much food that the fish were supplied with it all the time, and they did not want the bait with which the people went to fish for them, and a thousand reasons of that sort. So I think it is with the run of shad and the run of bluefish. Now, after three seasons of unparalleled increase in the run of shad in the Delaware, we had last season a great falling off, which everybody said was unaccountable. The only way I can account for it is that during almost the whole of the season up to the close of the shad-fishing season, there was cold water. The water was cold and did not, until nearly the close of the season, get into the condition in which we think it is desirable, and in which we usually have a run of shad. Consequently we did not catch half the quantity we did the year before.

Professor BAIRD. The principle in regard to shad is that unless the water in the river is warmer than it is in the ocean, they will not run up.

The WITNESS. That is it exactly. Last season at the time we usually begin to catch fish everybody was in despair; we did not catch any. There was snow at the head of the river. The snow was coming down, and then we went on for three or four or five weeks with cold rains, freshets, and muddy water, and the river was not in condition to invite the run of shad. I think they went up after we took our shad nets out, because I found the run of young shad towards the ocean last fall enormous, and I think they went up to spawn afterwards.

By the CHAIRMAN:

Q. What has the supply of mackerel been this year?—A. We take very few mackerel; it is not an industry with us.

Professor BAIRD. They take them off shore, do they not? When mackerel go up northward from Hatteras, do not they take them all along the coast?

The WITNESS. The industry in New Jersey is not of any importance at all. There is nobody there engaged in the business of any account, and those that are taken are taken by people from other States and off shore, and that does not come within my province. With regard to the spawning, I became aware year before last of an interesting fact. I suppose, standing by itself, it does not indicate much, but I was, as I do every summer, having shad artificially propagated to try to increase the supply in the Delaware River, and one of the men in my employ caught in a net in the Delaware, about 175 miles, I should think, from the sea, a menhaden with almost fully matured spawn, the only one I have ever heard of being taken up the river.

By the CHAIRMAN:

Q. What time was that?—A. It was in August. It was 90 miles above where the water is even brackish. It had gone that far through entirely fresh, pure water. It is the only one I ever heard of in that region, and it is an interesting fact, but, perhaps, not very significant.

WASHINGTON, D. C., *January 4, 1883.*

JEDEDIAH W. HAWKINS sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Jamesburg, Suffolk County, New Jersey.

Q. What is your occupation?—A. Menhaden fisher.

Q. Have you a factory?—A. I am interested in a factory; yes, sir.

Q. What practical experience have you had?—A. I have had eleven years' experience as a master of a fishing steamer.

Q. As master of one of the steamers?—A. I have been seven years in a steamer and four years in a sailing vessel.

Q. Fishing with purse nets, I suppose?—A. Yes, sir.

Q. Where were the most menhaden taken when you first began to fish?—A. When I first began to fish we fished in and around Sandy Hook in sailing vessels.

Q. Did you ever fish any further north than that?—A. I have fished as far north and east as Rhode Island.

Q. During the past two or three years where have the most of the menhaden been taken?—A. My range of fishing has been from Montauk to Cape May—between those points for the last three years. I have been as far south as Fenwick's Island; I have been that far south, but no further.

Q. Generally at what distance from the shore have you taken the fish?—A. Well, from one-half mile to two miles. Further south it is further off shore—about three miles is the fishing distance.

Q. But your fishing generally is within a range of three miles of the shore?—A. Yes, sir; generally.

Q. You have caught them further out, I suppose?—A. Yes; I have caught them out as far as five miles, but very rarely.

Q. Is the supply of menhaden as great now as it was when you began fishing?—A. So far as I can judge, I see no difference in the supply. I saw just as many fish last year as I ever saw in my life fishing; just as many, only in different localities.

Q. Further south?—A. Further south.

Q. And smaller?—A. Well, the fish have been very large, but I have seen more small fish this last year than I think I ever saw in all my fishing. The coast has been lined with small fish; very young fish—immense quantities last year.

Q. What is the mesh of your net?—A. We use a $2\frac{5}{8}$ -inch mesh.

Q. How small fish will that take in the ordinary mode of catching?—A. It would not take anything but a full-grown fish or a three-quarter-grown fish.

Q. Of what weight; half a pound weight?—A. I do not think the menhaden weigh as much as that; probably one-quarter of a pound; or say from one-quarter to one-half a pound.

Q. Do you ever use the menhaden for food?—A. Nothing more than we get a mess on board the boat when we get fish-hungry and all that. They are a very sweet fish, but have a great many bones.

Q. Have you any idea of the quantity of menhaden that have been caught during the past season?—A. No, sir; I have not.

Q. How many have you caught?—A. I think about six million.

Q. With your one boat?—A. There were two gangs. I didn't commence fishing until the latter part of May or the 1st of June. I built a new steamer, and the steamer was not finished ready to commence fishing until then.

Q. What is the usual season during which you fish?—A. I have commenced as early as the 14th of April, and fished until the 20th or 25th of November.

Q. You fish until driven out by cold weather?—A. Yes, sir; until the fish move south.

Q. They migrate?—A. Yes, sir.

Q. Did you ever examine the menhaden as to spawn?—A. Yes, sir.

Q. What is your observation in that respect?—A. My observation is that the spawning fish go south in the fall. Very few fish spawn (I never have seen but very few) in the spring; it is very rarely that you catch a fish that has spawn.

Q. When you first begin to catch menhaden in the spring they are poor; that is, comparatively poor?—A. Yes, sir; comparatively poor.

Q. Doesn't that indicate that they have come from the spawning beds?—A. I should say that it did, because when fish are full of spawn they generally are fat.

Q. How early in the season do they get so that they are really valuable for oil?—A. They are valuable for oil when we first begin to catch them.

Q. But I mean productive; I do not mean technically valuable; I mean when they are really productive in oil.—A. Well, we usually catch our finest fish in October and November.

Q. Have you ever examined them that season to see whether they have spawn or not?—A. Usually when we get fish that are quite fat we take some for table use, and in cleaning them we find spawn in them, and I have noticed when we catch a very large fish and open it to see if it has spawn, we usually find at that season of the year, late, that they have spawn.

Q. Then your impression is that they spawn during the winter?—A. Yes, sir; I think so. I think they spawn before they come north in the spring. They go south to spawn. I should say they spawn twice a year.

Q. There are many theories. A witness yesterday thought they went north to spawn.—A. I cannot think that they do, although we have large quantities of small fish in the north. We see them at the heads of bays and along the sounds, for instance; we see many small fish there.

Q. You have no opinion as to where they spawn?—A. No, sir; I have not.

Q. Whether they go into fresh water to spawn or not?—A. We find them in the mouths of rivers and bays; we find small fish there. But yet, as I say, in the spring of the year it is a rare thing that we find fish with spawn in them.

Q. How far up-stream have you seen them?—A. I never have been up there after them.

Q. You have not caught them there?—A. No, sir.

Q. As far as you have observed, what class of food-fish live on or eat the menhaden as food?—A. Bluefish principally.

Q. Is not that because the bluefish are more numerous?—A. I do not think it is. There is no lack of bluefish, of course. When we find plenty of bluefish we do not find any menhaden.

Q. They flee from the bluefish?—A. Yes, sir; they flee from them.

Q. Where they are pursued by blue fish, what do they do; go off on the surface or go to the bottom?—A. They do both. Sometimes the bluefish worry them so that they sink, and then again they rise to the top and get underneath and keep them off, and they do not capture them at all.

Q. How is the fact as to whether you take more or less food-fish in your ordinary operations of business?—A. In my eleven years' experience I can say that we have never taken, with two exceptions, more fish than what we would use for the table on board the boat. It is a very rare thing that we get more than what we want to use; very rare.

Q. If you take food-fish you cannot utilize them, I suppose, except for your table?—A. No, sir.

Q. You cannot keep them or preserve them for market?—A. No, sir; we have no ice or anything of that kind. The two exceptions that I spoke of were these: We caught at one time a school of bluefish, 1,800 of them, and at another time a school of weak-fish, and we ran them right into Fulton market in both cases; not one of them was used for fertilizing purposes.

Q. When was that?—A. That was in 1880 or 1881, I think.

Q. Some of the evidence shows that it was two years ago. We have had evidence about that before. Mr. Blackford gave testimony on that subject. They were sold to him, were they not?—A. Yes, sir; he sold part of them; Mr. Blackford handled part of them. One lot was weak-fish.

Q. At what season of the year is the catch of the menhaden the most numerous; when do you catch the largest schools—the largest quantity?—A. We make our largest hauls in May and June, and then in October and November. At that time the fish are making their passages, and they are in bodies—more compact. In warmer months they are spread out more on the surface.

Q. Where is your factory?—A. We have one at Barren Island and one at Shelter Island.

Q. What amount of capital have you there?—A. We have invested in the fishing business about \$175,000.

Q. Is any one interested but you and your brother?—A. There are four brothers.

Q. Do you find a ready market for your oils and fertilizers?—A. Yes, sir.

Q. What is the oil used for mainly?—A. It is used for tanning, for soap-making, and for lighting mines—coal mines.

Q. Does it burn freely?—A. Yes, sir; so I am told.

Q. Isn't it used some for mixing paint?—A. Yes, sir; I have used some for paint and find it a very good paint oil.

Q. I have the impression, obtained in some way, that your oil gets into linseed oil in some way?—A. Yes, sir; I think it does, the fish oil being the cheaper article.

Q. What is the market value of the oil?—A. It ranges from 38 to 43 cents a gallon, although that part of the business I am not fully acquainted with.

Q. What is the price of the fertilizer by the ton?—A. It has been sold this past year as high as \$38.

Q. Have you ever used it as a fertilizer?—A. Oh, yes, sir; I use it.

Q. Did you ever use guano?—A. I have used Peruvian guano.

Q. Which do you think the best?—A. I think the fish guano is equally as valuable, ton for ton and pound for pound, as a fertilizer.

Q. Do you know anything about the habits of the striped bass?—A. No, sir; I cannot say that I do. It is very rarely that we see one or catch one. I think they are a fish that come around in the spring, and I think they come earlier than the menhaden do, and they go away earlier in the fall than the menhaden do. They catch them on the

south side of Long Island in seines from the shore after the menhaden have gone by.

Q. Do they feed on the menhaden?—A. I suppose they do some. They are a much larger and stronger fish than the menhaden.

Q. The striped bass grow large, do they not?—A. Yes, sir; some of them weigh fifty weight, I suppose, or may be larger than that.

Q. Is there any more valuable fish than the striped bass?—A. I suppose the Spanish mackerel is as valuable.

Q. The salmon is. That ranks the highest, or sells for the most, does it not?—A. Perhaps so.

Q. If you think of any other statement you desire to make you can make it.—A. I do not know. As regards any legislation for the protection of menhaden, I do not think there is anything needed for that. The menhaden are in just as large quantities, so far as my experience goes in the eleven years' experience I have had, as ever, and so far as purse nets or steamers driving fish or stopping fish is concerned, I never have seen it in my experience. I have known at times where there have been fish, for instance in the year 1870, in the head of Long Island Sound. It is a very small place, right in the head between Throgs' and Sands' Point and as far down as Captain's Island. The fish are there the whole season, from the last of May until the very last of October or November. But there was a time when there was as many as forty steamers fishing among those fish, and they staid there the whole season and never left there. In my experience as a fisherman, I never saw a school of menhaden ever turned by a net; that is, when they were bound north, if the net was put in front of them, I never saw an instance where they were overturned or driven from the coast where they were going, either north or south.

Q. If I understand it, their general course is north towards the opening of the season, and south towards the close of the season?—A. Yes, sir; we sometimes find them working back and forth along the coast. Some days they would be working north and some days working south.

Q. How many times have you ever examined menhaden in the fall with reference to the question of whether they are spawning?—A. Of course I have always been interested in that part, to find out where they did spawn, every year that I have been fishing. I have taken notice of the fish to tell when they were full of spawn. It is very easy to tell when a fish is full of spawn by the looks of him without cutting him open. A spawn fish is very full.

Q. And that you find very different late in the fall?—A. Yes, sir; it is very different late in the fall. In the fall we find more spawn. It is an exception in the spring when we find fish with spawn in. I think the spawn fish come on in the spring, and I think they come earlier than the time when we begin to fish.

Q. Is it not true that all fish coming from spawning beds are poor; that is, less in flesh?—A. Yes, sir; I think that is so. After they spawn they decrease in flesh.

Q. And the menhaden do not get their full flesh until May or June, I think you say; that is, what you call full and hard?—A. I should say until September or October or November we get our best fish, although the fish make more or less oil during the whole season.

Q. How many steamers have you known engaged at any one time this season in this business?—A. I have been fishing among a fleet of about forty steamers this season.

Q. Catching an average of how much at a haul?—A. Our hauls vary from 1,000 to 150,000 or 175,000.

Q. Do you make more than one haul a day?—A. Oh, yes, sir; we make two; and I have made as high as ten hauls in a day.

Q. How many fish can you hold in your boat at a time; what is the size of your steamer; I mean the size of the fish-hole?—A. The fish-hole is about 28 feet long, and 20 feet wide and $9\frac{1}{2}$ feet deep. It holds about 350,000 fish—340,000 to 350,000.

Q. Your fish are thrown in there as you haul them in?—A. Yes, sir; we raise them by steam in nets, and they are dumped into the hole.

Q. About what quantity are taken at a time in that way; what quantities are raised and put in at a time?—A. The net I use holds about a thousand.

Q. Is it a net?—A. It is a net in the shape of a bowl, wide at the top and narrow at the bottom.

Q. With a rim to it, I suppose?—A. Yes, sir.

Q. Your nets will hold bluefish, won't they?—A. Oh, yes, sir; their mesh is small enough to hold them.

Q. And strong enough to hold them?—A. Oh, yes, sir; strong enough to hold bluefish.

Q. Is that the usual size of the mesh— $2\frac{1}{4}$ inches?—A. Two and five-eighths and $2\frac{1}{2}$ inches is about the usual size that we use.

Q. Do you know what the mesh of the mackerel nets is?—A. No, sir; I don't. They vary in size; it is a smaller mesh than that we use.

Q. The nets they use for blue-fishing, are they smaller or larger?—A. In catching bluefish they usually get a mesh large enough so that the fish will gill. If a bluefish gets his head through, he cannot bite the net. With our nets, if we get any bluefish in, they will strike the twine and bite a bar in two, and that will make the mesh long enough so that he can get his nose in and he will reach all around and eat the net. It is ruinous to our nets to catch bluefish in them. I have seen a new net that had not been in the water two weeks completely ruined by a haul of bluefish.

Q. How do you get along with sharks?—A. Well, we do the best we can with them; they tear our nets wonderfully.

Q. How many sharks have you caught this season?—A. I am bound to say that I destroyed 2,000 sharks this season. I destroyed over 200 in one day.

Q. By "destroyed" you mean killed; you put them into your hold?—A. The smaller sharks we do, but the very largest ones we throw overboard. They are hard to render at the factory, the larger fish are, unless they are cut up and cooked very slowly; but generally we use the most of them.

MR. WILLIAM F. BROWN. With the permission of the committee, I would like to ask a question or two.

(To the witness.) There is one question that the Senator has not asked, in regard to previous years—whether there has not been more of a scarcity in previous years than in the past year, and whether in the fishing of previous years there has not been a scarcity of menhaden, say in fishing ten or twelve years ago?

THE CHAIRMAN. You mean less than there are at the present time?

MR. BROWN. Yes; less than at the present. I would like to ask if about twelve years ago there was not a year when we fished up to July and did not get any fish, before there were steamers used.

THE WITNESS. I do not know about twelve years ago. Seven years ago, up to July there were very few fish caught.

MR. BROWN. It might be longer than that; twelve or thirteen years ago. There was one season when we did not get any fish.

The WITNESS. I have been a practical fisherman for eleven years, but I have been engaged in the fish business longer than that.

The CHAIRMAN. How long?

The WITNESS. I have been engaged in the fish business for thirteen or fourteen years. I was some time before I took charge of a boat. I do know of instances; I know the year before I commenced in the business, one of the brothers' boats, called the Sirocco, crossed from Montauk Point to Sands' Point and never saw a fish. That was in the month of July, I think.

Mr. BROWN. There was a year when there was no fish caught; I do not remember what year.

The WITNESS. I know that, from what I have heard, but I was not in the fishing business then.

Mr. BROWN. Don't you know that they were as plenty after that season as ever?

The WITNESS. Yes, sir.

Mr. BROWN. Can you distinguish any difference between the flow of fish to the north or their return to the south; have you been able to do that?

The WITNESS. I never have been able to see any difference; just as many go north as south.

The CHAIRMAN. They are an uncounted multitude at all times?

The WITNESS. Yes; there is no question about that. Anybody who wants to see the quantity of these fish should take a trip on these steamers and see them and be satisfied.

Mr. BROWN. Have you not seen the time when the water would be alive with them as far as the eye could extend at this moment, say, and then after an hour there would not be a fish seen on that ground?

The WITNESS. Yes; that has happened within this past year; some time in July.

By the CHAIRMAN:

Q. How far can you see a school of menhaden ordinarily?—A. You can see them from 200 rods to 2 miles. I have seen schools of fish 2 miles.

Q. Do you use glasses?—A. No, sir; we see them with the naked eye. In regard to the fish disappearing all at once, I would state that that happened this past year, I think in July. I was fishing and got on to the fishing ground before daylight in the morning and laid there until sunrise, and then as soon as we could see, we found we were amongst countless numbers of menhaden. We commenced fishing and fished three hours and made one or two hauls apiece and then all at once the fish sank.

Q. They were afraid of you?—A. Oh, there were millions and millions that we never saw. They did not appear any more until after twelve o'clock, and then they rose again and we filled the steamer in a very short time. I know I remarked at the time to the man at the mast head—"Well," I said, "if we had just arrived on the ground at this moment, and had not been here this morning, we would say that there was not a fish within a hundred miles of us, but we know we are sailing over fish because we have seen them this morning." And to all appearance a fish was not to be seen. I think that is often the case; we sail over fish and do not know of their presence at all in that way.

Mr. BROWN. Have you, during your experience, been over ground and had them rise up all about you?

The WITNESS. Yes, sir; I have sailed in Long Island Sound from one

end to the other and have never seen a fish, and afterwards saw millions and millions of them in the same place, within a very short time afterwards.

Mr. BROWN. I was out one day, with Captain Dayton, off Sandy Hook, and did not see a fish, and all at once they began to come up and up by hundreds and thousands.

The WITNESS. That is often the case with us.

Professor BAIRD. Do you attribute this appearance and disappearance of the fish to any change in the water, any change in the wind, or any thing of that kind?

The WITNESS. Yes, sir; I think an east wind has a tendency to settle fish, and in Long Island Sound particularly, a northwest wind will sink the fish there. The fishermen count it almost useless to look for them in Long Island Sound with a northwest wind.

The CHAIRMAN. Does a thunder-storm affect them?

The WITNESS. Yes, sir; a thunder-storm while in progress will affect them, but after the thunder-storm is over they usually rise to the top. I have seen some excellent fishing after a thunder-storm has passed over.

By Professor BAIRD:

Q. Were the menhaden decidedly more abundant last fall than they were in the summer and earlier?—A. There was no lack of fish last summer, no part of the time, to the south; there was not any part of the season but what there was plenty of fish.

Q. But these were smaller fish, were they not?—A. No, sir; they were large fish. There was plenty of large fish; more than ever I saw before. In all my fishing experience I never saw anything in comparison to what I saw last year.

Q. Do you fish south, yourself?—A. I fished from Montauk as far south as Fenwick's Island this season.

Q. Did you find in those southern fish a bug—a shrimp or crab—that comes out of the mouth of the fish?—A. I never have seen any of those fish with a bug in the mouth.

Q. All the Chesapeake Bay menhaden have them, do they not?—A. I have seen them with these little insects on their sides.

Q. I mean the one that crawls out of the mouth.—A. I never have seen any of those that I ever caught. I have seen them preserved in alcohol. I saw one specimen that Professor Goode had, and that is the only one that I ever saw. I never caught any with a bug in the mouth that I ever knew.

Professor GOODE. Do you know anything about that school of alleged spring-spawning menhaden about River Head, in one of those bays on Long Island—the school supposed many years ago to spawn about River Head in the spring?—A. No, sir; I do not know anything about them.

Q. A number of fishermen from that region have told me about it.—A. I live near River Head, but I do not know anything about it.

By Professor BAIRD:

Q. Did you ever find the menhaden at any time where the eggs would run out of the belly as they do with the shad?—A. No, sir.

Q. When you speak of spawning, you mean where they are swelled up?—A. Yes, sir.

Q. But you never found them where the eggs would actually run out when you handled them?—A. No, sir.

Q. You have seen shad do that, haven't you?—A. No, sir; I never have.

Professor BAIRD. That bug is a very remarkable feature of the menhaden on the coast. It is a little crab. When you haul them on the shore or deck of the vessel you will see these little crabs coming out of the mouth all the time. They fasten and hold on to the roof of the mouth.

The CHAIRMAN. It is not a food that they eat?

Professor BAIRD. No, sir; it is a living parasite, just like the crab you see in the oyster. All the way down to Florida, all that school from Chesapeake Bay south have these bugs. I have never found any-body in the north who ever admitted to have seen them.

The WITNESS. I never have. This specimen I saw was a very small fish, and it was caught in Chesapeake Bay, I think. As regards bluefish following on menhaden, I never have seen in my experience a large body of bluefish make their appearance but what the menhaden left directly. I know in my experience (it is about seven or eight years ago), on a Saturday afternoon, late on Saturday, when we had not had any fishing for a number of weeks and had hardly seen a menhaden, in going into Gravesend Bay on Saturday afternoon just before sundown, the fish seemed to strike in from sea, and from the deck of my sloop I counted forty schools, at one look, of menhaden. We had not seen any before for weeks. The next Monday we went out, expecting to make large hauls of fish, but never saw a fish. They had left the coast for some reason or other, and surely it was not purse nets that had driven them away, because there was nobody fishing with them, because they had not seen a fish for weeks before. I often see that in my experience in fishing, that the fish come on the coast, and if you leave them over night the next morning they are gone, and nobody knows where they have gone to.

Mr. WILLIAM F. BROWN affirmed and examined.

By the CHAIRMAN:

Question. Please state your residence.—Answer. I live at Point Pleasant, Ocean County, New Jersey.

Q. You may state to the committee any facts in your possession relating to the subject under investigation.—A. The question of fishing for menhaden by steamers with shirred or purse seines is agitating the people of the State of New Jersey generally, as well it ought. Scores of steamers during the fishing season, owned and manned by non-residents of the State, can be counted daily along the coast, whose business it is to catch these fish, and with these also the better grades of fish, and manufacture them for mechanical and fertilizing purposes. This wanton destruction of what is designed by a beneficent Creator for the food and sustenance of man has been prosecuted to such an extent that the occupation of many of our citizens is being destroyed, while the increasing demand for this desirable food and luxury is being constantly diminished, and that by non-residents of the State. Under these circumstances, and the continued persistence in their business by the parties I refer to, it can readily be seen that the period of time is near when not only the people along the seaboard will be deprived of these long-enjoyed natural rights and franchises, but these outside and foreign fish marauders will destroy their own (to our minds) illegitimate occupation.

The question is now properly before the people of the country, and of necessity it must be met. The question as to the jurisdiction of the waters of the Atlantic Ocean adjacent to the State of New Jersey has.

been and is being examined, and notwithstanding the governor of that State has seen proper to withhold his approval of a prohibitory law applicable to the case, passed at the last session of the New Jersey legislature, eminent lawyers are of the opinion that the State of New Jersey may exercise a certain or limited jurisdiction of the waters in question. It is with due respect to the decision of the governor that the question is at present yielded. Others of our citizens, candor compels me to say, believe that the Congress of the United States alone can exercise jurisdiction over these waters.

It affords me pleasure to know that while this important matter is before the people, our Senators and Members of Congress have become enlisted in our welfare, and are securing the co-operation of their co-members. The numerous petitions on this subject, and the almost unanimous vote of both branches of the New Jersey legislature in the winter of 1882, are clear and unmistakable evidences of the popular feeling in relation to this question. Having been denied the protection sought, by the executive authority of the State, the people aggrieved seek the needed relief and protection from the United States.

In referring to the statement of Senator Sewell to the senate of New Jersey, I can only say it expresses the facts in the case. I quote from his letter. He says:

The evil is a crying one, and must be suppressed by the best means at hand. The growing popular interest in the shore line of our State, and its magnificent summer resorts, have really brought this question up as one of the principal industries of New Jersey, from which we receive a revenue equal to, if not in excess of, that from our manufacturing interests.

It will not be regarded as underrating or undervaluing the knowledge of gentlemen who possibly may be better acquainted with this question than ourselves if I present for consideration some of the evils with which our fishermen are obliged to contend.

The first thing we find confronting us is organized capital, to the amount of millions of dollars, against unorganized and poor fishermen along our coast, with *no* pecuniary ability or capital at their command with which to meet it. It is well known that they have counsel employed, and a strong lobby, backed by wealthy capitalists, at work upon the New Jersey legislature, and this clearly demonstrates what they may be expected to do at Washington. This, it will be admitted, poor fishermen are not prepared to contend with, and therefore need the protection it is in the power of Congress to grant.

This capital invested in the menhaden steamers and the apparatus connected with them is an insurmountable obstacle in the way of our shore fishermen's success. The latter, with their simple machinery of row boats and seines, cannot compete with the steamer fishermen. It is only necessary for us to compare the two methods of fishing to see that, with these obstacles, our fishermen have no chance whatever. A school may be in sight—the shore fisherman with boat and seine ready to push into the sea is at once defeated and mocked, while the steamer with her lookout at mast-head steams within proper distance, the small boat is pushed off, the school is surrounded with the purse seine, and in a few minutes scooped into the hold of the vessel, while our shore fishermen look on, only to be laughed at.

The question then recurs, does the amount of revenue or income accruing from the steamer fishing exceed that in the aggregate which is or may be derived from the labors of our own fishermen? It may be difficult to determine this question, but granting for the argument's sake that it is in favor of the steamer men (which we are not prepared to be-

lieve), does that argue that protection and favor should be given to capital—afforded the rich as against the poor? No such proposition as this, it seems to me, would be reasonable, just, or right.

A reason given in favor of the menhaden fishermen is, that the menhaden, or moss-bunkers, are, like wild geese, migratory, and therefore should be caught and utilized when opportunity is afforded. This is a recognized fact by our own fishermen. If the argument holds good for the steamer men, does not the same argument apply to fishermen on shore? Or, is there not a good reason here why Jersey fishermen should be protected, and enjoy the benefit of what a kind nature or Providence sends to their shores? The steamer fishers may follow up the fish. The Jersey fishermen cannot. I may be permitted to say that this idea of migration is known to hold good in relation to other fish—the striped bass, the bluefish, the codfish, &c. But we are told when asking protection that there is no diminution of the fish, and that therefore protection is not demanded.

This we are obliged to deny. In doing so we would not merely impose our own opinion. It has been stated, we are told, that the past season fish along our coast have been unusually plenty. If there have been short intervals when good catches have been made, it will probably be found upon investigation that during these seasons the steamers were not along our coast. This, then, instead of an argument in favor of the steamer men, would be most conclusively against them, and in favor of the statement that the presence and operations of the menhaden steamers are constantly diminishing both the menhaden and the better grades of fish also. I am now speaking of the coast of New Jersey, and more especially of the vicinity where I reside. Years back, and up to within a short time, our fishermen have been in the habit of making large draughts of fishes, especially *bunkers*. I have known them to be carted away in wagon-loads formerly, for many miles back in the country, to be salted for winter fish; great quantities of this kind of fish were formerly caught and used for food fish. If a haul has been made, a wagon-load caught, on our beach the last year or two, I have no knowledge of it. But I will furnish this honorable committee ample testimony to confirm my statement. While I might say that I have frequently stood upon the beach and with squid and line pulled in the bluefish—yes, an expert could pull to shore, say a hundred or more—such occurrences as these are now rare and seldom occur. The bluefish follow the menhaden food. The fishes' food being caught or driven away, this delightful and profitable aquatic sport is also largely destroyed.

But as to the question, has a diminution of fish along the coast followed as a result of the appearance and operations of the menhaden steamers? I have already given, to a limited extent, my own personal observations. First, if the large quantities of these fish caught by the menhaden steamers is an argument on the point in question, that would indicate the fact that there must be diminution.

George Carver, a fisherman, and neighbor of mine, says he has been on board and witnessed the operations and work of these steamers. He says these steamers will hold 50 tons or more. He has seen them take from one school a full load. He has known 25 such vessels to leave in one day, loaded. Is not the idea preposterous that this wonderful draught from day to day should not diminish the fish? No sane person will believe it. I have counted myself, within easy range of the naked eye, sixteen; and a neighbor reports that he once counted thirty such vessels.

To give some idea of the amount, or quantities, of fish used up by these steamer men, I may be allowed to quote from a pamphlet published by Prof. G. Brown Goode, of Providence, R. I., entitled "A short biography of the Menhaden." The work must be reliable, as it has been circulated by the menhaden men themselves. On page 10 it says:

Several hundred thousand are frequently taken in a single draught of a purse seine. A firm in Milford, Conn., captured in 1870, 8,800,000; in 1871, 8,000,000; in 1872, 10,000,000; in 1873, 12,000,000. In 1877, three sloops from New London, seined 13,000,000. In 1877 (an unprofitable year), the Pemaquid Oil Company took 20,000,000, and the town of Booth Bay alone 50,000,000.

The New York Herald of January 31, 1882, says:

Surveyor King of Greenport, L. I., reports the following statistics of the menhaden fishery on the Long Island coast for 1881: Menhaden, rendered, 151,000,000 (some say bushels); gallons of oil manufactured, 650,000; tons of scrap, 13,616; tons of edible fish marketed from Greenport, 770.

I would now respectfully submit the testimony of a number of fishermen in the vicinity of where I reside, certified to before a notary public. These certificates represent fishermen whose ages range from twenty-six to seventy-three years. They are as follows:

NEW JERSEY,
Ocean County, ss:

I, W. James Cook, thirty-eight years of age, having spent much of my life as a fisherman, do solemnly declare that I believe the steamer fishing with purse seine operates very much against us as fishermen. I have witnessed as many as sixteen of such steamers within about three miles or in a distance of three miles. I have been aboard of such steamers, and was told by those on board, on one occasion, that the vessel would hold from 900 to 1,000 barrels, and I believe they all became loaded the same day.

WILLIAM J. COOK.

Personally appeared before me, the above-named William J. Cook, this 1st day of January, 1883, and certified to and signed his name to the above statement.

WILLIAM F. BROWN,
Notary Public, New Jersey.

POINT PLEASANT, OCEAN COUNTY, NEW JERSEY,
January 1, 1883.

NEW JERSEY,
Ocean County, ss:

I, C. W. Harvey, am thirty-two years of age; have pursued the occupation of fishing a good portion of my life; I have observed the effect of the fishing with purse seines by steamers, and in consequence of their operations the fishes' food is caught, and we are deprived of the food fish, and thus our business very much injured.

CHARLES W. HARVEY.

Personally appeared before me, the above-named C. W. Harvey, this 1st day of January, 1883, and certified to and signed the above statement.

WILLIAM F. BROWN,
Notary Public, New Jersey.

NEW JERSEY,
Ocean County, ss:

I, William Fleming, twenty-five years of age, do certify that from my personal observation, being a fisherman, the fishing of the menhaden steamers operates seriously against the fishermen, and the interest of the people, by depriving us of not only the moss-bunker, but by destroying these, drive away also food fish, such as bluefish, &c.

WILLIAM FLEMING.

Personally appeared before me, this 1st day of January, 1883, the above-named William Fleming, and certified to and signed his name to the above statement.

WILLIAM F. BROWN,
Notary Public, New Jersey.

POINT PLEASANT, OCEAN COUNTY, NEW JERSEY,
January 1, 1883.

NEW JERSEY,
Ocean County, ss :

I, William H. Pearce, am forty years of age (about); I have followed sea fishing much of my life; before the steamer fishing with purse seines we had plenty of moss-bunkers and other fish; I have known large quantities of moss-bunkers and other fish caught on the beach here before these steamers appeared; since their work has been going on very few fish of any kind are hauled in seines on the beach. I solemnly believe this steamer fishing with purse seines is very injurious to our interest along the coast.

WILLIAM H. PEARCE.

Personally appeared before me, at Point Pleasant, N. J., this 1st day of January, 1883, the above-named Wm. H. Pearce, and certified to and signed the above statement.

WILLIAM F. BROWN,
Notary Public, New Jersey.

POINT PLEASANT, OCEAN COUNTY, NEW JERSEY,
January 1, 1883.

NEW JERSEY,
Ocean County, ss :

I, Thompson B. Pearce, of Point Pleasant, N. J., am forty-three years of age; I have followed sea fishing through much of my life; I have seen the operation of the menhaden steamers with purse seines, and I am well satisfied that their operations along the coast are very detrimental to both the interests of fishermen and the people. Before the appearance of these fishermen we were in the habit of catching large quantities of moss-bunkers and other better fish. Since their operations we very seldom make a haul of the seine; indeed, our occupation is so materially affected that the beach seine is very seldom used. I believe if this kind of fishing could be stopped it would be for the benefit of the people along the shore.

THOMPSON B. PEARCE.

Personally appeared before me, this 1st day of January, 1883, the person named in the above, Thompson B. Pearce, who is known to me, and certified to and signed the above.

WILLIAM F. BROWN,
Notary Public, New Jersey.

POINT PLEASANT, OCEAN COUNTY, NEW JERSEY,
January 1, 1883.

NEW JERSEY,
Ocean County, ss :

I, David Fleming, am nearly fifty-four years of age; I have followed sea fishing since boyhood. I am acquainted with the mode of fishing by the menhaden steamers with purse, seines, and I am well persuaded their operations are destructive to fish and the fishing interest of the people along our coast. Formerly we were in the habit of fishing with gill and other seines, and used to catch large quantities of moss-bunkers, blue-fish, &c.

I am part owner in seines and boats, but have very little use for these now. We did not even make a haul this season, and have no encouragement to do so. The menhaden fishermen we cannot compete with. This statement I believe is correct and true.

DAVID FLEMING.

Personally appeared before me, this 1st day of January, the above-named David Fleming, this 1st day of January, 1883, and certified to and signed the above statement.

WILLIAM F. BROWN,
Notary Public, New Jersey.

POINT PLEASANT, OCEAN COUNTY, NEW JERSEY,
January 1, 1883.

NEW JERSEY,
Ocean County, ss :

I, Jacob Fleming, of Point Pleasant, Ocean County, New Jersey, do certify that I am seventy-three years of age; that I have always lived in this vicinity; that my chief

occupation of life has been fishing in the season, sometimes in the bay or river, but my chief fishing has been sea fishing, and that for any kind of marketable fish that could be caught. I am one-sixth owner in a fishery, consisting of boats, seines, &c.

I certify that I have often observed the operation of the steamer menhaden fishermen with their purse nets, and I am conscious of the fact that their work among the fish is very destructive. I have counted fifteen or twenty of these steamers at a time within a few miles, and within a few hundred yards of the beach, and with man at mast-head watching for schools of fish. The school could be descried by the lookout for the distance of a mile. It can be very readily seen that the shore fishermen could by no means compete with such an enemy, and hence our business is well-nigh or quite destroyed.

Before these steamers came into our waters, or the waters contiguous to our beach, we were in the habit of making large and profitable hauls of moss-bunkers, bluefish and others. I certify that we have caught as high at one time as about 40,000 bunkers at one haul. I further certify that our occupation and dependence for family support has been destroyed, and the chief cause is to be attributed to them menhaden steamers with purse seines. To such an extent has this operated against us, that our business has been abandoned and our implements are laid up and idle. The bunkers not caught by the steamer fishermen are frightened from the beach, and consequently we are left without the bunkers, deprived of the fish that feed on them, and therefore deprived of our ordinary means of support, and we earnestly desire relief and protection.

JACOB FLEMING.

Certified to and signed before me, this 1st day of January, 1883, the above-named Jacob Fleming.

WILLIAM F. BROWN,
Notary Public, New Jersey.

POINT PLEASANT, OCEAN COUNTY, NEW JERSEY,
January 1, 1883.

NEW JERSEY,
Ocean County, ss :

I, John H. Ortley, am forty-seven years of age, and am a resident of Point Pleasant, Ocean County, New Jersey. Ever since a boy I have been in the habit of fishing in the sea. I can certify that formerly, and before the menhaden steamers commenced their operations along our beach, we were in the habit of catching large quantities of mossbunkers, bluefish, &c., but that since their operations have been going on, we very seldom see an opportunity to make a haul, as, when one occurs, it is ordinarily gobbled up before it comes near enough to the beach. We therefore feel great need of protection in this matter.

JOHN H. ORTLEY.

Personally appeared before me, at Point Pleasant, Ocean County, New Jersey, this 1st day of January, 1883, the above-named John H. Ortley, whom I know, and certified to and signed his name to the above statement.

WILLIAM F. BROWN,
Notary Public for New Jersey.

POINT PLEASANT, OCEAN COUNTY, NEW JERSEY,
January 1, 1883.

NEW JERSEY,
Ocean County, ss :

I, Joseph W. Fleming, am forty years of age, a resident of Point Pleasant, Ocean County, New Jersey; and do certify that I have during my life been engaged more or less in maritime pursuits, and much of my time in the business of fishing in the sea. I have frequently noticed the operations of the steamer menhaden fishermen, and often been on board said steamers. In consequence of their operations, we have not been able to catch bunkers ourselves, and have been forced to buy of the steamers or go without. I am prepared to certify, to the best of my knowledge and belief, this mode of fishing cannot be competed with by our shore fishermen, and therefore our fisheries afford very little revenue to ourselves or the community. I feel that we ought to be relieved of and protected against this afflictive grievance.

JOSEPH W. FLEMING.

Personally appeared before me the above Joseph W. Fleming this 1st day of January, 1883, and certified to and signed his name to the above statement.

WILLIAM F. BROWN,

Notary Public, New Jersey.

POINT PLEASANT, OCEAN COUNTY, NEW JERSEY,
January 1, 1883.

Mr. JAMES BUCHANAN sworn and examined.

By the CHAIRMAN :

Question. Please state your residence.—Answer. Trenton, N. J.

Q. How long have you resided in Trenton.—A. Since December, 1864.

Q. What is your occupation?—A. Counselor-at-law.

Q. What acquaintance, if any, have you with the subject of fisheries?—A. I have somewhat of an extended acquaintance throughout the bays and sounds of the New Jersey coast. I have been in the habit for years of taking my vacation along that coast and on those bays and through those sounds in connection with a club of other gentlemen, and fishing in those waters. I have no acquaintance with off-shore fishing. That acquaintance has extended through some ten or twelve years and in all the waters of New Jersey, along the coast, without any exception, or but scarce an exception, from Cape May to Sandy Hook. I take my vacation in that way.

Q. Your fishing is within what range from the shore?—A. It is not off-shore fishing; it is in the bays and sounds and thoroughfares entirely and it is with hook and line. I am not a professional fisherman, but simply a fisherman by brevet.

Q. You may state your observation as to the quantity of the various food-fishes at different periods during the time you name.—A. I have observed more particularly the fishing in Barnegat Bay, which is the largest bay on our coast, and from which I think more food-fish are taken by shore-fisherman—I mean by that, by men residing along the shore and catching the fish for the support of their families—than any other portion of our coast. When we first commenced taking our vacations along the coast we found that bay well stocked with, amongst others, bluefish. It was not an uncommon thing for us to strike a school of bluefish very frequently in our cruises in the bay. The other kinds of fish that we found there were known by local names, such as the weak-fish, or, as they called it there, the “wheat” fish—a good many of them do—and the porgy, and another fish known as the Cape May goody; they were the main fish. The result of my observation during the past few years has been this: that as the number of steamers cruising along the coast in search of menhaden has increased, the supply of bluefish in the bay has very materially diminished, until this past season we were not able to find any, and I have learned from careful inquiry of but few catches of bluefish in the bay. As I stated before, I know scarcely anything about off-shore fishing. I know that these two facts exist. I know that they exist contemporaneously, and yet I am not able to demonstrate to a mathematical certainty that the one is the result of the other. I may say further that I became somewhat interested in these questions a few years ago because of the complaints that were made to me, as I have stated, by those parties along the shore—I mean those who had been in the habit of supporting their families by catches of fish taken with the hook and line. Their complaints were to the effect that the off-shore fishing of these steamers with purse-nets was destroying their business. I thereupon made some inquiry and paid some attention to the matter, and in connection with Mr. Brown endeavored to secure legislation from

our State legislature that would give us protection. The bills were passed by both houses by handsome majorities, although they were opposed by gentlemen interested in the menhaden fishery, who employed counsel to appear before the committees.

The CHAIRMAN. We have all those records before us, with the opinion of the Attorney-General.

The WITNESS. I was about to say that they were vetoed upon the opinion of the Attorney-General, and thereupon Senator Sewell introduced the bill which you now have before you. I was not aware of the fact that you had that information. I have also, in connection with my own experience in fishing in those bays, been observant of the catches brought in in the morning by the fishermen residing along the coast, and I have noticed year by year a diminution of the number of bluefish brought in by them; in fact, it has almost entirely ceased.

Q. Does your State law prohibit the taking of bluefish at any portion of the year?—A. It absolutely prohibits their being taken by net in some portions of our waters at any time. I think it does not prohibit their being taken by the hook at any time or period. That is my impression, although I cannot answer positively as to that. On my return I will address a note to you, giving you a copy of the law we have, with your permission. I have observed those steamers very frequently off our coast. I have seen a large number of them in sight at once lying along the coast, sometimes within 100 yards of the shore. Our coast from Atlantic City north is rather shoal—I mean the water is deep enough for them to approach closely to the shore, but beyond that the shoal water runs out further and would prevent larger vessels coming so near.

Q. Is not the water deep all the way from Atlantic City to Long Branch?—A. Yes, sir; but when I speak of shoal water I speak with reference to larger vessels. It is deep enough for these smaller steamers to approach closely to shore. But these steamers come from some other point. There are two or three establishments in New Jersey, I think, engaged in this business; but the great majority of these steamers come from other points on the coast, and naturally are not regarded with a very affectionate eye.

Q. What portion of the entire coast of New Jersey is occupied by fishermen?

The WITNESS. By fishermen do you refer to fishermen of the character I have named, who fish by hook or small nets?

The CHAIRMAN. Yes.

The WITNESS. On the whole coast, the entire coast, you will find these fishermen, from Cape May to Sandy Hook. You will find a good many of them laid up for the last season or two; but they exist with their appliances and implements along the whole of the coast.

Q. I wanted to have it go on the record. At what points do people come as sportsmen, in the summer season; name the various points.—A. The whole of the coast, I might say, particularly in the waters about Hereford Inlet, Atlantic City, Egg Harbor, and Barnegat Inlet; but beyond that there is no inland fishing; the fishing is off shore, or from the rivers, especially Shrewsbury River, running in back from Sandy Hook. There are not so many fish found in them.

Q. This prohibition against using seines goes out as far as your State laws extend, I suppose; it covers all bays and estuaries?—A. Yes, sir; it covers some portions. There was a difference of opinion between the fishermen as to whether they should be allowed to continue the use of the seine, or whether they would all be restricted to the use of the hook, and

there was a compromise effected by which the law covered a portion of the water only.

By Professor BAIRD :

Q. Is this restriction as to seining for the entire year, or part of the year?—A. It is for the entire year.

Q. For any limited or definite period of time, or absolute?—A. Absolute; that is my recollection, that it is absolute. I remember one instance of that particularly, where it covers a portion of the waters, and not others. There is one line drawn there from the north or south beach (I do not now remember which) of Barnegat Inlet across the bay to Waretown Ferry.

Mr. BROWN. South.

The WITNESS. On the one side of that line they may use seines, and on the other not. My impression is that sometimes on dark evenings they are not able to observe the line.

By the CHAIRMAN :

Q. Do you think of any other statement that you desire to have go on record; if so, you may make it.—A. It has been stated here by our commissioner of fisheries, Mr. Anderson, that the catch of fish in our bays and waters along our coast last year was as large as it had been for a long time. He stated that in response to a question that was asked him, or at least I so understood it. My observation and information is not entirely the same as that. The catch of food-fish other than bluefish was quite large last year, but the catch of bluefish was decidedly the smallest that I have known for years, and something has almost entirely, as I have said, broken up bluefishing in our bays and sounds where it formerly was quite an important item of income to our people living along the shore. I want simply to say, too, that these fishermen residing along the shore are an industrious race of men, but they have followed an occupation which has not resulted in the accumulation of much means, and there are many of them very seriously affected by the falling off in the supply of bluefish. A good many of them have practically ceased their business, and, if the committee will pardon me, I would like to express my regret that some means could not be taken for securing the attendance of a number of those men who are thus affected. I am aware of the fact that gentlemen who are interested in menhaden fishing are able to secure a full and proper presentation of their facts, but these fishermen are isolated; they are not associated as to capital or in any other way.

The CHAIRMAN. In regard to that I will say that I relied entirely on Senator Sewell as to the persons I should summon.

The WITNESS. But the difficulty in that case would be that Senator Sewell might not be able to secure the attendance of these men, as many of them could not advance the necessary money to come on here. I was not aware of the fact that the sub-committee held sessions at Atlantic City and Long Branch until after the sessions were held, or I would have secured the attendance of a number of these men there.

The CHAIRMAN. We expected them; we were two days at Long Branch and one day at Atlantic City.

The WITNESS. It was not known to the fishermen that the sessions were to be held.

The CHAIRMAN. I was in communication with Senator Sewell all the time.

The WITNESS. By some means the information did not get to the fishermen; at any rate, our men did not get this information, or they

would have been there—these men who depend upon their fishing. When I say “these men,” I do not mean those who fish with the hook alone, but also off-shore fishermen as well. Mr. Brown has done what he could to remedy that by securing the statements of a number of these men; but we could have secured the attendance of a few representative men from each portion of the shore.

The CHAIRMAN. Mr. Brown’s affidavits will probably answer all the necessary purposes in that regard.

Mr. BROWN. If I may be permitted to speak, I would say that I fully sympathize with the remarks of Judge Buchanan, and I would be very glad if two or three gentlemen along the coast from Sea Bright to where I live could be brought before the honorable committee.

The CHAIRMAN. If you choose to send me the names, I will determine then whether to continue the examination or not.

Mr. BROWN. I sent the names to Major Anderson two or three weeks ago.

The CHAIRMAN. I have not received any.

The WITNESS. I may add this, that ten years ago it was no uncommon sight to see from one to twenty schools of moss-bunkers in sight in Barnegat Bay. Last year I did not see but one school during a stay of ten days on the bay, and this year I did not see any school whatever during ten days upon the bay. There has undoubtedly been a very sensible diminution in the number of moss-bunkers entering the bay.

Prof. G. BROWN GOODE sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. In Washington.

Q. You are connected, I believe, with the department of fish and fisheries?—A. Yes, sir; since 1874 I have been, under Professor Baird’s direction, in charge of the special investigation upon the natural history of fishes and the fisheries of the coast, and in 1879 I was placed in charge, by the Superintendent of the Census, of the fishery division of the census work, and have during this whole time been giving a large portion of my time to studying the general questions of the fisheries of the coast and their connection with the habits of the fish.

Q. In the first place, I will direct your attention to what your observation is in regard to the season of spawning of the menhaden, and the locality when and where they go to their spawning beds, so far as you are able to state.—A. The menhaden—like the herring and, so far as I know, the other fishes of the herring family, which do not enter rivers—spawn on a falling temperature in the fall, and go south, as the spawning season approaches, from their feeding ground. We have had thousands of observations made in regard to menhaden under competent direction, and by fishermen along the coast upon our request, and we have had the most positive evidence, I think—certainly satisfying to myself—that no menhaden spawn in the summer months, the spawn in summer is very small and anybody who knows about these things knows it is very far from maturity. As the fall approaches, and the season for their migration southward draws near, the spawn seems to increase in size, and there have been numerous instances where in October and November late schools of menhaden, which have perhaps been retained in some creek in the coast, or driven ashore on their southward movement by schools of bluefish, have been found almost ready to spawn. There have been a few instances—they have not come under my personal observation but have been reported to me by persons in whom I have confidence—of menhaden being found very early in the spring with spawn

in them. I have here the notes giving the exact information about some fish that were sent to us in the fall with the spawn in them.

The general idea is, as we look at it, that the menhaden spawn in the winter months, perhaps in November and December, may be as late as January or February, off the coast, or at any rate south of Cape Hatteras. We think it probable that they spawn at sea, some distance from the shore, and that there is a limited—a spring—school, which may perhaps spawn upon the coast as far north as New York, or the eastern end of Long Island. It is my opinion that they spawn, the large majority of them, probably 90 per cent. of them, south of the Chesapeake Bay. I would like to call your attention to two cases, because they are the only definite observations that have been made upon the ovaries of the menhaden. Mr. D. T. Church sent to the Smithsonian Institution, November 6, 1881, a number of specimens of large menhaden taken from a large school which appeared at the mouth of Narragansett Bay, November 1. These fish had the ovaries nearly ripe and probably would have spawned within a month. Col. M. McDonald has sent me four menhaden caught by him in gill-nets in Hampton Creek, Virginia, November 27, one of which was full of nearly ripe eggs. Mr. D'Homerque states that the November fish in Barren Island are full of spawn. I wish to say that in my report on menhaden I gave an estimate of the number of eggs, which I have since found to be thoroughly erroneous, and I wish to correct it by saying that the ovaries of these menhaden which were received from the Chesapeake Bay were counted and it was found that there were not less than 150,000 to 200,000 eggs in each of the fish; that was the average of the four fish, showing that the menhaden is very much more prolific than the shad and herring, leaving out, of course, the cod and halibut, which have millions of eggs. I think there is not only no evidence to show that the menhaden spawn on our coast in the summer, but there is decided evidence that they do not spawn later than the 1st of April or earlier than the 1st of November in any of the waters in which they are caught, to any extensive degree.

Q. What is the usual number of spawn in a bluefish?—A. I could not tell you off-hand. I should rather not make that statement without referring to my notes.

Q. Can you state as to any of the food-fish—the shad, for instance?—

A. The shad, I think, have from 10,000 to 25,000, according to size.

Professor BAIRD. About 25,000.

The WITNESS. It varies with the size of the fish. Young fish have not so many.

The CHAIRMAN. How with mackerel?

The WITNESS. Mackerel, I think, have from 55,000 to 75,000.

Professor BAIRD. 50,000 to 60,000, I think, is the number.

The WITNESS. The cod is more prolific; that goes into the millions, and the halibut also into the millions.

Professor BAIRD. We have a specimen of cod which furnished nine million eggs—one fish.

By the CHAIRMAN:

Q. The quantity of spawn in menhaden, for so small a fish, is very large, is it not?—A. Yes, sir; and these fish I referred to were small fish. One of these fish had 262,859, and the other 144,928 eggs. These fish were, I should say, not over two years old. A four-year old menhaden, I should think, judging from analogy, might have nearly double that number of eggs.

Q. What is the weight of them?—A. I should say that they weighed about one-half to two-thirds of a pound.

Q. Haven't you got that too high?—A. No, sir; I think not. They were average individuals. The large fish weigh over a pound. These were not full-grown fish; I think about two years' old. I have here a statement which might be interesting to you; an examination of 200 specimens which were received at one time from this one place, stating the proportion which had ovaries in an active condition.

Q. That was received in November, 1881?—A. Yes, sir. These 200 were sent the 6th of November, 1881. Seventy of them were opened, of which 30 appeared to be males and 40 females. Of the whole number examined only one single pair, a male and a female, appeared to be mature. In all the rest the ovaries and spermaries were quite undeveloped, so that in most cases it was impossible, without close scrutiny, to distinguish the sex. None of the fish were "spent" fish, as it was conjectured they might be. The mature female as I find by reference to my notes was appreciably larger than the other specimens, its length being about $10\frac{1}{4}$ inches and its weight $13\frac{1}{2}$ ounces. The ovary of this fish was $3\frac{1}{2}$ inches long. The ova were measured with a micrometer, and found to be about twenty-five one-thousandths of an inch in diameter. They seemed, too, of about the same size in all parts of the ovaries. Twelve of the specimens examined, or about one-sixth of the whole number, had the crustacean parasite in the mouth. In one of the crustaceans a number of large eggs were visible. This, as I have stated, is the only instance in which true spawning ever came under my observation.

Q. That would indicate that they were in an immature condition?—A. The facts observed seem to indicate that menhaden spawned some as early as November and some as late as January and February. Of the school, which is claimed to spawn in the spring, I have had no thoroughly satisfactory evidence presented.

Q. What is the length of the spawning season?—A. It may possibly extend over six months. It depends entirely upon the temperature. When the temperature reaches a certain point on any part of the coast, the fish begin to spawn.

Professor BAIRD. The shad spawn in March and April in the water of North Carolina, in May and June in the Potomac, and not until July in Connecticut.

Q. Have you any means of judging of the effect of menhaden fishing on the supply of food-fish?—A. I have simply an opinion.

Q. Well, what is that?—A. I have been unable to convince myself that it has any effect upon the general supply of the country, although I have no doubt that it may at times influence the interests of small sections of the coast.

The CHAIRMAN. This bill we are considering is a bill to regulate or prohibit the catching of menhaden within three miles of the Atlantic coast generally. Mr. Blackford, of our New York commission of fisheries, advanced this theory; that the menhaden in the early spring are poor and comparatively unproductive, especially in oils, improving all the while as the season advances; and he thought prohibition until they had recovered from the effects of spawning would be all that would be required, if anything is done to secure the object in view. I think he named the 1st of July as the period he thought desirable.

The WITNESS. These fish undoubtedly come on the coast, like the mackerel, in a poor condition and increase in weight very rapidly. They find a food which is exceedingly abundant on our coast.

Q. What do they feed on?—A. On crustaceans in part, and they also feed very largely upon the organic matter which is found in the rich mud of the beds and estuaries. They swallow the mud in large quantities and digest it—the diatoms and the plants and various small animals in it, and I suppose also a large amount of other organic matter that would accumulate at such places. They digest the organic matter and eject the sand and mud. Their stomachs are like the gizzard of fowls and the intestine is exceedingly long, indicating that they are not exclusively carnivorous.¹ Their stomachs when cut open are found full of a greenish mud. I have examined large quantities of them.

Q. What is the usual season of spawning for bluefish?—A. The bluefish is supposed to spawn about the same time as the menhaden. I am not as well informed in regard to the spawning habits of the bluefish as I am in regard to those of the menhaden, because, so far as I know, no one in the United States has ever seen a bluefish with ovaries which appeared at all near the spawning time; but we know that the young bluefish come on the coast in midsummer of such a size that they must have been hatched some time in the previous winter, just like the menhaden. The habits of the menhaden and bluefish are, we think, similar in that respect.

Q. How about mackerel?—A. They are spring-spawning fish.

Q. And weak fish?—A. The weak fish is another of the winter-spawning fish and the same class of evidence will show that it spawns somewhere south.

Q. The bluefish disappear before the spawning season?—A. The bluefish disappear simultaneously with the menhaden or a little before them, and come back a little after the menhaden, always following them, and I think never in advance of them, except it may be in special locations.

Q. Is it your opinion that they spawn in deep water or go on to southern shoals?—A. I have no means of judging that. It is my opinion that they spawn on the edge of the continental slope, off Hatteras and south of it. We have no evidence of their spawning in any of the West Indies, on any part of the southern coast or in the Gulf of Mexico, although they have been carefully observed there.

The CHAIRMAN. Our lake trout spawn in deep water, I believe?

Professor BAIRD. They spawn in the lakes, but they come up on the shoal water of the lakes. They spawn on the Canadian shores very largely.

The CHAIRMAN (to Professor Baird). If you desire to ask any further questions, I should be glad to have you do so.

Professor BAIRD. The question I would present is as to whether, to a certain degree, the relations of cause and effect have not been somewhat perverted in the inquiry; that is to say, is it the menhaden that affect the bluefish or the bluefish that affect the menhaden; which is the prime factor and which follows the other in point of abundance? We are assuming to a certain extent that the absence of the menhaden involves the absence of the bluefish. Now the question is whether it is not the bluefish itself that is the chief factor in determining the abundance or absence of the menhaden. What has your experience been in regard to that?

The WITNESS. I think that the movements of the bluefish as well as the movements of any other fish are entirely beyond our knowledge. They seem to come and go without any reference to the fisheries. Take for instance the case of mackerel. The great season of which we heard so much said in connection with the abundance of mackerel, was in 1831, I think, or about that time, when there were something

like 230,000 barrels caught. We have at the Smithsonian Institution a chart showing the abundance of the mackerel from 1804 up to the present time, and it seems very curiously as if at the time of the introduction of the purse seine the curve began to run down, and it then looked as though we were going to learn something. The curve went down until 1877, when it reached the very lowest ebb, away down below the experience of any past year; only 55,000 barrels were caught. Then it began to go up again, and last year, in 1881, the limit was far above the highest figures of any previous year—I cannot state the exact quantity, but it was something like 300,000 barrels, counting the fresh and salt fish together.

The CHAIRMAN. Does not that depend to a certain extent on the fact that there are more persons engaged in these fisheries now than there were then; would not that account for the difference?

The WITNESS. No, sir, I do not think it would, because I think there were as many or more persons engaged in the fisheries at the time of the low place in the curve, or quite as many. I suppose it was because they got discouraged. But you can take the history of bluefish and weak-fish and Spanish mackerel, and of the scup and of other species which I could mention if there were time to speak of it, and if it were worth while I could show you that at times during the past one hundred and fifty years they have disappeared entirely and have been absent for a period of ten to forty years and then come back again in great abundance without any warning. In 1880 there came on our coast, in schools almost of incredible size, a fish known about the Canaries and in the Mediterranean, but which never had before come on our coast. They came in such quantities that they were regarded with great anxiety, and they were seined I think in one instance, as many as a hundred barrels at a time, they remained for awhile, and now they are gone. It is a fish called the frigate mackerel; and similar statistics might be made concerning the bonito. The case of the chub mackerel, too, is instructive. As late as 1820, a little fish which corresponds closely (although it is not identical) with the Spanish mackerel on the English coast, was very abundant in Massachusetts Bay, and it used to be about as numerous. This chub mackerel catch would be about equal to that of the ordinary mackerel. It is a mackerel smaller than the common mackerel, with spots on its belly. It absolutely disappeared between 1820 and 1824, and for the first eight years the Fish Commission was in existence it offered high rewards for specimens of this fish. But in 1879, when we were at Provincetown, these fish came back in considerable numbers; made their appearance again. Of course there cannot have been any over-fishing to account for the disappearance of this species, because they were caught by the same means as the common mackerel which disappeared, and the chub mackerel remained in abundance.

The CHAIRMAN. The Messrs. Chase, of Tiverton, who were the first witnesses I examined, testified that when they began, 15 or 18 years ago, to catch menhaden, they took them entirely on the coast of Maine; they did not come into the southern waters at all; they did not even come into Long Island Sound, along that coast, and in the bay at Newport—Narragansett Bay. But they say they have entirely disappeared there; they cannot catch any at all; and they are now found further south—further south this year than they have ever caught them before; as far, I think they said, as South Carolina, some of their steamers have gone. How do you account for that; what opinion have you in reference to that?

The WITNESS. It is no doubt a fact that the menhaden have abso-

lutely disappeared from the coast of Maine since 1878. It is a well-known fact that prior to 1850 they were abundant in the Bay of Fundy; but since 1850 they have entirely disappeared from that locality. It is unquestionable also that they were very abundant in former years in the eastern part of Long Island Sound, although the Chase brothers may not have fished there. I have given considerable thought to the cause of the disappearance of this fish, and I have a little memorandum here which I hope I may be allowed to refer to, which contains some observations on this subject.

CAUSES OF THE ABSENCE OF THE MENHADEN NORTH OF CAPE COD.

When a certain species of fish disappears from waters in which it has been at one time abundant, there are two explanations possible for their absence: (1) The fish which formerly resorted to the locality have been destroyed, or (2) they have sought some other locality.

We need not hesitate to choose the latter horn of this dilemma, for there is no evidence whatever of the decrease in the numbers of menhaden on our coast. So far as I am aware no one has seriously advanced the opinion that the schools of menhaden ordinarily frequenting the waters of Maine have been exterminated. In fact every one who has studied the subject is satisfied that these very schools have been repeatedly observed in other localities during the past season.

This was written in 1879 or 1880, at the close of the first season's business, but I see no reason to change my opinion in this matter.

It being granted that the absence of menhaden north of Cape Cod is due to the fact that the schools which usually feed here have gone elsewhere, it is necessary next to inquire what has been the cause of this change of habits. Here we meet a larger number of alternatives; but the possible reason may perhaps be summed up as follows: (1) They may have been prevented by the presence of some enemy; (2) the supply of food may have been insufficient; (3) the temperature of the water may have been distasteful to them. No other possible reasons occur to my mind, although I have heard it suggested that they may have been disgusted with the existing legislation of the State of Maine.

The first explanation seems to me hardly sufficient, although I find that many of our correspondents among the oil and guano manufacturers are inclined to accept it. In the first place, although bluefish may have been observed in considerable abundance north of Cape Cod this year, it can be easily demonstrated that the number of this species on our coast is by no means as great as it has been in past years. From 1850 to 1860, particularly, the quantity of bluefish in New England was immensely greater than it is now and there has been a slow but steady falling off in their numbers for several years. In the second place experience furnishes ample proof that the presence of bluefish in enormous numbers among the schools of menhaden does not have the effect of driving them away. If it did why were not the menhaden fisheries of Southern New England, the Long Island region, destroyed thirty or forty years ago? At the time when bluefish were most abundant there was no perceptible diminution in the number of menhaden. Observations extending over a great many years, particularly those made at Waquoit, from 1859 to 1871, show that the bluefish were always later than the menhaden in their arrival; the menhaden arriving from April 21 to May 15, the average date being May 5; the bluefish arriving from May 11 to May 24, the average date being May 16. The bluefish appear to follow in the menhaden as a usual thing, and certainly would not have shown themselves so far north this year had not they been decoyed

by an abundance of schools of small mackerel. Besides the bluefish, one of the most formidable enemies of the menhaden is man, and many persons will argue that the extent of the fisheries in Maine has had its effect in driving out the menhaden. I have already fully expressed my belief that man is quite powerless to accomplish any such result as this. In fact the claim of the shore fishermen of Maine, that the use of seines has been the cause of the wider ranging of menhaden schools out at sea, a claim which has been so forcibly urged as to bring about the new legislation in that State, seems to me to be amply disproved by the movements of the schools on that coast in 1878, when they hugged the shores, entered the bays and estuaries, and ascended the rivers to a greater extent than ever was known before.

The claim that the food supply has been insufficient has not been very generally considered, and it seems to me to be of little moment, since I firmly believe that the bulk of their food is taken from the muddy deposits of the ocean's bottom. The third alternative is the most satisfactory one. The temperature of the water in which they swim has been shown to be of the utmost moment to all kinds of fish. It is this which by its periodical changes brings about the periodical movement of all sea fishes, and the periodical condition of partial or entire torpidity among lake and river fishes which are confined within narrow limits.

I have elsewhere shown the arrival of the menhaden schools to be closely synchronous with the period at which the weekly average of the surface temperatures of the harbors rises to 51° F.; that they do not enter waters in which, as about Eastport, Me., the midsummer surface temperatures as indicated by monthly averages, fall below 51° F.; and that their departure in the autumn is closely connected with the fall of the thermometer to 51° and below. These are the temperatures of the bays and rivers. That of the ocean at the same depths is presumably somewhat lower.

While the temperature of 80° , and perhaps even 75° , is equally distasteful to them, the menhaden under ordinary circumstances appear to prefer a temperature of 60° or 70° . If it can be shown that the water of the Gulf of Maine and Massachusetts Bay was considerably colder than usual at the time when menhaden schools usually enter it, we shall have apparently a sufficient explanation of their absence. A study of the temperatures of the water in this region, as indicated by the observations made in Portland Harbor, actually does establish the fact that the season of 1879 has been an unusually cold one. The averages for the three summer months are as follows: the numerator of the fraction being the average surface temperature; the denominator that of the bottom; 1876, 62.5-57.9; 1877, 58.5-56.7; 1878, 61.5-58.1; 1879, 56.1-54.6.

The average for the three summer months of 1879 is less than that of June, 1876. The season of 1878, in Maine, was fairly successful, the three summer months being warmer than in 1877, but cooler than in 1876. In August, 1878, there was a very rapid fall in the temperature of the surface, in the Gulf of Maine, so that the average temperature of that month was less than that of July, instead of being higher, as is usual. This may have had the effect of driving the fish into the warmer water of the bays and estuaries. The monthly averages for 1876, 1877, 1878, and 1879 are as follows:

1876.—June,	$\frac{56.9}{54.0}$	July,	$\frac{66.7}{59.4}$	August,	$\frac{63.9}{60.4}$
1877.—June,	$\frac{54.9}{53.3}$	July,	$\frac{58.1}{56.3}$	August,	$\frac{62.4}{60.6}$
1878.—June,	$\frac{56.8}{55.2}$	July,	$\frac{66.9}{59.3}$	August,	$\frac{60.7}{59.6}$
1879.—June,	$\frac{52.0}{51.7}$	July,	$\frac{55.9}{54.1}$	August,	$\frac{58.6}{58.6}$

While it is impossible to predict what may be the temperature of these waters in the future, there is little reason to fear that the absence of the menhaden will be permanent.

This temperature idea has not been worked out, I may say, for the years subsequent to 1879 or the present, but this is certainly one of the possible causes of their absence—the change in the temperature which in years previous drove them away from the Bay of Fundy.

By the CHAIRMAN:

Q. Is there any doubt in your mind that if from any cause, climate or otherwise, menhaden are driven out or leave the waters of the coast the bluefish will disappear also?—A. I should be reluctant to say that, because there are many other fish in our waters which they also feed upon. For instance, the river herring or alewife, which is exceedingly abundant, and the young shad and the scup.

Q. You spoke of their following them in the fall and returning with them in the spring?—A. Perhaps I did not say quite enough there. There are other fish which come in about the same time with the menhaden, but the bluefish only come into our waters after they are filled up with the fish on which they feed—menhaden probably being the most numerous of all.

Q. They are the general food for bluefish?—A. They are the general food for almost all of our food fish.

Q. What would you think of the effect of forty steamers on the coast of New Jersey in a season, catching from a half million to a million fish a day?—A. I should think, as I look at it now, that it might very readily drive away the fish from the shore and might prejudice decidedly the interests of the shore fishermen.

The CHAIRMAN. That really is the question here.

The WITNESS. I think there is no question that the interests of the shore fishermen might be affected. But of course that and the question as to whether the general interests of the country are affected are two different things.

The CHAIRMAN. Of course they are; but still I suppose you would not question the proposition that a supply of fish for food to our people is of paramount interest to any other abstract interest.

The WITNESS. I should certainly not; but I should not put it exactly in that way. The tendency is more and more, it seems to me, in the supply of fish as food to the country, especially to the interior of the country, which is yearly demanding more and more of them, to get them through the large cities; and the statistics which I have been working on for the past three years show that a very large percentage of the food fishes pass through two or three centers.

The CHAIRMAN. Where are they caught—that is the point? where are they taken? Not where they are put into the market. That would not be a test. They go to a central market, necessarily.

The WITNESS. But these fish are taken by the vessels and the capital of organizations which exist in connection with these markets, and the supply of any individual locality along the coast, remote from the city market, is derived from the labors of the shore fisherman. The country at large is not supplied by the shore fishermen, but to a very large extent by vessels which go out and fish on an extensive scale.

The CHAIRMAN. Have you any idea how far bluefish are taken from the shore?

The WITNESS. How far they are actually taken by our fishermen?

The CHAIRMAN. Yes.

The WITNESS. I should say within the limit—a large majority of them—of 3 miles or within a limit of 5 miles, except accidentally. I do not profess to be thoroughly posted on that point, however. Large schools of menhaden have been taken as far as 30 miles from shore. They are taken all over the coast of Maine, 100 miles from shore; I mean in time of abundance they are—say out beyond Georges banks. I have a statement of the statistics of menhaden fishing for the year 1880, which is the only absolute thing of the kind which has been prepared, and which with the permission of the committee I will submit.

The CHAIRMAN. If you can give it in a condensed form you may do so.

The WITNESS. This is for the census year of 1880. The grand total of number of persons employed is 3,635—2,543 fishermen and 1,092 factory hands. The total capital invested is \$2,362,841. Value of products, \$2,116,787. Number of vessels, 456; boats, 648. Number of purse-seines 366, valued at \$138,400. I have these same statistics for States, and if you desire I can furnish a copy of the table.

The CHAIRMAN. What are the statistics of New Jersey?

The WITNESS. Number of persons employed, 304, of whom 174 are fishermen, and 130 factory hands. Capital invested, \$129,250.

The CHAIRMAN. That has reference, I suppose, to those who inhabit that State, and not to the number who fish on the waters?

The WITNESS. No, sir; to the fisheries carried on with State capital; not to the quantity taken in the waters at all. The total value of product is \$146,286; number of vessels, 31; tonnage, 560.68; value of vessels, \$35,400.

The CHAIRMAN. That is sufficient.

The WITNESS. Do you wish the product?

The CHAIRMAN. No; we do not care for that. How about the State of Maine?

The WITNESS. Capital invested in Maine, \$299,187. There were no products and no persons employed. We have a full statement of the number of vessels and their value, and the value of the factories, which is idle property.

The CHAIRMAN. Most of the menhaden fishermen have turned their nets into mackerel seines, as I understand. I know Mr. Church fitted up his, he said, last spring, by reason of the absence of menhaden.

The WITNESS. That was only a temporary expedient.

The CHAIRMAN. He did not know how long it would be that they could not catch menhaden, and they fitted up their seines in order to catch mackerel.

The WITNESS. New York State, in regard to the value of its product, is ahead of any other State.

The CHAIRMAN. Yes; there are more factories in that State, all along the sound.

By Professor BAIRD:

Q. Will you mention briefly what you know about the abrupt disappearance of bluefish from our coasts, and their reappearance again?—

A. I think you have that subject more at command than I.

Q. Please just give what you know about it.—A. I think between the years 1740 and 1760, they disappeared entirely from the coast, but they came back again towards the close of the century, did they not?

Professor BAIRD. No; about 1820 they showed themselves.

The WITNESS. They were entirely absent from the coast during those periods.

Professor BAIRD. So much so that the fishermen did not know the fish when they reappeared, except that perhaps an old grandfather may have carried the recollection of them, but the two generations succeeding were entirely ignorant of them.

The WITNESS. I have here one item of statistics which may possibly be significant, showing the relative importance of the mackerel seine fishery and the menhaden seine fishery. The number of purse seines used in the mackerel fishery is 338, which is considerably less than the number used in the menhaden fishery.

Mr. BUCHANAN. Professor Goode spoke as though the shore fishermen distributed their fish to the immediate consumers. I wish to know whether he excludes the idea that their fish are also sent to New York and Philadelphia, as distributing points?

Professor GOODE. Oh, no; by no means.

Mr. BUCHANAN. Because that is the fact. They send them to those points as distributing points.

Adjourned.

WASHINGTON, D. C., *January 10, 1883.*

BARNET PHILLIPS sworn and examined.

By the CHAIRMAN :

Question. Where do you reside?—Answer. Brooklyn, N. Y.

Q. How long have you lived there?—A. Ten years.

Q. What attention, if any, have you given to the subject of food and other fishes?—A. I have studied the question for probably twenty years. I have been secretary of the American Fish Cultural Association for seven years. I was employed by the last census to compile the statistics of fish and fisheries of the city of New York. I have paid a good deal of attention to fish in its economic sense, as to the curing of fish. I have, I suppose, a certain amount of scientific acquaintance with fish, and have endeavored to introduce into use as food a great number of fish which have been hitherto neglected. I have studied fishing, not in an angling sense, but in a business sense, and to become more familiar with the methods of catching I have made quite a number of trips on fishing smacks, to understand as well as I could the methods. I have for the last five years kept a weekly account of the prices of fish in the New York market, both wholesale and retail, which weekly prices have been used as standards of price in the New York market. In that way, I believe, I have become somewhat familiar with the quantity of fish received, with their abundance or scarcity in certain seasons.

Q. Have you any acquaintance with the subject of menhaden fishing?—A. I have.

Q. To what extent?—A. I am somewhat familiar with the vessels—with their construction. Although I have not been on a menhaden vessel during her cruise, I have seen menhaden caught by them, and have seen menhaden caught by gang boats: I have been over the menhaden grounds; was over them last summer; have seen them caught; have seen them taken out of pound nets on the coast of Long Island. I have, however, never been to an oil-factory.

Q. What varieties of food fish, as they are termed, subsist, or mainly subsist, upon the menhaden as food; what is your observation in that respect?—A. I suppose that, principally, it would be the bluefish. The

striped bass would eat them, and probably the cod, but perhaps the blue-fish eat more menhaden than the rest of the fish, as far as our observations go. Still that is a question it is exceedingly difficult to determine.

Q. Do mackerel feed on them?—A. I should think not.

Q. Nor shad, I suppose?—A. Certainly not the shad.

Q. Nor weak-fish?—A. Perhaps so, but I should not be sure of that. Questions of that kind would, of course, have to be settled by examination of the fish.

Q. Have you to any extent studied the habits of the menhaden, or, in other words, what is your opinion as to the spawning season of that fish, and where they go to spawn?—A. If you will allow me to start from Mr. Blackford's statement it would assist me to give some ideas on that subject. Mr. Blackford says, speaking of the menhaden: "The stomach is distended with spawn, and, unlike many spawning fishes, the fish is not fat." The question of the fish being fat and of the fish being in a spawning condition are two questions which are very closely related. In fish probably, as in all other organisms, the period of reproduction is the one when nature brings the creature to its highest condition of perfection. This can be very readily understood. It has to go through a certain strain—that of reproduction—and therefore nature makes the fish at that period in its finest condition. I agree with Mr. Blackford in that respect, that the menhaden is not always as fat before the period of reproduction as at other times. I must diverge, however, a little to say that the shad is at its best condition, it is fattest, just before the period of reproduction. Now, in studying the question of the period of spawning of menhaden, like a great many fish along our coast which extends from Maine down to the capes of Virginia, it is pretty well shown that reproduction of fish occurs according to temperatures. There being such a long extent of coast and such variations of temperature, menhaden probably spawn at very different periods. I should suppose that along the coast of New Jersey and Long Island the period when the menhaden would commence to spawn would be somewhere before April, and would close about June, or the middle of June, perhaps. But those questions we are very ignorant about. We do not know. I fancy that all the testimony you have received so far is of a negative character, and tells you rather what we do not know than what we do know. My idea is that the menhaden must commence to spawn early in the spring, and finish about June or the first week in June.

Q. They show spawn before they leave in the fall, do they not?—A. They do sometimes. Menhaden are found quite late with spawn.

Q. Would not that indicate an earlier spawning than the period you name?—A. It would for fish along certain regions of coast.

Q. You mean by your answer to cover the whole period?—A. The whole period; yes, sir.

Q. What time in the fall do they disappear, so far as you have observed?—A. About October—October or November.

Q. And the bluefish leave about the same time?—A. They leave about the same time. The last bluefish which come into the New York market are those which are caught by vessels engaged in fishing along the coast, and then go down to the coast of Virginia and North Carolina to catch the last of the fish, which occurs about the beginning of November.

Q. What time do they reappear in the spring?—A. They appear in the spring, the first scattering of fish, probably about June—the middle or end of June. Occasionally very early fish are caught before, but

rarely. I beg to state this, that in a study of this kind the impressions of fishermen are generally those which they receive last. If a certain kind of fish is very scarce in the season of 1882 they are somewhat inclined to think that the fish has entirely gone. They forget that in 1880 or 1879 the fish were very abundant. I remember, in my own experience, when I have had fishermen tell me, "The cod are all gone; we can catch no more. Our vessels have been out a week or two; we have not made a fare. What is it that prevents our catching cod?" And they have alleged sometimes certain reasons which apparently were plausible at the time. This season of 1882 and '83 cod have been more abundant off the coast of Long Island, and are so at this moment, than they have been for a number of years. By this I mean to say that it is impossible to judge of the abundance or scarcity of a fish by looking only at its condition during two, three, or four years. It must be considered from a much longer range of time. The actions of nature are always, in a certain measure systematic, and unnatural or abnormal conditions, though they may exist sometimes, are exceedingly rare. The complaint, I fancy, of the menhaden fishermen is that certain kinds of fish have been destroyed off the coast. Is not that it?

The CHAIRMAN. That is one allegation. Another is that it takes the food from the food-fish.

Q. A few years ago the menhaden fishermen caught their fish on the shores of Maine?—A. Yes, sir.

Q. And they were very plenty?—A. Yes, sir.

Q. And they say now they have entirely disappeared from there for the past two or three years, I think it is?—A. Yes, sir.

Q. And they catch them entirely at the south. This season they have been caught mainly south from the center of New Jersey; south of Atlantic City, and along the coast of Virginia and North Carolina, even as far south as South Carolina, and comparatively few in the northern waters. Well, I will put you the direct question which has been asked all the witnesses, which is: What, in your opinion is the effect of the menhaden fishery upon the supply of food-fish, or any variety of food-fish?—A. If all the menhaden had been taken from the coast of Maine and the coast of Long Island, the supposition would be that food-fishes—not calling the menhaden a food-fish, but food-fishes such as the bluefish, striped bass, and weak-fish—would have been absent. Bluefish, I think, have been as fairly abundant this year—I mean the season of 1882—as they were in 1881. If they had been absent, and there had been no menhaden, the idea might have been entertained that there was no feed for the bluefish, and therefore bluefish would not have been caught. But they were caught. As to striped bass, there has been a very great and marked diminution in the catching of striped bass for the last five or six years. However, not more than a month and a half ago one of the largest schools of striped bass that has been known for the last eight years was seen off from Montauk, which the fishermen declared to be larger than they had ever seen before in their lives. They caught some of them, but were unable to make as big hauls as they hoped to make, as the water was very rough. But striped bass were in enormous abundance. Therefore I should think that as far as food-fish are dependent on menhaden for their existence, the absence of the menhaden had not made any very great difference as to their presence at all.

Q. The striped bass is a valuable fish?—A. Quite a valuable fish.

Q. Next to salmon, I suppose?—A. Yes, sir; it is quite a valuable fish, and almost always commands at retail in the New York market

from twenty to twenty-five cents a pound. The larger the fish the less it costs. The smaller fish, that is, a fish of medium size, three, four, or five pounds, is worth almost always four or five cents in advance of a fish of larger size. A fish of thirty, forty, or fifty pounds is cheaper per pound than the smaller fish. They have always been in demand, but there has been a scarcity of such fish for the number of them.

Q. You had practical experience in the catching of bluefish with hook and line?—A. Yes, sir.

Q. To what extent?—A. As far as personal experience is concerned, I have caught a great many bluefish in the last few years. I never have gone with a party to catch bluefish for a business, but I have caught bluefish for amusement and sport.

Q. Where have you usually fished?—A. I have fished in New York Harbor, off Long Island, and off the New England coast.

Q. Never on the New Jersey coast?—A. Never on the New Jersey coast.

Q. Of course the menhaden industry, so far as it can be pursued without serious detriment to food-fish, is a valuable industry to the country?—A. A most valuable one.

Q. Yet, as between that and the diminution or destruction of food-fish, I suppose you agree with me that the preservation of food for the people is of more importance still?—A. Yes, sir; it is of more importance, of course.

Q. And that is the real question that we are considering?—A. That, I suppose, is the real question at issue.

Q. Do you think of any other statement that you desire to make? I do not care to pursue this subject by questions, but would be glad to have you make any statement you desire.—A. I should agree with the New York State commissioner, Mr. Blackford, in some respects, that is, that it would be wiser for the menhaden fisherman to commence their fishing later, that is, not to fish during one-half of June, perhaps; say, during the first ten days of June; not to commence their fishing before that time, and then the chance would be that if they are overfishing (I am not asserting, however, that they have caused a diminution of the menhaden), that the experiment might be tried. I understand very fully that it is too important an industry, with too much capital invested in it, to have it squelched or stopped, and, of course, there are more interests than those of food-fishes to be considered.

Q. I suppose that menhaden, like all other fish, when they come from their spawning beds, are comparatively poor and less productive, in oil especially?—A. Yes, sir; they are comparatively poor. That has occurred in seasons this year. They have been very fat later in the season. The fish which I saw caught in October were the fattest of the year.

Q. In October last?—A. Yes, sir, in October, 1882. They were very fine, large fish which yielded 30 or 40 per cent. more oil than those which had been caught a month or a month and a half earlier. That depends sometimes on the presence of food in the water.

Q. Are you able to state which is the more valuable, the oil product or the fertilizers obtained from the menhaden?—A. That I would not be able to state.

Q. Isn't it true of all fish that the poverty of the fish is after the spawning season is over?—A. Yes, sir; after the spawning season is over they become very poor; they have drained themselves to reproduce their kind.

Q. The menhaden recuperate rapidly, do they not?—A. Yes, sir.

Q. Do you know what they feed on?—A. On some crustaceans which

are designated by various names. Some of the crustaceans are quite visible to the eye. I had quite a number of them in my hand this fall while the fish were in the act of feeding upon them. They were so plentiful that a bucket put in the water where the fish were caught would be apparently one-eighth or one-tenth solid with this food after the top had been drawn off.

Q. The restraint upon catching menhaden upon the 10th or middle of June would enable them to get a better quality of fish?—A. Very probably; yes, sir.

Q. And probably make the catch of the season quite as valuable?—A. Quite as valuable in point of oil product as before. Nature brings the fish to the shore, or at least some fish to the shore, during its period of reproduction, as for instance, the shad and salmon, and even the cod. The cod are fairly abundant now and will be caught full of spawn nearer the shore than at other periods. Therefore man is forced to catch certain kinds of fish during their periods of reproduction. We never could catch shad at any other time than at that period when they ascend fresh-water streams and deposit their eggs. Therefore, if we were to catch all the shad as they ascended the streams they could reproduce no more. There are certain closed seasons in regard to shad in some of the States, I believe (Major Ferguson can correct me if I am in error), when they can run Saturday or Sunday. They pass through therefore (a fractional portion), ascend the stream, lay their eggs, and these eggs reproduce their kind for the ensuing crop. It is possible, I have always averred, that with an anadromous fish like the shad, engines of destruction being very perfect, you could catch the last shad in a river if you wanted to. But with sea-fish you could not do that, because there is such a vast range of extent or area that although you might have menhaden fishing up and down the whole coast, some of them would escape the nets, and the chance of the reproduction of those fish would be rendered more possible. It would be wise to allow the fish to spawn from the time they come near the coast until the 10th of June and not to be caught, so that there should be a stock of fish for the next year's crop.

Q. Have you any theory on the subject of the disappearance of menhaden from the coast of Maine?—A. No, sir; none at all. I should be perhaps disinclined to insist that it was on account of the catch of the steamers themselves, but still I cannot in my own mind feel very sure in regard to that matter, and I would not like to assert that it is the cause.

The CHAIRMAN (to Prof. Ferguson). If you desire you can ask the witness any questions.

By Prof. FERGUSON:

Q. I understood the witness to say that he had seen menhaden taken by nets.—A. Yes, sir.

Q. Did you ever see any other fish but the menhaden?—A. No, sir; I never have that I know of.

Q. Have you ever opened or examined the contents of the stomachs of bluefish taken fresh from the water?—A. I have seen them opened; yes, sir.

Q. Have you noticed menhaden in the stomachs of the bluefish?—A. I have noticed two or three times decomposed fish, but the fish were so thoroughly decomposed that it was rather impossible to find out what kind of fish they were.

Q. The digestion of fishes is very rapid?—A. Yes, sir; exceedingly rapid.

Q. And continues even after death?—A. Yes, sir; it continues after death, so that it is almost impossible to determine that question.

Q. Have you made inquiry as to the temperature of the waters that the menhaden are found in?—A. No; nothing beyond what I have read in Professor Goode's work on that subject.

JAMES B. FLEMING sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Point Pleasant, N. J.

Q. How long have you resided there?—A. I have resided there for forty-seven years; I was born there?

Q. Is that on the beach?—A. Yes, sir; I live about a mile from the seashore.

Q. What is your occupation?—A. Fisherman.

Q. How long have you followed that business?—A. I have followed that business ever since I could pull an oar in a boat.

Q. Hand fishing?—A. Yes, sir; hand fishing and net fishing both.

Q. Do you follow it as a commercial business; catch fish for market?—A. Yes, sir; catch them for market.

Q. Have you had persons in your employment also in the business?—A. Yes, sir; I have had. At one time I had quite a large business in catching fish and supplying the markets.

Q. What did you use?—A. We used nets and open row-boats; what we call squid fishing. We used to hoist sail on a little boat and sail through a school of them and catch them, what we call trawling.

Q. How many years have you followed that business?—A. I have followed it I suppose, for thirty odd years, or may be longer. My father was a fisherman before me and I went along with him fishing.

Q. What varieties of fish have you been in the habit of catching?—A. Well, since the fish have come on our coast, I have caught the most bluefish, but then I fish for all kind of fish that I can catch for the market, bluefish, menhaden, weak-fish, cod, and mullets, a variety of kinds of fish.

Q. Have you ever caught mackerel there?—A. Oh, yes, sir; we make quite a business of catching mackerel.

Q. How long is it since bluefish appeared on your shores?—A. It has been now some seven or eight years that they have been getting scarcer every year.

Q. I mean how long is it since you first caught them?—A. I cannot tell you that, but I can remember the first day I ever saw a bluefish on the beach, but I cannot tell you how long ago it was.

Q. About how many years ago was it?—A. I should think may be it was thirty-two or thirty-three years; I cannot say exactly, but somewhere along there. It is quite a while ago; quite a long spell ago.

Q. Do you catch menhaden to any extent for food?—A. We have in years back. I will say some eight years back, I have caught as high as \$300 worth a day, and sold them for food to people to salt up, the same as farmers salt pork for their families.

Q. As a pickled fish they are very good, are they not?—A. Oh, yes, sir; very good in the fall of the year.

Q. Are they not in the spring?—A. No, sir; when they come on from the southward to go north they are not very fat, they are a very poor fish.

Q. What time do they get in heart so as to be good?—A. About the

1st of October or in November, or along there. They are the best fish to salt down then.

Q. What time do they disappear?—A. Along about the 1st of December they did this year, the last I saw.

Q. What is your observation as to the supply of fish on your coast during the past ten or twelve years; whether it has been increasing or diminishing?—A. Oh, it has been diminishing for ten years back. There is a greater and greater scarcity of them every fall.

Q. They are gradually diminishing?—A. Yes, sir, gradually diminishing. We call them moss-bunkers, but these eastern fellows have a different name from what we have, and call them menhaden. They have been decreasing for ten years, and I suppose it has been so for three years that we never have taken our nets out of our barns to fish for them, because it won't pay us.

Q. What reason do you assign for it?—A. My reason is that these eastern men running these steamboats after them—the menhaden fishermen, they call them—and the purse-nets is the cause of it. That is my opinion of it. Well, it is no opinion; I know it by experience.

Q. How long is it since they first began fishing on your coast?—A. I cannot say that; but I will say for fifteen years, and may be longer.

Q. How many steamers have you ever seen fishing at one time?—A. I have seen sixteen load at one time; that is, in one day, as close as three miles together; sixteen steamers, and they will carry from nine hundred to one thousand five hundred barrels apiece, and we count 240 for a barrel of these bunkers, as we call them. I have seen sixteen loaded right down with them within three miles along our coast.

Q. On the same ground where you were accustomed to fish?—A. Yes, sir; on the same ground.

Q. How near the shore were they?—A. I have known them to come so near shore that they would have to jump out on the sand and shove their boats off, and I have helped shove them off myself.

Q. What did you observe as to whether they take any other fish than menhaden?—A. I have been aboard of them when they have had some few weak-fish and some bluefish in the nets; but they don't make a practice of catching them, and yet they do.

Q. They cannot avoid it, I suppose?—A. No, sir; they cannot avoid it. I was aboard one of them this fall, and I asked one of the men how big his net was, and he told me his net was 1,800 feet long, and would fish in 120 feet of water; that is, from the top to the bottom. This big net is what they call a shirred-net. They run right around a whole school of fish and scoop the whole school right up. They will have two big boats, and they have one-half of the net on one boat and the other half on the other. These bunkers are almost always on the top of the water, so that you can stand on the shore and see them miles off at sea. And they take these nets on the boats and go right round the school and lap them together. They have a piece of lead, called a "billy" which weighs from 150 to 300 pounds, and when they come alongside the boats, together, they let this run down right to the bottom, and they draw the bottom up like a bag, and they have them all right in there just as they want them.

Q. And then they load them on steamers by steam hoisting?—A. Yes, sir; they have steam apparatus; what they call a steam hoister.

Q. Do you mean that you have ceased for three years fishing entirely, or only ceased fishing as a business—catching fish for market?—A. Yes, sir; as a business for market, because there is no other fish that we can catch now; that is, not enough to make it pay.

Q. What amount of fish have you caught within a year at any time during twelve years?—A. I cannot tell you; it has amounted to a good deal, though.

Q. I would like to have you give some idea of the extent of your fishing, as near as you can; the most you ever caught in one season.

The WITNESS. Do you mean all kinds of fish?

The CHAIRMAN. Yes; all kinds of food fish.

A. Well, I will say that within a year I suppose two of us have sold \$800 worth.

Q. How long ago was that?—A. That was last year. That was bluefish and codfish?

Q. Do you mean this last season, or a year ago?—A. I mean this last year.

Q. A year from now?—A. Yes, sir; counting last summer in. And then I fished for all kinds of fish. We have nets for almost all kinds of fish.

Q. For two or three years, you say, you have not taken your seines out?—A. Not our bunker nets. The menhaden nets are straight nets. When a school of bunkers used to come down the beach (they go like race horses) we used to lay our straight nets ahead of them; our nets are straight, not shirred nets.

Q. Now take it for ten years past, what has been the supply of bluefish?—A. The bluefish have been growing scarcer every year for ten years along our coast.

Q. How with the weak-fish?—A. With the weak-fish it is the same. Our bluefish feed on weak-fish too.

Q. How with mackerel?—A. There are two kinds of mackerel. Do you mean the round mackerel?

Q. Either one.—A. Well, they have been getting scarcer, our mackerel have, for ten years back along our coast.

Q. Which variety do you refer to? You spoke of round mackerel.—A. Some call them Boston mackerel, and in the market they call them round mackerel. Then there is a Spanish mackerel.

Q. Do you catch those?—A. No, sir; we do not make a business of catching them. They are a smart fish, but sometimes we get hold of a few of them.

Q. Where have you marketed your fish?—A. In Philadelphia and New York.

Q. Did you send menhaden to Philadelphia and New York?—A. No, sir; we sold them to people who came out of the back country with wagons for them, to salt down for their families.

Q. To pickle for the winter?—A. Yes, sir; to pickle for the winter.

Q. The bluefish are only used fresh, are they not?—A. Oh, they are salted down too.

Q. Is the bluefish a good fish for corning?—A. Yes, sir; a very good fish. We think along our way that the bluefish is the leading fish in the market.

Q. Could you catch more of them eight or ten years ago than you could this last season?—A. Oh, yes, sir; I will say five times the quantity.

Q. How many is the most you ever caught—I mean in value—of all fish in a season, if you remember?—A. Well, about \$1,500 worth, that is, in three months. We generally take our nets down and fish for about three months—our bluefish nets; and I sold \$1,500 worth in one season, about.

Q. How long ago was that?—A. I think that was about fourteen

years ago, or somewhere along there; I cannot tell you exactly, but not far from that time.

Q. Your opinion, then, is that the menhaden fishing is what effects the quantity of fish on your coast?—A. Yes, sir; that is my belief in regard to it. I have had a good deal of experience along the surf.

Q. You used the expression that you knew it to be so.—A. Yes, sir; I know it to be so on that coast.

Q. You never catch the menhaden for food until late in the season, do you?—A. No, sir.

Q. What is their condition in the spring of the year when they first come?—A. They are very poor and very thin when they first come.

Q. How is it with the bluefish when they first come?—A. Bluefish are not as good as in the fall; the longer they stay with us the better they are.

Q. They feed mainly on menhaden?—A. Yes, sir; that is their main food.

Q. Have you ever opened them and noticed that?—A. Yes, sir; I have. I have counted as many as five menhaden in them, or nearly that much in them.

Q. In one fish?—A. Yes, sir; in one fish.

Q. The fish weighed how much?—A. The fish weighed twelve or fourteen pounds.

Prof. FERGUSON. I would like to get from the witness a description of the system that he pursues in catching the fish. [To the witness.] You speak of your nets not being taken from the barn; you refer to haul-seines?—A. No, sir; they are not haul-seines; they are what we call set-nets.

Q. A trap. Will you describe how you catch the fish with those nets?—A. We will be on the shore, and you can see these fish coming on top of the water. They make it look the same as wind does when it strikes the water. We will be on the beach and see a bunch of them coming (and they used to come like race horses, the mackerel or bluefish chasing them, so that they would go with all their might), and we used to go off ahead of them. We would try to get 100 yards ahead of them if we could, and then we would run our nets right straight ahead of them, right across their path, so that when they came up to our nets they would strike our nets, and then we would lift our nets alongside of the boat and bring them out.

Q. They were gilled?—A. Yes, sir; that is what we call gilling.

Q. Did you take the whole school, or how many would get away from you?—A. O, gracious, I don't suppose we took more than one out of a million.

Q. You do not do any hauling for them at all?—A. Yes, sir; we have hauled for them when we get them close into the beach and get the tide down; then we have nets—drag-nets—that we haul with for them.

By the CHAIRMAN:

Q. Bag-nets, with a hollow in them?—A. Yes, sir; right in the middle they have a hollow in them.

By Prof. FERGUSON:

Q. You haul right around and take the whole school?—A. No, sir; when they strike the nets they run right down to the bottom.

Q. Then your gill-nets do not gill bluefish at the same time?—A. Some few of them, not many. Our bunker-net has not a big enough mesh for bluefish. We have different nets to fish for bluefish.

Q. How do you take your weak-fish ?—A. Our mackerel nets answer for some of them. Weak-fish weigh from six to seven and eight pounds, and then for small weak-fish we use our shore nets, what we call haul-nets, leaving one man on the sand beach and running and hauling them right up on the sand. That is for small weak-fish.

By the CHAIRMAN :

Q. What length of net do you use for that purpose ?—A. About one hundred fathom or six hundred feet.

By Prof. FERGUSON :

Q. Are the sharks abundant ?—A. They are sometimes. They come in schools to our place, and sometimes they come very thick. I have seen them very thick there.

Q. Are they getting more plentiful or scarcer ?—A. They are getting scarcer.

Q. Are they getting scarcer fast, or is it a gradual scarcity ?—A. It is gradual ; it is about the same as the bunkers. They are a great fish to feed on bunkers too—the sharks are.

Q. How do you know that they feed on bunkers ; have you ever seen them catch the bunkers ?—A. Yes, sir ; a good many times.

Q. Did you ever open a shark ?—A. Yes, sir ; I have opened them.

Q. Did you ever find bunkers in them ?—A. Yes, sir.

Q. How many ?—A. Well, now, I will not say that I ever saw a whole one in them, but I have seen enough in them to make half a dozen if they were all put together ; but they have been cut up so that they were in pieces. I have seen sharks opened that weighed 500 pounds.

The CHAIRMAN. It is pretty hard for a bunker to be swallowed by a shark without being beaten to pieces, I suppose ?

The WITNESS. Yes, sir.

Q. How long is it since the sharks began to get scarcer ?—A. I should suppose it is ten or twelve years that they have been getting scarcer every year. I have had to run from the sharks for three miles to get rid of them ; that is, what I call running. I rowed the boat as fast as I could to get out of the way of them, and I have seen them, I may say, one hundred at a time, jump right out of the water, ten feet from there, and my brother and myself were as wet as if we had been thrown overboard from the splashing. One came right alongside of the boat and left the marks of nine teeth right on the plank of the boat where he caught hold. I have often been running along in schools of sharks where a shark would jerk the oar out of my hands into the water as I was pulling along. It is a very savage kind of fish.

By the CHAIRMAN :

Q. They cannot attack anything except they turn on their backs, I believe ?—A. No, sir ; they cannot. They cannot bite when they are swimming ; they have to turn before they bite.

Q. If they could bite the other way, they would come into the boat and take you ?—A. Yes, sir ; they would so. I don't like those fellows ; they are a bad fish.

By Prof. FERGUSON :

Q. Did you ever see any sword-fish ?—A. I never have seen but one. I have seen one in my time ; one sword-fish.

Q. You fish very little with hand-lines now ?—A. In the summer time we fish a good deal with hand-lines.

Q. That is, trawling ?—A. No, sir ; we fish with still bait with a hand-

line. We fish for codfish this time of year with hand-lines, and with what we call a trawl-line.

By the CHAIRMAN:

Q. Do porpoises come along your shore?—A. Yes, sir; they come right along our beach, within a hundred feet of the sand; you can see them jump out.

Q. What do they feed on?—A. On bunkers and bluefish. I have seen them catch bluefish.

Q. Are they good for anything?—A. Nothing only for oil. They used to make it a business to catch them for oil, that is about all.

Q. Do the menhaden fishermen catch them?—A. No, sir; they are too smart a fish.

Q. They cannot catch them?—A. No, sir; they won't let them get around them. They are the smartest fish along our coast, the porpoises are.

Q. Did you ever see a whale there?—A. Oh, yes, sir; last week I saw three.

Q. How near the shore?—A. I suppose they were about a mile from the beach.

Q. What do they feed on?—A. I have seen them in schools of moss-bunkers, and they hurry up the moss-bunkers when they get at them. I suppose they feed on moss-bunkers, and I suppose they scoop in quite a lot, too.

Q. They would eat a shark, wouldn't they?—A. Yes, sir; if they could get hold of him, I should think so. I have run a good many miles from whales, too, and I don't like them. I have had them come within ten feet of my boat when I have been seining. I was with a gentleman once; there were two boats fishing for bluefish—trawling for them with a trawl-line, and we would catch them as fast as we could handle them, and there was a whale in a school of moss-bunkers, and by and by he came up under one of our boats and broke the center-board off, and this gentleman went ashore then and I stopped a little longer, and by and by he came up and I could nearly lay my hand on the whale, and I told my partner we had better go ashore, and we left.

Q. How large was he?—A. I should suppose that he was from 18 to 20 feet long. When he came up he threw the water 50 feet in the air with his spouting, and kicking with his tail.

WILLIAM L. CHADWICK, sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. I reside at Seabright, Monmouth County, New Jersey.

Q. How long have you resided there?—A. It is only two years that I have resided there, but I have been there four fishing seasons.

Q. Where did you reside prior to that?—A. At Point Pleasant, Ocean County, New Jersey.

Q. What is your occupation?—A. For the last fifteen years or thereabouts I have been fishing; that is, constantly, I may say. Before that I led a seafaring life and fished together. My life has been spent on the sea, as a general thing, all the way through.

Q. How long have you been acquainted with the subject of fishery and fishing on the New Jersey coast?—A. I think, if my memory serves me right, about forty-two years.

Q. Fishing with what?—A. Net fishing, and bottom fishing, and

hand-line fishing; not all the time; I have not been engaged exactly in that for forty years, but most of it.

Q. For sport merely, or for marketing purposes?—A. For marketing.

Q. How extensively have you carried on the business?—A. Not very extensively. I have carried on fishing now for the last four years pretty extensively, but before that the most of my fishing was fall fishing—fishing for menhaden, gilling menhaden and bluefish. I believe, if I remember right, and I think I do, I caught the first bluefish that was caught on the Jersey coast, if I was told right by an old fisherman, a very old man, older than any of us in here, that they had been gone from there about eighty years, and I believe I caught the first one that was caught.

Q. How long ago was that?—A. That, I think, was about 41 years ago; I will say from 39 to 41 years ago.

Q. Since you caught your first bluefish?—A. Yes, sir.

Q. When did the menhaden fishermen first come there?

The WITNESS. The purse-net fishermen?

The CHAIRMAN. Yes; with their purse-nets.—A. I think it is not far from twenty years ago, the first ones that came out. But they did not make much of a business of it; it was in its infancy. But it increased, and has from that time up to the present time.

Q. How many steamers with purse-nets have you ever seen at any one time?—A. I could not tell you that if it were to save my life, although I am right there among them, where they are passing and re-passing all day long.

Q. You could approximate to it?—A. Oh, I should think I have seen twenty-five, or maybe more, at a sight almost. I have, I think, seen over fifty a day; that is, steam and sail.

Q. Have you any opinion as to whether they affect the quantity of fish?—A. That is my opinion, that they do; but I do not say it is so, because I do not know; it is only my opinion. I can give you the reason for my opinion.

Q. Please state your reasons.—A. The reason why I think so is this: that forty years ago, with our gill-nets, whenever we could get off to sea, whenever the surf was so that we could get through it to get off, we would always catch fish. There was hardly a day ever passed but what there was an abundance; and we caught them so until the purse-fishing came on, and after the purse-fishing came on, or some time after there got to be a quantity of purse fishermen, it seemed as though they began to decrease, and they have been on the decrease ever since. Where we used to, ten years ago (or longer than that), take our gill-nets in the fall and make quite a nice little business of it, now they are not of any use to us. We could not catch menhaden enough with our kind of gill-nets to buy the tobacco that we would smoke. And my opinion is that that has caused it; but I do not say that it is so, because I do not know. Disease gets among fish, as you know. You will find them in great abundance where they drift up and float on top of the waters dead.

Q. Has there been any indication of that during this year on your coast?—A. No, sir, not on our coast. A year ago there was an indication of it in James River and along the James River.

Q. Where was your market for fish?—A. Philadelphia and New York. When we were there catching menhaden with our gill-nets, we sold them all right on the beach to carters and people who came from

some miles back in the country to buy them. We always had a constant market.

Q. How is the supply of bluefish now, compared with former years?—A. Oh, they ain't here; they have not been so plenty. Ten or twelve years ago bluefish were very plenty, but now I don't think we have more than half the quantity of bluefish, or if we have them, they do not show and we do not catch them. I can give you my reasons why I think they ain't there.

Q. Please do so?—A. From the fact that their feed—the moss-bunkers or menhaden—do not go north for the bluefish to follow them north. The bluefish follow them as far as they come; but the menhaden get up in the neighborhood of Atlantic City; that is about as far as the great body of them get, and they are caught up there with purse-nets so that they are all scattered. Once in a while you can see a little bunch here and there that don't amount to anything, and they get north eventually and the bluefish we get, they follow along with them. They come along with the weak-fish, &c., what we have, that is about all. The main body of bluefish, from what we can find out from vessels coming from the south (there are several captains of vessels that I am well acquainted with), when I can fall in with them they tell me about how far they have sailed through bluefish, so that that gives us an idea that the bluefish, the main body of them, do not come up to the north like they used to, or not so far north. But of course, we hold that is the reason of it, because the moss-bunkers do not come as far north as they used to.

Q. Have you any opinion or theory as to the reason the menhaden do not come further north now?—A. That is the reason, I think, because they are caught up, so that they do not get north, or the body of them do not get north. Along the Virginia coast and down there they are in abundance.

Q. What quantity of fish—what value of fish have you ever taken in any one year in the business?—A. I cannot tell you that, but I will give you a little idea of it. At Seabright fishery (as I have got it down here) there are 225 boats, but I will take off the 25 and say 200 boats. These 200 boats are engaged constantly, that is in the summer season, bluefishing. That employs 400 men; two men to a boat. Then there is the amount of our stock which consists of our boat, our ice, &c. Of course I do not mean property in real estate or anything of that kind. But we purpose that that will amount to about \$32,000, and the number of pounds of fish as near as we can get at it (I had a man to help me in this who is better posted than I am, Captain West, of station No. 3; he has been a fisherman there a long while, all his life pretty nearly) is 5,645,000 pounds landed at Seabright in a season. That we have laid down at a low figure; at the rate of \$3 per hundred weight, 5,645,000 pounds will amount to good deal of money at \$3 a hundred pounds, and they will fetch that good enough. Then the amount of our expenses, laid down at low figures, is \$75,000.

Q. For that business?—A. Yes, sir; for that business. That is, bait and our other little expenses, ice and gear.

Q. What bait do you use principally?—A. Menhaden; we cannot use anything else. We cannot find anything that would be a good substitute for it, although we have tried. We had a fair trial this fall.

Q. Do you know whether that is so in New York, also?—A. I do not know.

Q. Do you use them whole or cut them up?—A. We cut them up. Sometimes we chop them with a small ax like a carpenter's hatchet, and

then we have a grinding machine like a sausage-cutter, and we grind them sometimes, and sow them broadcast over the surface of the water, and we take the back fin, a piece about three inches long, say, and we cut it out, and that is the bait we put on the hook, and the balance of the fish we cut up. We have to keep a little of this bait all the time going overboard, and the fish strike into that. It don't make any difference how far off, even if it is a mile away from you, these bluefish will come to where you throw it over. That seems strange, but it is so.

Q. Do you think they see it or smell it?—A. They smell it. We fish from three to eighteen fathoms of line. Sometimes we cannot get them close up to us, though we do sometimes. We do not have to fish with more than four or five fathoms of line usually.

Q. How is the product of your fish annually compared with what it was ten years ago, comparatively speaking?—A. That question I could not answer, because I do not know how the fishing was at Seabright at that time. Ten years ago we fished altogether by night fishing; we still-boated at night.

Q. How has it been during the last four years?—A. The last four years has not been so good. It seems as though the fish—the bluefish—have dropped away. There seems to be less of them every year.

Q. What is the condition of the bluefish and of the menhaden when they appear in the spring?—A. Very poor and very thin.

Q. What time in the year do they get in good heart?—A. They won't get in good heart before the latter part of September or the middle of September, from that out; and the last run of them will be most likely to be the best.

Q. Most of your fishing, then, is in the fall months?—A. Yes, sir, for menhaden.

Q. For any fish?—A. For bluefish we commence about the 25th of May, generally.

Q. What condition are they in at that time?—A. They are thin, very.

Q. What time do they get in good condition?—A. In the fall of the year; the same as the menhaden. It seems as though when the menhaden first come on our coast that they have just spawned, and I think that they do not spawn here at all; I do not think they spawn in our waters at all; and what makes me think so is that when they come in the spring it seems as though they had just spawned, and when they go away in the fall you will find them all full of roe, ready to spawn almost; that is, from appearance. I think a world of young ones—

Q. Then they are the fattest?—A. Yes, sir.

Q. What were you going to say about young fish?—A. Their young, I think, follow on, and there is a world of these young fish in our waters; a world of them.

Q. How early do they appear?—A. You won't see them, likely, until long about the 1st of July.

Q. What time do the menhaden appear?—A. The menhaden will begin to come along about the 15th of May.

By Prof. FERGUSON :

Q. You spoke of the young fish; how large are they?—A. When they first make their appearance I should say they were about three inches long.

Q. And weigh about how much?—A. A mere trifle.

Q. Have you ever seen them smaller than three inches?—A. I think I have seen them smaller than that. I have seen them shorter or smaller than that, but not many.

Q. Are they in schools then?—A. Yes, sir; they come in schools just the same as the large ones.

Q. When you were following the sea did you cruise along the southern coast?—A. Yes, sir.

Q. How far south did you see those small fish?—A. I have seen them at Cape Fear pretty plenty.

Q. Did you see them smaller there?—A. No, sir; the same size. I never saw any there only in the cold weather season; that is, in the winter time here, in our winters north. I have seen menhaden down about Cape Fear and off around Frying Pan shoals, and to the southward of Frying Pan shoals; down in that section I have seen quite a number of them.

Q. How far out to sea have you seen schools of menhaden?—A. I do not think I ever saw them over five or six miles; I do not think I ever did.

Q. You spoke of the menhaden having roe ready to spawn?—A. Yes, sir.

Q. Have you ever seen a fish ready to spawn?—A. I do not know; I have thought that I had (but I do not know that I ever did), from the act that the eggs become, as I have thought, when they were ready to spawn, very large and kind of separated.

By the CHAIRMAN:

Q. Did you ever see them, so that by pressing the spawn it would come through?—A. Yes, sir.

By Prof. FERGUSON:

Q. You have seen menhaden in that condition?—A. Yes, sir.

Q. When the spawn would run from them?—A. Yes, sir; by squeezing.

Q. What month was that?—A. I have seen them in the month of October; in the last of October.

Q. You are certain of its being in October that you have seen them?—A. I think so, but it might have been the first part of November. Now our moss-bunkers I have seen them here the last of December, but very few. But the main body of our menhaden will leave us here by the first of November, or along about the first; I will say from the 1st to the 15th at all events.

Q. Do you know the difference between the male fish and the female fish?—A. Not without cutting them open.

Q. They both have a roe?—A. Yes, sir; you might call it so. One is white in the male fish—a white flat roe, and the other, you know, is yellow.

Q. Have you ever pressed or squeezed the male fish in the latter part of October or November, to see whether anything would come from them?—A. I have seen it run from them where they have been lying in heaps.

Q. What was its appearance?—A. Nothing more than a kind of whitish appearance, something like white-lead.

By the CHAIRMAN:

Q. You mean where they were lying in heaps after they were caught?—A. Yes, sir; with the weight of others on them. I have seen that.

By Prof. FERGUSON:

Q. How are the sharks; have you noticed those within the last few years?—A. Yes, sir. They do not seem to be so thick as they were, well,

say, twenty years ago. Twenty-five years ago sharks were very thick, but I think myself sharks come thicker some seasons than they do others. I am under that impression from what I have seen of them. I have seen them wonderfully thick; twenty-five or thirty years ago I saw them wonderfully thick.

Q. Do you see any sword-fish?—A. Yes, sir; I have seen sword-fish, but sword-fish are not very plenty on our coast.

Q. You do not see them feeding off-shore?—A. No, sir; but I have seen sharks feeding, or I suppose they were feeding, on the menhaden.

Q. You have seen them haul these purse-seines that you refer to?—A. Oh, yes, sir; I have.

Q. What proportion of a school of fish do they take?—A. My gracious, they sometimes don't get one quarter of it, and sometimes again they will get it all. It is owing to the size of the school of fish. Sometimes they fall in with a school of fish so large that they couldn't surround one-quarter of it, or did some years ago.

Q. They take pretty much all they surround if the sharks do not get them, I suppose?—A. Yes, sir; pretty nearly all they surround they are supposed to get.

Q. Which gets out of the seine the easiest, the shark or the bluefish?—A. The shark; the shark will go through the easiest. Bluefish, of course, will eat a net all up like, but so that she ain't torn apart to a great extent. But they are very destructive, bluefish are.

Q. And when they eat the net many of the moss-bunkers get out?—A. Oh, yes sir; when they get bluefish and sharks in they do. If they get any heavy sharks in at all, they make a very large hole.

Q. Have you noticed whether the menhaden in the last few years have been swimming as much on the surface as they used to, or do they swim lower?—A. I do not know that I see any difference; that is, in regard to the quantity of fish. I think they show just as much as they ever did, according to the quantity of fish. I do not see that there is any difference in that.

By the CHAIRMAN:

Q. Your idea, if I understand you, is that the schools are growing smaller and smaller?—A. Yes, sir, smaller and smaller; and the quantity of fish is growing less from some cause.

By Prof. FERGUSON:

Q. You do not set nets any longer for moss-bunkers?—A. No, sir; we do not. It has got so we do not pretend to buy nets for them at all because we could not get one-tenth part enough to pay for one net while she will last. We cannot catch enough for one sea skiff's bait, with a net in a day, and that only takes about three bushels.

By the CHAIRMAN:

Q. Where do you get your bait?—A. We have been getting it for the last few years from the pounds inside of Sandy Hook, and up along the bay there.

Q. You send there for bait?—A. Yes, sir; we have boats running the bait to us, but this last fall we could not get any bait.

Q. Do you ever get any bait from the menhaden boats?—A. Very little they have given us. They won't let us have it for nothing.

Q. What do you have to pay?—A. We pay them 50 cents a bushel. Where we used to pay 25 cents for our bait, we paid them when they did let us have it, 50 cents a bushel.

Q. What do you pay in the market for bait?—A. We pay 50 cents a

bushel now. We pay our bait-runners, as we call them, men who run from the pounds, that amount. There are some three boats running.

Q. I intended to have asked you before, but I will ask you now, when you caught the menhaden for pickling or salting what were they worth a pound?—A. I sold them by the piece. I sold them for from 50 cents to \$1 a hundred.

Q. What would that be a pound, about?—A. A hundred of these 50-cent fish would weigh 80 pounds, say.

Q. Less than a cent a pound, then?—A. Yes, sir; and the fish that we sold for \$1 a hundred would weigh 100 pounds.

Q. What do you know in regard to porpoises; what do they feed on?—A. I do not know.

Q. Did you never catch one?—A. No, sir; I never caught one in my life, although I have seen thousands and thousands of them. I see them every year.

Q. Have you ever seen a whale along our coast?—A. Oh, yes, sir; plenty of them.

Q. Any this year?—A. Oh, yes, sir; I saw several this last year—some very large ones.

By Prof. FERGUSON:

Q. Do you know the different kind of whales?—A. Yes, sir.

Q. What kind?—A. I have seen the right whale, and then the fin-back, and once in a while a black-fish shows, but the principal one along our coast is the fin-back. We do see frequently a right whale, and you generally see two of them together, if you see a right whale.

Q. Do you see any calves?—A. I have seen them, but I haven't seen any of those in late years.

Q. Do you see the grampus?—A. Yes, sir.

SAMUEL LUDLOW sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Sea Plain, N. J.

Q. How long have you lived there?—A. I have lived there some thirty-eight or forty years.

Q. What is your occupation?—A. Fisherman.

Q. How long have you followed that business?—A. I have followed it, I think, forty-eight or forty-nine years. I commenced when I was about twelve years old, and I am now going on sixty-one.

Q. What kind of fishing have you been engaged in?—A. I have fished for shad; that was my first fishing, in the Hudson; and then fishing with the seine for sea-bass and porgies, bluefish, and bunkers and various fish, such as cod-fish and striped bass.

Q. Hand and seine fishing both, I suppose?—A. Yes, sir.

Q. That is with the hook and line and with seines?—A. Yes, sir; with hook and line. We used to do all our fishing with hook and line off our shore, excepting in the fall, and then we would fish for bunkers with gill-nets. But in the summer we used to fish with hook and line off the shore.

Q. How is the supply of fish now, compared with former years?—A. There are not so many as there used to be.

Q. Have they been gradually diminishing, or have they disappeared suddenly?—A. They have been gradually diminishing. I want to be very careful about this matter; this is only my opinion; but I think the producers have been the cause of the fish diminishing—of some kinds of fish, such as cod and Boston mackerel, and net-fish, especially.

A great many men directly after the war went into the Navy and went following the water; they ran away from the draft and followed the water, and when they came back they would go fishing; they would think they would make a living in that way; and I think the producers were greater than they are now, and I think the fishing at this present time is gaining a little. I think we have had more cod with us this fall than before, and more striped bass than we have had before for several years. But bluefish I do not think there has been any plenty of them; and bunkers they have been very scarce.

Q. That is, the menhaden?—A. Yes, sir; we call them bunkers. The Eastern people call them menhaden, and we call them bunkers. What makes me know they are scarcer is, from twenty to thirty years ago sometimes the sea would be almost alive as far as we could see them. They swim on the top of the water, and they flap the water and make it fly with their tails, and we could see them a great distance on a still day. I have seen the schools so large that we would not dare to lay the net on to them, fearing we should get too many. We gilled all our bunkers; we didn't dare to lay a net right into the body of the school, fearing it would get too full. Our moss-bunker nets were rigged with heavy corks, and not loaded so heavy, in order that when the school struck the net they would not run it down. But when they would strike it hard and solid they would run it down, and the rest would go over them or on top of the water, as they swim close to the surface generally. For that reason we had to have the moss-bunker nets pretty heavily corked; but sometimes we would not dare to lay the net in the bulk of the school, fearing we would get too many. But of late years we do not catch them at all as we did then. We would catch more than we could sell; but we had them in the nets and would have to take them ashore. I have seen the time when I have seen them driving to our landing thirty to forty wagons of a morning for bunkers to take back into the country to salt. They would come twenty-five to thirty miles for them to the shore, and if they could not get them one day they would stay two or three days until they got them before they would go home. They made considerable account of them. But now nobody comes for them, and we do not catch them. We do not catch hardly any for ourselves.

Q. Is their place filled with anything else for pickling?—A. No, sir; nothing else.

Q. They would be sought now if they could be caught?—A. Yes, sir; if we could only get them they would salt them. The same is true in regard to sea-bass and porgies. We used to go off to our fishing-ground, about ten or twelve miles at sea, and we used to get a good fair fish every day when we could get through—when the surf was so that we could get off. Sometimes for three or four days there would be a big spell of sea and we could not get off; but when we got through we would go there and return about twelve or one o'clock with fish and sell them to the wagons; we did not have such access to New York and Philadelphia as we have now. That is the way they used to get through the country.

Q. That was the case in regard to sea-bass?—A. Yes, sir; sea-bass and porgies. They were thrown into wagons and iced pretty heavily.

Q. Did they use the sea-bass for pickling?—A. No, sir; fresh, and porgies also.

Q. How large were the porgies?—A. They would weigh from a half a pound to a pound.

Q. What is the size of menhaden?—A. They vary.

Q. The ordinary size, I mean?—A. They will run from a half a pound or may be three-quarters of a pound to a pound and a quarter or a pound and a half. We did catch one, I remember, that weighed two and a half pounds, but it was a very big one; it was a she one; the she ones are the largest always.

Q. What season of the year are they in the best condition?—A. They are best in October and along the forepart of November.

Q. How are they in the spring?—A. They are poor. They are always poor when they come north.

Q. How are the bluefish?—A. The bluefish are poor when they come north; they are not fat like they are in October.

Q. How early in the season do they get in good heart or in good condition?—A. Not until September on shore there. When we cannot get anything else we will eat them there in the summer time, but they are poor and blue. But we think (that is my opinion) that bluefish and bunkers—menhaden—all spawn south somewhere, I don't know where. But I think shad and herring spawn in fresh water; I think their destination is fresh water to spawn, but whether bunkers and bluefish find fresh water somewhere around the Gulf or not I can't say. I don't know where they do go when they leave us. There is no one yet ever did know where they do go, or where they start from when they start to come here.

Q. How early in the season do they make their appearance?—A. They make their appearance about the 1st of May, and from that on later; hardly ever before the 1st of May.

Q. Which comes first?—A. The bunkers come a little ahead.

Q. And which leaves first?—A. They leave pretty much at one time; there don't seem to be much variation between them.

Q. In regard to the menhaden fishing, how has that been for ten or twelve years past?—A. It has been carried on pretty extensively on our coast there.

Q. Increasing?—A. I do not know as it has increased much this last few years. I do not know whether it has or not. I thought that perhaps it was not very profitable.

Q. How many steamers have you ever seen at once fishing?—A. I do not know that I could remember. They are off there every day; numbers of them.

Q. Have you any opinion as to whether they affect the number of menhaden on your coast?—A. I would not like to say definitely about that. I can give you my opinion.

Q. It is your opinion I ask for.—A. I would not say definitely, but I think their catching so many is breaking them up.

Q. Breaking up the schools?—A. Yes; for when we used to have to go to New York by steamboat we would go up across Raritan Bay, and there I suppose we could see one hundred acres of these menhaden flapping their tails and making the water fly. But now we would hardly see any; now we do not catch them in there. Those bone boilers—those steamers—have to come outside after them. If they were inside they would not come down the beach after them. I think the first of their starting down there was they had an old hulk of a boat, and they got a boiler on board and apparatus for manufacturing them, and they hauled them ashore on the bay there. That was rather a slow process, or whether they saw it was profitable or not, after that they got these purse-nets.

Q. How many years ago was that?—A. I suppose it was some twenty years ago; fifteen or twenty years. I do not know exactly.

Q. Have you ever been on those steamers when they have caught and hauled them in?—A. No, sir.

Q. What do you use for bait?—A. We used to use clams for sea-bass and porgies, but for bluefish we use bunkers when we can get them. The way we use them is this: Here is our boat [indicating] and we chop them up, and throw them out, whichever way the current is. Oftentimes the current will be going south and sometimes north; the current changes frequently, but there is always more or less current. But whichever way that current is going we feed and sag off, and the fish get a little taste of it, and we would keep trawling it up until they got up pretty near the boat, and then we would be fishing for them—squid-ding; we would use squids with a little bait on them, and that is the way we would catch them.

Q. Where you catch them by seines how do you do?—A. We used to catch them with seines, and we do now; but that was in the summer time; we do not seine much in the summer. We do not catch them in the fall now with seines like we used to.

Q. Why not?—A. They ain't there, and they are not so large. We used to fish with meshes of five or five and a half inches, but now we have meshes down to four inches. We do not have these big meshes.

Q. That gills them?—A. Oh, yes; we always had to gill them all. We have caught a whole school of them, and they would average from ten to eleven for a hundred pounds clear of the basket. But now they won't average—it would be hard work to get them to average—four pounds. But then I have caught them and opened them, and they had two or three bunkers in them; I often catch them and open them and find two in them. But we do not get those big ones any more; we have not of late years.

Q. What is the price or the value of bluefish per pound in your market; what do you get for them?—A. We have had them from two to three and four cents a pound on shore.

Q. What did you get for the menhaden when you used to catch them?—A. We used to sell them by the piece. Sometimes we would sell them by the dozen.

Q. At what rate, or about what rate?—A. Well, at a penny apiece.

Q. Taking the average?—A. Yes, sir; a dollar a hundred.

Q. How with the weak-fish?—A. We never used to catch very many weak-fish.

Q. But when you did?—A. We sold them for about the same as mackerel.

Q. What do you get for mackerel?—A. Blue mackerel are worth about four cents on shore.

Q. And sea-bass, when you catch them?—A. Sea-bass are worth four cents on shore.

Q. No more than that?—A. No, sir.

Q. I had an impression they were the highest-priced fish except salmon in the market.—A. Oh, no, sir; they are not as high priced as striped bass.

Q. I mean the striped bass?—A. I was speaking of sea-bass; that is a different fish; we have to fish differently for them.

Q. What do you get for those when you catch them?—A. I suppose they are worth twenty-five cents a pound now.

Q. Do you catch any of those?—A. Yes, sir; we have caught them. We have to haul for them.

Q. Are they increasing or diminishing in quantity?—A. I think they have gained a little. There seems to be more this winter and last fall than there has been before.

Q. For how many years?—A. Probably for ten or fifteen years. I think they take turns; they sometimes take another route.

Q. What do they feed on?—A. They feed on little fish—shrimps and small fish.

Q. What do you catch them in?—A. In a seine.

Q. You do not catch them with hook and line?—A. No, sir; we do not catch many with hook and line. We have a seine, and run around them and haul them ashore. We have to work from the shore to catch them.

Q. The striped bass?—A. Yes, sir. They are a peculiar fish to catch.

Q. How large have you ever caught them?—A. From a half a pound to thirty or forty pounds; they vary in size considerably.

Q. Then the menhaden, to manufacture into oil and fertilizers, grow better and better as the season advances?—A. Yes, sir. I do not think they get much oil out of them in the summer time. They are most always poor. Most every fish is poor directly after they spawn. Our shad are not good for anything after they go up the Hudson and spawn.

Q. Do you know how it is with the menhaden as to their multiplying rapidly, like the shad?—A. I do not know how that is; but I suppose they do. We find a great many eggs in them, and if those eggs all mature they must increase very rapidly.

Q. A great many more in proportion than the bluefish, I suppose?—A. Yes, sir.

Q. How is it with the cod; their spawn is large, is it not?—A. Their spawn is larger. They vary in size; but they have pretty big roes in them. Their spawn is pretty large.

By Prof. FERGUSON:

Q. Have you followed fishing anywhere else except at the places you have mentioned on the Jersey coast?—A. I have fished on the Hudson.

Q. You never have been up and down the coast?—A. No, sir; never much up and down the coast; no further than Barnegat, down the coast, and from that to Sandy Hook.

Q. Do you ever see small menhaden or bunkers?—A. We supposed they were small menhaden or bunkers, the way we would see them, seaward. The bluefish would chase them, and run them up on shore on the sand; and that is the way they run shad. Bluefish will run at almost anything; anything they come in contact with they will try to get out of the way, and drive them up on the sand or into small inlets. I have known them to run two or three thousand shad up into an inlet in that way.

By the CHAIRMAN:

Q. The bluefish would drive them in there?—A. Yes, sir; the bluefish would drive them up there; they dare not come in themselves.

By Prof. FERGUSON:

Q. These small fish that you have seen you have supposed to be menhaden, but you do not know that?—A. Well, they had the appearance of menhaden or bunkers. I suppose (my experience is) that they follow the old ones, the same as shad and herring.

Q. How small have you seen them?—A. From three to six inches, say.

Q. Did you ever see the young of any other fish that you could recognize?—A. Yes; there would be other small feed fish; different kinds of fish.

Q. Did you ever see the small striped bass?—A. No, sir; no small striped bass, not to amount to anything.

Q. Do you think you could distinguish the difference between a small shad and a young bunker?—A. I do not know about that; I would not like to say; I am well acquainted with both of them, too, but I would not like to say when they are young. I know I have seen plenty of young shad swimming. I think they were young shad, but I will not be sure. When I was a boy I was reared on the banks of the Hudson, fifty yards may be, from the shore, and I used to see these young shad in August or September, the first ebb of high water, working along down the shore. I would watch them, and there would be multitudes of them. That was in the Hudson. We used to suppose—my brothers and myself used to suppose—they were young shad.

The CHAIRMAN. They were, undoubtedly.

The WITNESS. I have always thought they were. I have always had an idea that these young shad in the Hudson went away and came back home again. That is my opinion.

Q. Have you ever seen roe in the menhaden or moss-bunkers?—A. Yes, sir.

Q. Have you seen it run from them at all?—A. No, sir; I never have seen them enough impregnated for that.

Q. What season of the year have you seen them?—A. In the fall.

Q. Never in the spring?—A. No, sir; we never use them much in the spring. In regard to shad, I might give you information in regard to them. I suppose I am about the oldest shad fisherman on the Hudson.

The CHAIRMAN. That is hardly within the range of our inquiry, but if there is anything you desire to state you may do so.

The WITNESS. If it is not in question here then it is immaterial. But I can give you my idea about it. I think the shad are diminishing, and the cause of that is the late fishing up the river. They fish up there until July, and they catch the impregnated shad, which ought to be left there to deposit their spawn; they destroy them. And they have nets they drag over the spawning ground, and they destroy a great many spawn after the shad does deposit it. I have seen them send shad down to market there, where hundreds of them had spawned out. I think the growth of shad is getting down quite fast, for I know when the time was when we would catch 50 per cent. more shad than we do now.

The CHAIRMAN. Do you fish for shad on any of the streams of your coast—the New Jersey coast?

The WITNESS. No, sir; we don't have many shad streams there. Sometimes they will go up into Squan River, and they catch some, but not enough to make a business of it.

Adjourned.

WASHINGTON, D. C., *January 22, 1883.*

JAMES R. O'BEIRNE sworn and examined.

By the CHAIRMAN:

Question. Where is your residence?—Answer. New York City.

Q. How long have you lived there?—A. I have lived there off and on for the last forty years, but recently for the last fourteen or fifteen months.

Q. What is your occupation?—A. I am a journalist; I am special inspector of customs also.

Q. Have you given any attention to the subject of the supply or want of supply of food fish?—A. I have quite a good deal.

Q. For how many years?—A. Well, I think off and on my experience along the coast, and those with whom I have been talking, say, for twenty years.

Q. What knowledge, if any, have you of the subject of menhaden fishing—the catching of menhaden for commercial purposes?—A. Well, I know the subject generally from the records and from statements that have been made and conversations I have had upon it.

Q. What varieties of food fish have you been accustomed to take, more or less?—A. Weak-fish, bluefish, and mackerel.

Q. Have you ever caught the striped bass?—A. Never many striped bass, except of the smaller kind, not of the larger species; those weighing about, say, three-quarters of a pound to a pound.

Q. What is your observation as to whether the supply of the fish you name has either increased or diminished in late years?—A. They have decreased as far as my observation has been, particularly upon the coast of New Jersey, and so far as the information I can obtain in regard to them would go.

Q. What variety of fish has decreased the most?—A. Well, principally bluefish and weak-fish.

Q. Do you know on what they feed?—A. Bluefish I am pretty well satisfied feed upon menhaden. The weak-fish feed upon almost any kind of bait; I hardly know exactly what.

Q. Is there any bait which is a specialty in the catching of bluefish; what bait is used ordinarily?—A. Menhaden is a good bait, and then in trolling for bluefish the silver imitation of a sprat or a piece of red rag is very often used effectually.

Q. But they have to be attracted by throwing out food to do that, do they not?—A. Occasionally. I think there is a system called "chumming" very much like that used upon the coast of Maine in the catching of mackerel—breaking up fish and throwing it over board by handfuls.

Q. How large have you ever seen a bluefish?—A. The largest I have seen would weigh about from 10 to 12 pounds.

Q. What is the size of those ordinarily caught?—A. I should say between five and eight pounds.

Q. Are they a desirable fish for food?—A. They are very desirable indeed. Fresh caught, they are probably one of the most palatable and savory of fishes and quite in demand.

Q. Do you know anything of the habits of the menhaden?—A. I have been accustomed since a boy to watch them a good deal upon the Jersey coast, especially in their migrations near the shore, and have always been astonished at their peculiar freaks as it were—their strange way of acting at times. I have seen them in very large numbers, large fields or shoals; and I have seen them taken in very large numbers and carted up along the coast to the farms, back in the older days, in wagonfuls. Of course I have always thought it was wonderful why they should be so numerous.

Q. The farmers pickle or salt them, do they not?—A. Some farmers do. I think the poorer farmers do, inland; but the most of the farmers whom I have known were in the habit of using them as fertilizers. They are a very bony fish.

Q. Put them on the soil raw—just throw them on and let them decay?—A. Yes, sir; that was the old fashion.

Q. Have you observed any change in the supply of menhaden?—A. Yes, sir; as far as my observation goes during the last two or three

summers, down along the coast of New Jersey, and I noted it personally myself, frequently sitting or going along the sea shore, wondering that I did not see—as I used to see them as a boy—these large shoals or schools.

Q. They have diminished perceptibly then, have they?—A. As far as my observation goes they have.

Q. Have you any opinion as to the cause of it?—A. I have; and I may state, by way of explanation, that it comes more largely from mixing among men who are familiar with fishers and fish than from any actual knowledge that I have from experience of my own. I have been in the habit of going a good deal among fishermen and studying them, and have been rather fond of their society. Frequently in conversation with them I have asked about the fish, and in that way the subject came up as to the decrease of the fisheries, and some of them going out of business, and the reason why the fish decreased.

Q. Well.—A. The causes generally attributed by them in talking were stated by them to be the prevalence of the new system of catching menhaden by the aid of steamers and by purse nets; and with that came up the general question of the injury that they had been doing to the catching of food-fish, and also to the absence of menhaden, which seemed to go hand in hand, in their minds, in thinking over the fish question.

Q. Do you know anything as to their spawning season?—A. I do not, except from my reading. My impression is that they spawn somewhere on the line of the warmer water near the Gulf Stream.

Q. And at what season of the year?—A. I think that it is rather through the winter, from what I have read and familiarized myself with.

Q. Do you remember ever to have observed menhaden with spawn in them?—A. Oh, yes, sir; very largely.

Q. At what season?—A. More generally in the early part of the summer, I should say, and late in the spring.

Q. They are very prolific, are they not?—A. Exceedingly prolific. I do not know of any fish, except the small fish caught off the coast of Maine, used as a kind of sardine or shadine, that is so prolific; and I have thought, without examining the scientific records on the subject, that they were allied to the same family as the menhaden, or that they were of the herring family, which I suppose would cover the idea and be accurate.

Q. Have you seen these steamers fishing off the coast of New Jersey?—A. Yes, sir; I have seen them at times.

Q. Do you remember how many you ever have seen at any one time?—A. I have seen as high as seven or eight. I think I remember once of counting twelve; but then I have more frequently seen them three and four together.

Q. How far from shore?—A. I should say somewhere about three miles; sometimes, in high water, nearer.

Q. Do the menhaden come in schools to the shore, or near the shore?—A. Yes, sir; very near the shore, and sometimes so remarkably so that I have seen people in bathing—youths—get among a school of them, and then they would scamper off. I have even seen them in rough weather beaten up on the shore.

Q. Do the bluefish pursue them when they come on shore?—A. That was our impression; that that was the cause of their going in so close to the shore—running from the bluefish and sharks.

Q. Afraid of sharks?—A. Afraid of sharks; yes, sir; a kind of instinct they had.

Q. Have you any knowledge as to the relative value of food-fish—which is the most valuable, and the order in which they rank?—A. I have, except so far as market prices would be concerned. I know the standard of value they would have in appreciation as selected fishes.

Q. Please state that.—A. I think the bluefish is first with us, especially in New York, and I might say in New Jersey, which is a very large consumer of bluefish during a large part of the year—say four months. Then there is the bonito, the weak-fish. I might range, probably first, striped bass as the most rare; valuable because of its rarity.

Q. Not more valuable than salmon, I suppose?—A. No, sir; the salmon is, I should say, the most valuable.

Q. Salmon ranks highest?—A. Salmon ranks high; yes, sir.

Q. What is the relative value of the bluefish and Spanish mackerel?—A. The bluefish is the more valuable, because the Spanish mackerel are, when caught, caught in larger numbers, and caught much more quickly. I have caught 15 mackerel in 10 minutes.

Q. About what season of the year do bluefish make their appearance; how early in the season, say, on the coast of New Jersey?—A. As near as I can remember, the latter part of May and the early part of June.

Q. The menhaden before or after them?—A. The menhaden generally before them.

Q. The first?—A. The first; yes, sir.

Q. What is their condition when they first come on the coast?—A. The menhaden, when they first come on, hardly seem to be the same kind of fish as later on—in caliber or weight. They seem to be a meager fish, a hungry fish, a poor fish; but later on they seem to fatten out and grow to be a much larger fish.

Q. How is it with the bluefish in that respect?—A. I think the same thing would apply to the bluefish. Along toward the month of July, and later on, bluefish seem to become plumper and more solid in their meat.

Q. About what time of the year do they disappear?—A. After the first heavy cold storm, usually on the coast, so far as my information extends. Usually it is a comment about the equinoctial that if it grows cold after that the fishing will get poor, and the fish will disappear. They go south.

Q. And menhaden disappear too, I suppose?—A. Yes, sir.

Q. The bluefish spawn in the winter, do they not?—A. I think so.

Q. Or during their absence they do not come to spawn on the coast?—A. No, I think not, although you find in the early part of the bluefishing season a smaller fish; that is before the regular bluefishing season commences, as though it were the bluefish not yet grown.

Q. Young fish?—A. Young fish; yes, sir.

Q. Is it not the same with the menhaden?—A. Yes, sir.

Q. The young of the menhaden appear also?—A. Yes, sir. As I remarked before, they appear to be a different kind of fish, although they have the same marks.

Q. You see the drift of the inquiry. If there is any general statement you desire to make without questions, we will give you an opportunity to do it. I will state to you that the bill introduced by Senator Sewell, which led to this inquiry, is a bill absolutely prohibiting the use of purse-nets to catch menhaden within three miles of the Atlantic coast, perpetually. That is the bill which has led to this inquiry, and the question we are investigating is to learn whether such a prohibition should be made, or whether it should be made for a portion of the season, or whether there should be any prohibition at all, or any re-

straint. Those are all questions which are involved in the inquiry before us. Now, if you have any suggestions with reference to that, I will be glad to have you make them?—A. I should say, in general terms, of my own conviction, from what information I have had, and conversations I have had from time to time with different parties, and examinations which I have made, that I think something should be done in the direction of the bill offered by Senator Sewell. I am, I might say, almost prepared to say that I think the bill is a very proper one and very just, so far as I can see; because, while there are equities upon both sides of the case, as to the menhaden side and the fishermen of New Jersey and the interests of the coast of New Jersey, I am well assured that there are equities on the side of those who are engaged in the catch of menhaden who have large capital invested. But I cannot see how, under the provisions of the bill as you have just stated them, with their appurtenances and appliances, and the strong vessels they have—which are remarkably strong and very excellent weather boats—that they cannot with equal advantage or with fair advantage fish at least three miles from the coast.

Q. Do you know Mr. Blackford?—A. I know of him by reputation.

Q. You do not know him personally?—A. No, sir; I do not know him personally.

Q. Mr. Blackford, in his testimony, suggested that prohibiting the catch until the first of July he thought would, to a great extent, obviate the difficulty, covering the entire spawning season; for he thinks a portion of them spawn even after they return, or late in the season—in the spring—covering the spawning season and the season of their recuperation. He thinks the menhaden fishermen would get as much value if they wait until the menhaden get matured and fleshy as they would to commence taking them earlier in the season.—A. Well, I should be inclined to agree with Mr. Blackford, for I regard him as a very high authority, and we do generally in New York, on fish matters. At any rate, whatever would fairly compromise the difficulty that undoubtedly now exists, in accordance with the best judgment of those who are practically informed, would be very desirable, for there is certainly, and apparently well founded, a sense of injustice in the action of the menhaden fishermen. I forgot to say that they scour right in close to the inlets and bays, and at such times so that the fish cannot get away from them, and it affects also the supply of food fish that are caught in the estuaries and different bays, and sometimes very largely and very advantageously furnish the table.

Q. I suppose you do not know as to whether they catch food fish to any extent?—A. I do not know of my own knowledge. That is to say, I have never been upon a menhaden fishing steamer when they have made their catch so as to see what fish they had among them; but it is a subject of frequent remark along the coast all the way up from Barnegat that they take the fish just as they come; and largely among them, and very recently—this summer and summer before—weak-fish abound to quite an extent, and do not select them out but throw them right into the hold and take them on their vessels to their factories at Barren Island and elsewhere. And that seems to be the aggravating part of it. Now, speaking from a stand-point of the sustenance of life, or more properly speaking, the furnishing of delicacies, I have heard it frequently remarked at tables along the coast, “Why don’t we have fish?” “Well, we can’t have them; they are all thrown into the receiving places for the menhaden, and taken to the menhaden factories,” and that they are thrown in to make oil and the fertilizers.

Q. I did not mean to interrupt your statement if you designed to state anything further.—A. The corrective would seem to me to be that if they would fish three miles off shore, and not come nearer than that, then the menhaden, which, beyond our power of calculation, furnish a supply of food for the bluefish and weak-fish, would have a chance, and the bluefish and weak-fish would also have a chance, first to feed, and then to escape the purse-nets of the menhaden fishers. At all events, supposing that upon the moment of alarm these fish that are strong enough and powerful enough to defend themselves, and could take to deeper water, would proceed to do that, to get down to deeper water and get out of the way, they would be better enabled to do it by the interval between the operations of the menhaden fishers if three miles from the shore; and, consequently, it would seem to me that if that line were established it might correct the difficulty.

Q. The menhaden, when they are left undisturbed, are a surface fish, are they not?—A. A surface fish entirely. You may look along the water and almost see their motions. There is a rippling on the water almost like a smooth brook when a breeze of wind passes over it.

Q. How far from shore have you seen schools of them?—A. Within half a mile.

Q. What distance at sea have you seen them?—A. I have never seen them much further than five miles; probably five or six miles from the shore, and then of course in calm water.

Q. Well, that may arise from the fact that you do not ordinarily go further than that from the shore yourself?—A. Yes, sir; I go a great deal outside, out at sea. I have gone all along the coast of Maine, on the roughest part of it, and have been in the habit of being a little adventurous as a boy and man in going outside along the coast in the breakers, &c.

Q. The evidence is that menhaden have disappeared from Maine, where they used to be caught in large quantities.—A. So I learned from the record. But I cannot say about that, and in referring to it and to the testimony of Prof. G. Brown Goode, on reflecting, I compared it in my own mind to the disappearance of the buffalo in the West. I have been on parts of the prairies which used to be the hunting grounds, or at least the feeding grounds—hunting grounds of the Indians, and feeding grounds of the buffalo—where the rich buffalo grass came up and where it was succulent, and where there was water, that is, the little streams near by furnishing water during certain seasons which they did not subsequently. Then I have known them to disappear, and, as the present fact shows, to have disappeared for ten to twelve years, and all of a sudden, nobody knows how or why, they come right back to those pasture grounds where the only trace of them was the old buffalo wallow left, and the only reminiscence of a buffalo that came up in conversation was that you saw buffalo wallows, but the buffalo had gone forever. It appears from information that I had directly from there, from an eye-witness, that recently in the Belle Fourche country, just west of the Black Hills and running around it somewhat—it is a very fertile country where that buffalo grass used to be very succulent and of a good supply—that the buffalo have again appeared, and in large numbers. So that from that section of country some 700 or 800 Indians have gone off to hunt them who never thought they would again hunt a buffalo—never find them near enough to them to obtain the consent of the government that they should go to a hunt, which is now about from 90 to 100 miles of their reservation. In that connection, though, an element enters that may possibly be analagous to the disappearance of the men-

haden, and that element of the buffalo is that the grass is very good at certain seasons and the pasture is excellent, and then the dry season comes on and burns it up, and it is not perceived on certain parts of the prairie for years. Then again the recurrence of change would bring that grass which had disappeared up again, and, reviewing the question in that light, it would be about the only way that I could account for their disappearance from the coast of Maine, because the coast generally has been known, and we have found it—those of us who have fished in the waters and have mixed among the fishermen—quite prolific in all sorts of fish.

Q. Then you would not attribute their disappearance there to the menhaden fishing, which commenced there?—A. No, sir; I would not. I would rather attribute it to the migratory character of the fish and the general laws of nature, which I suppose govern the buffalo as well as they do the fish.

Q. I suppose the menhaden do not like cold water?—A. No, sir.

Q. And I suppose the reason they come nearer the shore is because the water is warmer?—A. Yes; I should say that the warmer water would be the preferable water with them, because of their disappearance, as well as the others, when a heavy cold storm comes on in the early part of the fall and winter.

Q. Have you ever noticed whether a thunder-storm at sea affects the catch of fish for the time being?—A. Yes, sir; I have. I have some very queer ideas about that. I have an idea that the fish get alarmed at the noise and the flashing of the lightning—something unusual—and they go down.

Q. There never was a trout caught in Canandaigua Lake during a thunder-storm, to my recollection.—A. I believe it would stand to reason that that would be so, for this reason: Because if three or four of you were in a boat catching fish, and the fish are pretty plentiful, and you commenced laughing and joking and making loud noises, why the fishing will change.

Q. That alone would affect it?—A. Yes, sir.

Q. Now, you take game of any kind—take the quail or the partridge—does not the bare fact of hunting for them in a certain locality cause their disappearance?—A. I was going to remark in that connection about my strange ideas with regard to fish and animals. We know that they have an instinct, and we know also that they have a sense of danger, and, just like a rational animal, they avoid danger.

Q. Now, is it unreasonable to suppose that the menhaden, when they find themselves surrounded and trapped in this way, take warning from that?—A. I think so; just as you take the shooting very extensively on fishy places of our ducks and geese, they will disappear from there for quite a long time; then after a long time has elapsed they will return. That might also be governed to some extent by the change of supply of the nutriment they have subsisted upon.

Q. If you think of any other statement you wish to make, please do so. I think you spoke of having prepared something.—A. I did intend to, but I changed my mind about preparing anything, because I did not know fully what scope your investigation would take. I will say this, however, from a disinterested standpoint, that I believe—and in the face of the strong opposition of views on the menhaden side of the question—I believe that the complaints made by the people of New Jersey have strong foundation; that they are certainly aggrieved, and the thing needs some correction; whether it would be in the scope of the bill as presented, or something near it, as I said before, as a compromise.

At all events I am quite sure that something should be done. The subject-matter is one that has agitated New Jersey a good deal. I have had occasion to do a good deal with New Jersey, both socially and commercially, I might say, as well as politically, and their legislature has been very much worked up about it, and they have passed a bill which was unavailing on account, as I need not say, of our treaty rights—the question of what would control the matter of marine laws—but notwithstanding that they did—

Q. That legislation was defeated on the ground of its unconstitutionality; the State had no jurisdiction?—A. Yes, sir; I was about to say so. It would involve our treaty relations, and therefore it seems to me an eminently proper, an eminently wise thing, that this inquiry should be before you, and that it should receive the thorough investigation that it is having, and if from it this corrective can be applied, as I said before, equitably to all interests concerned, it will be great relief to the State of New Jersey, and especially along the coast. There are a very fine class of people who have been interested in fisheries for years.

Q. Well, almost the whole coast of New Jersey is our watering place and fishing place.—A. Yes; and not only that, I might say without extravagance, the fisheries are a great source of revenue to the State. You will pass the people there by the thousands for 15 or 20 miles along the beach, walking upon the plank passage-way that is there, extending all the way from Long Branch down, I might almost say, to Cape May. At intervals these large crowds become greater as you get down beyond Point Pleasant and Barnegat, but they are all extending in that direction. Those people are all consumers of delicacies, who spend money largely, and who have a right to what their money will buy. Well, fish is very largely a delicacy that they, going from the cities, get fresh from the sea, and by consequence of the expenditure of money, which is very large, when you take these valuable fish like bluefish—and, you mentioned a while ago, the salmon and bonito—and it becomes a source of great income or revenue to the people of the State of New Jersey, and therefore it combines a question of trade as well as the supply of a delicacy, with the inter-dependent relations of the two elements of labor and of supply that are introduced in it. Another feature is, it would render those people more satisfied down there.

Q. Looking at it purely in the light of the question whether the people shall be supplied with this article of food or whether commerce shall have the advantage of the oil and fertilizers, I suppose no one would question that the claim of the people for food would predominate over the mere commercial interest?—A. Yes, sir; but as between the two points that you raise I would state there is the medium line that may be drawn without involving the rights of either side.

Q. Well, I am supposing the case that one has got to absolutely yield to the other?—A. Well, the question of food must always prevail, because man fights for it. But I was going to say, if you will allow me, that the men who are engaged in this menhaden fishery are very keen men. They have a lookout, and can see a long distance off. Their first business is to keep a man on observation in order to ascertain, as they move vicariously about from place to place, when they are nearing a school of fish. Then, of course, as you know from the testimony, they get ready for business. It is just as well to ascertain three miles off shore as nearer. They have, as I suggested in my reference to the strength of the boats and the skill of their seamanship and everything, all that man can supply for a mastery of the sea at large.

Q. In the ordinary catch of bluefish do they go as far as 3 miles

from shore?—A. No, sir; I should say not. But the natural law must be borne in mind, that the bluefish is a roamer of the sea, as most other game fish, as we call them, are, and he probably has been on a long chase somewhere about the farms of the sea for these menhaden, and he has barely run them down to cover, so to speak, as you would speak of shooting, and probably before he gets right near them, or the time of his eating or feeding, he is then within, say, 4 or 5 miles of the shore.

Q. Do not they kill a great many more than they eat?—A. Naturally they would, because they are a fierce fish and they would strike in among them and kill generally in order to feed *ad libitum* afterwards.

Q. Some one has said to me that they bite a piece right out of a fish?—A. Oh, yes; I have seen fish all mangled. I will give an instance of a small species of fish that I sent to Professor Baird that I caught at Bayview, L. I., a year ago last August—which is pertinent here from the fact of your reference to the disappearance—which Professor Baird had informed me had not appeared upon our coast for a great number of years, and I asked all the fishermen there what it was (and I thought I had a *rara pisces*, I might say, instead of a *rara avis*), but none of them knew the fish. I therefore thought it was my ignorance of the general subject of fishes from a scientific stand-point. I thought it was a new species, so I bottled it up and sent it to Professor Baird with a letter telling him where I caught it, and stating the fact that several of the fish caught in the same seine were terribly mangled and cut up. This seemed remarkable, because it was a small narrow fish, very flat, and of the purest silver, but without any scales upon it. The head was a perfect armament, an engine of attack. It was pointed at the nose, and around it were a number of sharp teeth outside of the mouth and gills, and the edge of the mouth was as tough as a piece of iron, so that the apparent business of the fish was to drive at a fish and go back and go to and fro and tear him, and then, being smaller and requiring to get the feed in smaller quantities, commence to eat at leisure.

Q. Eat the fragments?—A. Eat the fragments. I forget the technical term of the fish, but Professor Baird wrote me a reply stating what its designation was in the fish world, and that the remarkable feature about it only was that it had not been known upon our shores for a number of years, and the other remarkable fact was that of the old fishermen who were there, who had been hauling fish for thirty or forty years, none of them knew what it was, had never seen them before.

Q. What was the weight of it?—A. I do not think it would weigh more than a quarter of a pound. It was a long fish, about fourteen inches long; a very remarkable fish; and then its dorsal fins were very peculiar. There were no fins upon the side at all, except two small ones back of the gills, and what struck me in studying the fish was how it could make any lateral motion; that is to say, slide to the right or left; but there was everything to show that it was a bold fish, a fierce and striking fish.

Q. It had a large tail fin, hadn't it?—A. Yes; and the tail tapered off to the finest kind of a rat tail.

Q. To a point?—A. A point. It seemed as though it had that as a whip to scourge the fish.

Q. A sort of snake fish?—A. Exactly so.

TESTIMONY

TAKEN UNDER

SENATE RESOLUTION OF MARCH 2, 1883,

DIRECTING

A subcommittee of the Committee on Foreign Relations of the Senate, consisting of Mr. Lapham (chairman), Mr. Call, and Mr. Morgan, in conjunction with the Commission of Fish and Fisheries, to continue the examination of the subject of the protection to be given by law to the fish and fisheries on the Atlantic coast, as proposed in the bill S. 1823, first session Forty-seventh Congress.

CAPE MAY, N. J., July 12, 1883.

The subcommittee met at 10 o'clock a. m., pursuant to call, all the members being present, with Mr. M. McDonald representing the Commission of Fish and Fisheries.

Mr. MORGAN. I submit an abstract of the history of menhaden, by Prof. G. Brown Goode, written in 1880. Professor Goode is our representative in England now at the Fish Exhibition, and I desire to have this paper included in the record because it contains a great deal of valuable statistical information and is very accurate.

The paper was ordered to be printed. It is as follows:

A SHORT BIOGRAPHY OF THE MENHADEN.

(AN ABSTRACT OF "A HISTORY OF THE MENHADEN.")

BY G. BROWN GOODE.

[Read before the Saratoga Meeting of the American Association for the Advancement of Science, and the Chicago Meeting of the Central Fish Cultural Association, and in an extended form before the New York Meeting of the United States Menhaden Oil and Guano Association.]

The herring family is represented on the Atlantic coast of the United States by ten species, all of which swim in immense schools, and several, such as the sea herring, the shad, and the various species of the river alewives, are of great economical importance.

In abundance and value these are all surpassed by the menhaden, *Brevoortia tyrannus* (Latrobe Goode), a fish whose habits are in many respects anomalous, and concerning which very little has been known or written.

The menhaden has at least thirty distinct popular names, most of them limited in their use within narrow geographical boundaries. To this circumstance may be attributed the prevailing ignorance regarding its habits and migrations, among our fishermen, which has perhaps prevented the more extensive utilization of this fish, particularly in the South.

North of Cape Cod the name "pogy" is almost universally in use, while in Southern New England the fish is known only as the "menhaden." These two names are derived from two Indian words of the same meaning; the first being the Abnaki name, "pookagan" or "poghaden," which means "fertilizer," while the latter is the modification of a word which in the Narragansett dialect meant "that which enriches

the earth." About Cape Ann, "pogy" is partially replaced by "hard-head" or "hard-head shad" and in Eastern Connecticut by "bony fish." In Western Connecticut the species is usually known as the "white-fish," while in New York the usage of two centuries is in favor of "mossbunker." This name is a relic of the Dutch colony of New Amsterdam, having evidently been transferred from the "scad," or "horse mackerel," *Trachurus lacerata*, a fish which visits the shores of Northern Europe in immense schools, swimming at the surface in much the same manner as our menhaden, and known to the Hollanders as the "marshbanker." New Jersey uses the New York name with its local variations, such as "bunker" and "marshbanker." In Delaware Bay, the Potomac, and the Chesapeake, we meet with the "alewife," "bay alewife," "pilcher" (pilchard), and "green-tail."

Virginia gives us "bug-fish," "bug-head," and "bug-shad," referring to the parasitic crustacean found in the mouths of all Southern menhaden. In North Carolina occurs the name "fatback," which prevails as far south as Florida, and refers to the oiliness of the flesh. In this vicinity, too, the names "yellow-tail" and "yellow-tailed shad" are occasionally heard, while in Southern Florida the fish is called "shiner" and "herring." In South America, among the Portuguese, the name "savega" is in use. On the Saint John's River, and wherever Northern fishermen are found, "menhaden" is preferred, and it is to be hoped that this name will in time be generally adopted. A number of trade names are employed by the manufacturers in New Jersey, who can this fish for food; these are "American sardine," "American clubfish," "shadine," and "ocean trout."

In 1815 the species was described by Mitchell, of New York, under the name of *Clupea menhaden*, which has since been commonly accepted. A prior description by Latrobe, in 1802, long lost sight of, renders it necessary, as I have elsewhere demonstrated, to adopt the specific name *tyrannus*. The genus *Brevoortia*, of which this species is the type, was established by Gill, in 1861.

The geographical range of *Brevoortia tyrannus* varies from year to year. For 1877 it was, so far as it is possible to define it in words, as follows: The wanderings of the species are bounded by the parallels of north latitude 25° and 45° ; on the continental side by the line of brackish water; on the east by the inner boundary of the Gulf Stream. In the summer it occurs in the coastal waters of all the Atlantic States from Maine to Florida; in winter only south of Cape Hatteras. The limits of its winter migration oceanwards cannot be defined, though it is demonstrated that the species does not occur about the Bermudas or Cuba, nor presumably in the Caribbean Sea. In Brazilian waters occurs a geographical race of the same species, *Brevoortia tyrannus*, subspecies *aurea* (the *Clupanodon aureus* of Agassiz and Spix); on the coast of Paraguay and Patagonia by *Brevoortia pectinata*; in the Gulf of Mexico by *Brevoortia patronus*.

With the advance of spring the schools of menhaden appear near our coasts in company with, and usually slightly in advance of, the other non-resident species, such as the shad, alewives, bluefish, and squeteague. The following general conclusions regarding their movements are deduced from the statements of about two hundred observers at different points on the coasts from Florida to Nova Scotia.

At the approach of settled warm weather they make their appearance in the inshore waters. It is manifestly impracticable to indicate the periods of their movements except in an approximate way. The comparison of two localities distant apart one or two hundred miles will indicate very little. When wider ranges are compared there becomes perceptible a certain proportion in the relations of the general averages. There is always a balance in favor of earlier arrivals in the more southern localities; thus it becomes apparent that the first schools appear in Chesapeake Bay in March and April; on the coast of New Jersey in April and early May; on the south coast of New England in late April and May; off Cape Ann about the middle of May, and in the Gulf of Man in the latter part of May and the first of June. Returning, they leave Maine in late September and October; Massachusetts in October, November, and December, the latest departures being those of fish which have been detained in the land-locked bays and creeks; Long Island Sound and vicinity in November and December; Chesapeake Bay in December, and Cape Hatteras in January. Farther to the south they appear to remain more or less constantly throughout the year.

A strange fact is that their northern range has become considerably restricted within the past twenty-five years. Perley, writing in 1852, stated that they were sometimes caught in considerable numbers about Saint John, N. B., and there is abundance of other testimony to the fact that they formerly frequented the Bay of Fundy in its lower parts; at present the eastward wanderings of the schools do not extend beyond Isle au Haut and Great Duck Island, about forty miles west of the boundaries of Maine and New Brunswick. That have not been known to pass these limits for ten or fifteen years. They have this year hardly passed north of Cape Cod, and forty or more steamers which have usually reaped an extensive harvest on the coast of Maine have been obliged to return to the fishing grounds of Southern New England, where menhaden are found as abundantly as ever.

I have elsewhere shown the arrival of the menhaden schools to be closely synchronous with the period at which the weekly average of the surface temperature of the harbor rises to 51°F ; that they do not enter waters in which, as about Eastport, Me., the midsummer surface temperatures, as indicated by monthly averages, fall below 51°F ., and that their departure in the autumn is closely connected with the fall of the thermometer to 51° and below. In 1877 a cold summer seemed to threaten the success of the Maine menhaden fisheries. In September and October, however, the temperatures were higher than in the corresponding months of the previous year, and the scarcity of the early part of the season was amply amended for.

The season of 1878 in Maine was fairly successful, the three summer months being warmer than in 1877, but cooler than in 1876. The absence of the menhaden schools north of Cape Cod in 1879 is also easily explained by the study of temperatures, the water of the Gulf of Maine, as indicated by the observations made in Portland harbor. The averages for the three summer months are as follows, the numerator of the fraction being the average surface temperature, the denominator that of the bottom: 1876, $62^{\circ}.5-57^{\circ}.9$; 1877, $58^{\circ}.5-56^{\circ}.7$; 1878, $61^{\circ}.5-58^{\circ}.1$; 1879, $56^{\circ}.1-54^{\circ}.6$.

The average for the three summer months of 1879 is less than that of June, 1876.

This may perhaps be explained by a study of ocean temperatures. In August, 1878, there was a very rapid fall in the temperature of the surface in the Gulf of Maine, so that the average temperature of that month was less than that of July, instead of being higher, as is usual. This may have had the effect of driving the fish into the warmer water of the bays and estuaries. The monthly averages for 1876, 1877, 1878, and 1879 are as follows:

1876—June, $56^{\circ}.9-54^{\circ}$; July, $66^{\circ}.7-59^{\circ}.4$; August, $63^{\circ}.9-60^{\circ}.4$.

1877—June, $54^{\circ}.9-53^{\circ}.3$; July, $58^{\circ}.1-56^{\circ}.3$; August, $62^{\circ}.4-60^{\circ}.6$.

1878—June, $56^{\circ}.8-55^{\circ}.2$; July, $66^{\circ}.9-59^{\circ}.3$; August, $60^{\circ}.7-59^{\circ}.9$.

1879—June, $52^{\circ}.9-51^{\circ}.7$; July, $55^{\circ}.9-54^{\circ}.1$; August, $59^{\circ}.6-58^{\circ}$.

The arrival of the menhaden is announced by their appearance at the top of the water. They swim in immense schools, their heads close to the surface, packed side by side, and often tier above tier, almost as closely as sardines in a box. A gentle ripple indicates their position, and this may be seen at a distance of nearly a mile by the lookout at the mast-head of a fishing vessel, and is of great assistance to the seiners in setting their nets. At the slightest alarm the school sinks toward the bottom, often escaping its pursuers. Sailing over a body of menhaden swimming at a short distance below the surface, one may see their glittering backs beneath, and the boat seems to be gliding over a floor inlaid with blocks of silver. At night they are phosphorescent. Their motions seem capricious and without a definite purpose; at times they swim around and around in circles; at other times they sink and rise. While they remain thus at the surface after the appearance of a vanguard they rapidly increase in abundance until the sea appears to be alive with them. They delight to play in inlets and bays, such as the Chesapeake, Peconic, and Narragansett Bays, and the narrow fiords of Maine. They seem particularly fond of shallow waters protected from the wind, in which, if not molested, they will remain throughout the season, drifting in and out with the tide. Brackish water attracts them, and they abound at the mouths of streams, especially on the southern coast. They ascend the Saint John's River more than 30 miles; the Saint Mary's, the Neuse, the York, the Rappahannock, the Potomac nearly to Washington, and the Patuxent to Marlborough. They come in with or before the shad, and are very troublesome to the fishermen by clogging their nets. I am not aware that this difficulty occurs in northern rivers, though they are found in the summer in the Hudson and its tributaries, the Hoosatonie, Mystic, Thames, and Providence Rivers, in the creeks of Cape Cod, and at the mouth of the Merrimac. A curious instance of capriciousness in their movements occurred on the coast of Maine, where much alarm was felt, because their habits were thought to have been changed through the influence of seining. The shore fishermen could obtain none for bait, and vessels followed them far out to sea, capturing them in immense quantities 40 miles from land. The fisheries had produced no such effect south of Cape Cod, and it was quite inexplicable that their habits should have been so modified in the north. In 1878, however, after ten years or more, they resumed their former habits of lugging the shores, and the menhaden fishery of Maine was carried on, for the most part, in the rivers.

Why the schools swim at the surface, so conspicuous a prey to men, birds, and other fishes, is not known. It does not appear to be for the purpose of feeding; perhaps the fisherman is right when he declares that they are playing.

An old mackerel fisherman thus describes the difference in the habits of the mackerel and menhaden: "Pogies school differently from mackerel; the pogy slaps with his tail, and in moderate weather you can hear the sound of a school of them, as first one and then another strikes the water. The mackerel go along 'gilling'; that is, putting the sides of their heads out of the water as they swim. The pogies make a flapping sound; the mackerel a rushing sound. Sometimes in calm and foggy weather you can hear a school of mackerel miles away." They do not attract small birds as

do the schools of predaceous fish. The fish-hawk often hovers above them, and some of the larger gulls occasionally follow them, in quest of a meal. About Cape Cod one of the gulls, perhaps *Larus argentatus*, is called "pogy gull."

On warm, still, sunny days, the fish may always be seen at the surface, but cold or rainy weather and prevailing northerly or easterly winds quickly cause them to disappear. When it is rough they are not so often seen, though schools of them frequently appear when the sea is too high for fishermen to set their nets. The best days for menhaden fishing are when the wind is northwesterly in the morning, dying out in the middle of the day, and springing up again in the afternoon from the southwest, with a clear sky. At the change of the wind on such a day they come to the surface in large numbers.

A comparison of the weather upon the menhaden and the herring yields some curious results. The latter is a cold-water species. With the advance of summer it seeks the north, returning to our waters with the approach of cold. The menhaden prefers the temperature of 60° or more; the herring, 55° and less. When the menhaden desert the Gulf of Maine they are replaced by the herring. Cold weather drives the former to the warmer strata, while it brings the latter to the surface. The conditions most favorable on our coast for the appearance of herring on the surface, and which correspond precisely with those which have been made out for the coast of Europe, are least so for the menhaden.

Their winter habitat, like that of the other cold-water absentees, has never been determined. The most plausible hypothesis supposes that instead of migrating toward the tropics or hibernating near the shore, as has been claimed by many, they swim out to sea until they find a stratum of water corresponding to that frequented by them during their summer sojourn on the coast.

This is rendered probable by the following considerations: 1. That the number of menhaden in southern waters is neither less in the season of their abundance, nor greater in that of their absence from the north coast. 2. That there are local varieties of the species, distinguished by physical characters, almost of specific value, by differences in habits, and, in the case of the southern schools, by the universal presence in the mouth of a crustacean parasite, which is never found with those north of Cape May. 3. That the same schools usually reappear in the same waters in successive years. 4. That their very prompt arrival in the spring suggests their presence in waters near at hand. 5. That their leanness when they first appear renders it evident that they have had no food since leaving the coast in autumn. The latter consideration, since they are bottom feeders, is the strongest confirmation of the belief that their winter home is in the mid-oceanic substrata.

As is indicated by the testimony of a large number of observers, whose statements are elsewhere reviewed at length, the menhaden is by far the most abundant species of fish on the eastern coast of the United States. Several hundred thousand are frequently taken in a single draft of a purse-seine. A firm in Milford, Conn., captured, in 1870, 8,500,000; in 1871, 8,000,000; in 1872, 10,000,000; in 1873, 12,000,000; in 1877, three sloops from New London seined 13,000,000. In 1877, an unprofitable year, the Pemaquid Oil Company took 20,000,000, and the town of Boothbay alone 50,000,000. There is no evidence whatever of any decrease in their numbers, though there can be in the nature of the case absolutely no data for comparison of their abundance in successive years. Since spawning menhaden are never taken in the nets, no one can reasonably predict a decrease in the future.

The nature of the food of the menhaden has been closely investigated; hundreds of specimens have been dissected, and every stomach examined by me has been found full of dark, greenish or brownish mud or silt, such as occurs near the mouths of rivers and on the bottoms of still bays and estuaries. When this mud is allowed to stand for a time in clear water, this becomes slightly tinged with green, indicating the presence of chlorophyll, perhaps derived from the algæ so common on muddy bottoms. In addition to particles of fine mud, the microscope reveals a few common forms of diatoms.

There are no teeth in the mouth of the menhaden, their place being supplied by about 1,500 thread-like bristles, from one-third to three-quarters of an inch long, which are attached to the gill arches, and may be so adjusted as to form a very effective strainer; the stomach is globular, pear-shaped, with thick muscular walls, resembling the gizzard of a fowl, while the length of the coiled intestine is five or six times that of the body of the fish. The plain inference from these facts, taken in connection with what is known of the habits of the menhaden, seems to be that their food consists in large part of the sediment, containing much organic matter, which gathers upon the bottoms of still, protected bays, and also of the vegetation that grows in such localities. Perhaps, too, when swimming at the surface with expanded jaws, they are able to gather nutritious food which floats on the water.

Their rapid increase in size and fatness, which commences as soon as they approach our shores, indicates that they find an abundant supply of some kind of food. The oil manufacturers report that in the spring a barrel of fish often yields less than 3 quarts of oil, while late in the fall it is not uncommon to obtain 5 or 6 gallons.

There is still some mystery about their breeding habits; thousands of specimens have been dissected since 1871 without the discovery of mature ova. In early summer the genitalia are quite undeveloped, but as the season advances they slowly increase in size and vascularity. Among the October fish a few ovaries were noticed in which the eggs could be seen with the naked eye. A school of large fish driven ashore in November in Delaware Bay by the bluefish contained spawn nearly ripe, and others taken at Christmas time in Provincetown harbor, evidently stragglers accidentally delayed, contained eggs quite mature. Young menhaden from 1 to 3 inches in length and upward are common in summer, south of New York, and those of 5 to 8 inches in late summer and autumn in the southern part of New England. These are in schools and make their appearance suddenly from the open ocean like the adult fish. Menhaden have never been observed spawning on the southern coast, and the egg-bearing individuals when observed are always heading out to sea. These considerations appear to warrant the theory that their breeding grounds are on the offshore shoals which skirt the coast from George's Banks to the Florida Keys.

The fecundity of the menhaden is very great, much surpassing that of the shad and herring. The ovaries of a fish taken in Narragansett Bay, November 1, 1879, contained at least 150,000 eggs.

Among the enemies of the menhaden may be counted every predaceous animal which swims in the same waters. Whales and dolphins follow the schools and consume them by the hogshead; sharks of all kinds prey upon them largely; one hundred have been taken from the stomach of one shark; all the large carnivorous fishes feed upon them. The tunny is the most destructive. "I have often," writes a gentleman in Maine, "watched their antics from the mast-head of my vessel, rushing and thrashing like demons among a school of fish; darting with almost lightning swiftness, scattering them in every direction, and throwing hundreds of them in the air with their tails." The pollock, the whiting, the striped bass, the cod, the squeteague, and the gar-fish are savage foes. The sword-fish and the bayonet-fish destroy many, rushing through the schools and striking right and left with their powerful swords. The bluefish and bonito are, however, the most destructive enemies, not even excepting man; these corsairs of the sea, not content with what they eat, which is of itself an enormous quantity, rush ravenously through the closely crowded schools, cutting and tearing the living fish as they go, and leaving in their wake the mangled fragments. Traces of their carnage remain for weeks in the great "slicks" of oil so commonly seen on smooth water in summer. Professor Baird, in his well known and often-quoted estimates of food annually consumed by the bluefish, states that probably ten thousand millions of fish, or twenty-five millions of pounds daily, or twelve hundred million millions of fish and three hundred thousands of millions of pounds, are much below the real figures. This estimate is for the period of four months in the middle of the summer and fall, and for the coast of New England only.

Such estimates are professedly only approximations, but are legitimate in their way since they enable us to appreciate more clearly the luxuriance of marine life. Applying similar methods of calculation to the menhaden, I estimate the total number destroyed annually on our coast by predaceous animals at a million million of millions; in comparison with which the quantities destroyed by man, yearly, sink into insignificance.

It is not hard to surmise the menhaden's place in nature; swarming our waters in countless myriads, swimming in closely-packed, unwieldy masses, helpless as flocks of sheep, near to the surface and at the mercy of every enemy, destitute of means of defense and offense, their mission is unmistakably to be eaten.

In the economy of nature certain orders of terrestrial animals, feeding entirely upon vegetable substances, seem intended for one purpose—to elaborate simple materials into the nitrogenous tissues necessary for the food of other animals, which are wholly, or in part carnivorous in their diet; so the menhaden, feeding upon otherwise unutilized organic matter, is pre-eminently a meat-producing agent. Man takes from the water every year eight or nine hundred millions of these fish, weighing from two hundred to three hundred thousand tons, but his indebtedness does not end here; when he brings upon his table bluefish, bonitos, weakfish, swordfish, or bass, he has before him usually menhaden flesh in another form.

The commercial importance of the menhaden has but lately come into appreciation. Twenty-five years ago and before, it was thought to be of very small value. A few millions were taken every year in Massachusetts Bay, Long Island Sound, and the inlets of New Jersey. A small portion of these were used for bait; a few barrels occasionally salted in Massachusetts to be exported into the West Indies. Large quantities were plowed into the soil of the farms along the shores, stimulating the crops for a time, but in the end filling the soil with oil, parching it, and making it unfit for tillage.* Since that time manifold uses have been found. As a bait-fish this

* Professor Trumbull tells us that the Indian names of *Brevoortia*, "menhaden" and "poghaden" (pogy), mean "fertilizer," that which manures, and that the Indians were accustomed to employ this species, with others of the herring tribe (*aum-suog* and *munna-whateaug*), mostly the alewife (*Pomolo-*

exceeds all others; for many years much the greater share of our mackerel was caught by its aid, while the cod and halibut fleet use it rather than any other fish when it can be procured. The total consumption of menhaden for bait, 1877, did not fall below 80,000 barrels, or 26,000,000 of fish, valued at \$500,000. Ten years before, when the entire mackerel fleet was fishing with hooks, the consumption was much greater. The Dominion mackerel fleet buy menhaden bait in quantity, and its value has been thought an important element in framing treaties between our Government and that of Great Britain.

As a food resource it is found to have great possibilities. Many hundreds of barrels are sold in the West Indies, while thousands of barrels are salted down for domestic use by families living near the shore. In many sections they are sold fresh in the market. Within six years there has sprung up an important industry, which consists in packing these fish in oil, after the manner of sardines, for home and foreign consumption. In 1874 the production of canned fish did not fall below 500,000 boxes.

The discovery made by Mr. S. L. Goodale, that from these fish may be extracted, for the cost of carefully boiling them, a substance possessing all the properties of Liebig's "extract of beef," opens up a vast field for future development. As a food for the domestic animals in the form of "fish meal," there seems also to be a broad opening. As a source of oil, the menhaden is of more importance than any other marine animal. Its annual yield usually exceeds that of the whale (from the American fish-

bush sp.), in enriching their corn-fields. Thomas Morton wrote in 1632, of Virginia: "There is a fish (by some called shadds, by some alizes) that at the Spring of the yeare passe up the rivers to spawn in the ponds, & are taken in such multitudes in every river that hath a pond at the end that the inhabitants dounge their grounds with them. You may see in one township a hundred acres together, set with these fish, every acre taking 1,000 of them, & an acre thus dressed will produce and yeald as much corne as three acres without fish; & (least any Virginea man would inferre hereupon that the ground of New England is barren, because they use no fish in setting their corne, I desire them to be remembered, the cause is plaine in Virginea) they have it not to sett. But this practice is onely for the Indian maize which must be set by hand), not for English grain; & this is, therefore, a commodity there."

This passage is very interesting, showing the use of fish fertilizers in Virginia two hundred and fifty years ago or more, and, from what is known of the habits of the herring family in Virginia rivers and the persistency of local names, there can be little doubt that many menhaden were used among the fertilizing fish, though "shadds and alizes" doubtless includes the shad (*Alosa sapidissima*), the matowocca (*Pomolobus mediocris*), the alewife (*Pomolobus vernalis* and *P. cestivalis*), and the thread-berring (*Dorosoma cepedianum*), all of which are common in spring in the Potomac and other rivers which empty into Chesapeake Bay.

In Governor Bradford's "History of Plimoth Plantation" an account is given of the early agricultural experiences of the Plymouth colonists. In April, 1621, at the close of the first long dreary winter, "they (as many as were able) began to plant their corne, in which service Squanto (an Indian) stood them in great stead, showing them both ye manner how to set it and after how to dress and tend it. Also he tould them, axcepte they got fish & set with it (in these old grounds) it would come to nothing; and he showed them yt ye in middle of April they should have store enough come up ye brooke by which they begane to build and taught them how to take it."

An allusion to the practice of the Indians in this respect may be found in George Mourt's "Relation or journal of the beginning and proceedings of the English plantation settled at Plimoth, in New England, by certain English adventurers both merchants and others." * * * "London, 1622." "We set the last Spring some twenty acres of Indian corn, and sowed some six acres of barley and peas, and, according to the manner of Indians, we manured our ground with herrings, or rather shads, which we have in great abundance and take with great ease at our doors. Our corn did prove well, and God be praised, we had a good increase of Indian corn, and our barley indifferent good." * * *

Again, in Edward Johnson's "Wonder-working Providence of Sion's Saviour in New England, Being a Relation of the first planting in New England in the yeere 1623, London, 1654," written in 1652, the author says: "But the Lord is pleased to provide for them [the colonists] great store of fish in the Spring time, especially alewives, about the bignesse of a herring. Many thousands of these they used to put under their Indian corne, which they plant in hills five foot asunder; and assuredly when the Lord created this corne, hee had a special eye to supply these his people's wants with it, for ordinarily five or six grains doth produce six hundred."

Menhaden do not appear to have been much used by agriculturists of Cape Cod in the beginning of this century, though the old record shows that the horse-shoe crab and sea-weed were extensively applied.

In 1792, the Hon. Ezra L. Hommedieu, of New York, published a paper in the New York Agricultural Transactions which gives somewhat more accurate data and directions concerning the use of fish as a fertilizer. He says: "Experiments made by using the fish called menhaden or nosbankers as a manure have succeeded beyond all expectation. * * * In dunging corn in the holes, put two in a hill, on any kind of soil where corn will grow, and you will have a good crop." He recommends them as a top-dressing for grass. "Put them on a piece of poor loamy land, at the distance of fifteen inches from each other. * * * And by their putrefaction they so enrich the land that you may mow about two tons per acre." But he adds very wisely: "How long this manure will last has not been determined." He gives in his quaintly interesting way, an account of "an experiment made the last Summer by one of my near neighbors, Mr. Tuthill, in raising vegetables with this fish manure," which is worth citing as an illustration of the curious combinations of truth and error, which, in their lack of definite knowledge of the laws of plant-growth and the action of manures, the theorizers of that time invented.

The following order from the records of the town of Ipswich, Mass., May 11, 1644, illustrates, in a comical way, the customs of using fish for manure in these early days:

"It is ordered that all doggs, for the space of three weeks after the publishing hereof, shall have one legg tyed up, and if such a dogg shall break loose and be found doing any harm, the owner of the dogg shall pay damage. If a man refuse to tie up his dogg's legg, and hee bee found scraping up fish in a cornfield, the owner thereof shall pay twelve pence damage beside whatever damage the dogg doth. But if any fish their house lotts and receive damage by doggs, the owners of those house lotts shall bear the damage themselves."

eries) by about 200,000 gallons, and in 1874 did not fall far short of the aggregate of all the whale, seal, and cod oil made in America. In 1878 the menhaden oil and guano industry employed capital to the amount of \$2,350,000, 3,337 men, 64 steamers, 279 sailing vessels, and consumed 777,000,000 of fish; there were 56 factories, which produced 1,392,644 gallons of oil, valued at \$450,000, and 55,154 tons of crude guano, valued at \$600,000; this was a poor year. In 1874 the number of gallons produced was 3,373,000; in 1875, 2,681,000; in 1876, 2,992,000; in 1877, 2,427,000. In 1878 the total value of manufactured products was \$1,050,000; in 1874 this was \$1,809,000; in 1875, \$1,582,000; in 1876, \$1,671,000; in 1877, \$1,608,000. It should be stated that in these reports only four-fifths of the whole number of factories are included. The refuse of the oil factories supplies a material of much value for manures. As a base for nitrogen it enters largely into the composition of most of the manufactured fertilizers. The amount of nitrogen derived from this source in 1875 was estimated to be equivalent to that contained in 60,000,000 pounds of Peruvian guano, the gold value of which would not have been far from \$1,920,000. The yield of the menhaden fisheries in pounds is probably triple that of any other carried on by the fishermen of the United States. In the value of its products it is surpassed only by three; the cod fishery, which in 1876 was estimated to be worth \$4,826,000; the whale fishery, \$2,850,000, and the mackerel fishery, \$2,275,000; the value of the menhaden fishery for this year being \$1,658,000.

In estimating the importance of the menhaden to the United States, it should be borne in mind that its absence from our waters would probably reduce all our other sea-fisheries to at least one-fourth their present extent.

E. S. TAYLOR sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Cape May City.

Q. How long have you lived here?—A. About twenty-seven years.

Q. What is your occupation?—A. Civil engineer.

Q. What experience, if any, have you had on the subject of fisheries?—A. I have a yacht that follows fishing in the summer season along our coast.

Q. How many years have you owned it?—A. I think three years now; this one particularly.

Q. Does that cover the whole of your experience?—A. No, sir; as far as my experience goes in fishing it does off-shore. It does not extend beyond three years from work done by my boat. Of course my observations previous to that time—

Q. Extend over a period of how many years?—A. I have been engaged along this coast, where I have seen fishing done both inside and out, I suppose, for twenty-eight years; at Long Branch and Atlantic City.

Q. Please state what you mean by "inside and out."—A. Well, I have seen them fishing outside for mackerel.

Q. Outside of what?—A. Outside of the bar; that is, on the ocean, and for weakfish and other fish which come inside of our sounds to spawn.

By Mr. MORGAN:

Q. By weakfish you mean bluefish?—A. No, sir; the bluefish is what we call the blue mackerel at Cape May.

By Mr. CALL:

Q. The weakfish is a sort of trout, is it not?—A. Yes, sir; a species of trout.

Q. Speckled trout?—A. No, sir; not a speckled trout.

By the CHAIRMAN:

Q. What are the principal varieties of food fish, as they are termed, which have been taken along this coast during this period of twenty-eight years?—A. Bluefish, or snapping mackerel, as they are called, and sea bass; I am speaking of outside fishing now.

Q. Outside or inside?—A. Spanish mackerel, red and black drum, sea porgies; there are two species of porgies.

Q. There are no striped bass, I think, on this coast?—A. Yes, sir; rockfish we call them here. We have some very fine bass. Those bass do not come along our coast much. They are not here until the fall in quantities; at least I have not seen them.

Q. First I will inquire of you whether there has been, during the period you have named, a change in the quantity of these descriptions of fish, and, if so, what the change is?—A. I am satisfied that the quantity of food-fish has lessened one-half in the space of ten years. I follow fishing a great deal for sport myself, with a hook and line, not much outside, principally inside, and I speak from my own experience in that matter. I have fished at Long Branch, Tuckerton, Barnegat, and also Atlantic City, and ten years ago I am satisfied I could go with a hook and line and catch, I suppose, double—I can safely say double what I could at the present time.

Q. Have you any opinion as to the cause of this diminution?—A. No, sir; nothing that I am positive about, except that I feel well satisfied that using these long nets which are used on our coast by a class of men here who are catching menhaden—I suppose to be catching them—must necessarily destroy a large quantity of fish that would come into our sounds to spawn and feed; and I am satisfied of another thing, that it is not only what they destroy, but it is what they frighten away. I mean by that that I have seen nets put in our sounds in shallow water or in narrow creeks, and the fish would become so frightened that you would see them jumping out of the water for probably a hundred yards above the net. So it is very evident to me that they know there is something there and that they will go outside as soon as they commence to haul the nets; they leave and go outside, and I think more are frightened away than are caught by using nets. I might, if I may be permitted, state that a few days ago—I cannot name the date, probably a week or ten days—I went down fishing in our sounds close to this inlet. I caught, I think it was six sheepshead, and as many weakfish as I wanted; I do not know how many; I suppose thirty or forty. The next day, I think it was, they came here and commenced fishing with these boats, and I can safely say there has not been, up to within the last three or four days, any fish scarcely to be caught. Sheepshead appear to be gone, and I have that from other men who fish every day, such men as George Richardson, who fish for their own sport. He says they have not caught any sheepshead hardly since that boat was here in front of the inlet. I am satisfied that the sheepshead go out on low water; a large number go outside of the inlet in deeper water and come in on the flood.

Q. Do you know what the food of the sheepshead is?—A. I think their principal food is black mussels.

Q. What is the food of the bluefish?—A. I think the principal food of bluefish is menhaden.

Q. When did the menhaden fishermen first come this season?—A. I think about three weeks ago, the first I saw of them; this time I spoke of. It has not been three weeks, I think.

Q. How many vessels of different kinds have you seen here at any one time?—A. I do not think I ever saw more than five at one time; I have seen five here.

Q. Steamers or sailing vessels?—A. These were all steamers that I saw. There were four here day before yesterday, so close to the island that the smoke came on the island here.

Q. Do you know anything as to what quantity they caught?—A. No, sir. I think you will have testimony as to that from parties who have been alongside. I have never been alongside when they hauled them in.

Q. Do you know whether the menhaden were formerly used by the people along this coast for food?—A. I think not; not to any extent; some like them, but they are not extensively used.

Q. I have the impression that they used to be sold to farmers and salted down.—A. Yes, sir; for farms.

Q. I mean salted down for food.—A. No, sir; I think not; not to my knowledge.

Q. They were caught and sold for fertilizers?—A. That is the principal use in Monmouth County; they were taken in large quantities and used there.

Q. Does that continue to the present time?—A. Yes, sir; we have very few now. They use these menhaden for bait for the blackfish or porgy and sea-bass, and four years ago you could take a surf-boat and go out with a spear and get all you wanted in fifteen or twenty minutes.

Q. All the menhaden you wanted for bait?—A. Yes, sir.

Q. Cannot you do so now?—A. No sir; cannot even catch them in a net; cannot catch them in the inlet. I do not think I have seen a school of menhaden in two years. I have been surveying along the coast all this spring, and I do not think I have seen a school.

Q. They are very easily seen when they make their appearance?—A. O, they show. They are always on the surface. That is the way we spear them; just take a spear and row out and throw the spear in them, and probably have two on it; but they are getting very scarce. You could sit on this pier at any time and count eight or ten schools.

Q. Fishing for bluefish, what bait do you use?—A. We use nothing. A white rag is as good as anything; anything that is white or red; a bright color that will show in the water; a piece of lead is very good in the shape of a fish, or anything that looks like a fish going through the water.

Q. I have the impression that some former witnesses said that fish were cut up and used to attract bluefish?—A. Yes, sir; they do that at Long Branch, but the principal manner in which my captain catches them is, he has a piece of ivory in the shape of a fish, with a hook in the end of it; he covers that with eelskin. His reason for covering it with eelskin is that when the fish take hold of it, with the fishy taste they hold on, but if it is bone they let go. It looks very reasonable. I do not suppose I ever tried that experiment myself, but he tells me so. I am satisfied that the destruction of the menhaden along the coast is diminishing the quantity of bluefish; that is their food.

Q. Do you know of any other cause for the diminution of food-fish?—A. No, sir; I do not.

Q. How long is it since you knew of the menhaden-fishing along this coast?—A. It is about twenty-seven years since the menhaden-fishing first commenced along this coast, to my knowledge.

Q. What craft did they use then?—A. They used sailing vessels. They had a factory at Port Monmouth; I think they had two there. In fact, I know they had until the steuch became so great that the people in that vicinity made a complaint and it had to be removed.

Q. As a nuisance?—A. Yes, sir. I ran a steamer of the New Jersey Railroad from New York to Port Monmouth for about four years, and

saw them use very long nets. Their nets would be very deep, I suppose 40 to 50 feet deep.

Q. And how long?—A. I cannot say as to the length; very long.

Q. The net gathers in the form of a bag at the bottom?—A. Yes, sir; about half the net goes into the form of a bag.

Q. How did the sailing vessels get the fish out of the nets?—A. I have seen them pursing up these nets; they will have two boats; after they get the net pursed they put what they call their lead line over the thwart of the boat; then they take hold and gather them in.

Q. Draw them in by hand?—A. Yes, sir. I have never seen them pick out bluefish. I have heard it remarked that if they were good fish they do not destroy them. That is not possible. They could not put a net down 10 fathoms and discriminate between menhaden and bluefish, or good fish, and consequently they must take all that come. The next point is that if they took sufficient time to let the good fish go it would not be a paying business; they could not cull these fish. I am satisfied, from the quantities I have seen them catch, it would take two days to cull what they would take up in a net. Consequently they must put them all in together.

By Mr. McDONALD:

Q. Is there any pound-net fishing in the vicinity of Cape May?—A. Yes, sir; I think there are two on the bay shore.

Q. You mean on Delaware Bay?—A. On the Delaware Bay; we call it the bay shore.

Q. None on the sea side?—A. None on the sea side. I have never seen any on the sea side.

Q. Are any menhaden taken in these pounds?—A. I think there must be. I do not know as to that. I have never seen them. I do not see why they should not. They must necessarily.

Q. They could not take them unless they came in shore, of course?—A. No, sir; they take most every other kind of fish; at least I see them bring them here to market.

Q. Do they take many sheepshead in those pounds?—A. Yes, sir, quite a number.

Q. Many trout?—A. Principally salt-water trout.

Q. They catch quite a number of what you call food-fish, then?—A. Yes, sir. I think the great injury that the pounds are to the fishing is that they have their meshes made so small that they catch very small fish. I have seen along the bay shore after what they call their scooping—that is, they take a scoop net and scoop out fish as they want them at low water—and I have seen wagon loads of fish not over 3 inches long lying dead along the shore. Those are young fish that have come back. I presume have spawned here and have returned and got into these pounds; been pounded before they got large enough for food.

Q. There are no pound nets on the sea-side?—A. None that I know of.

Q. None between here and Sandy Hook?—A. Not to my knowledge. I have not been further than Atlantic City for the last three or four months. I think they are using them, though, pretty constantly about up to Barnegat. I do not know that, though, of my own knowledge.

Q. There are only two pound nets in Delaware Bay?—A. All that I know of.

Q. Are there any higher up the bay?—A. Not that I know of.

Q. Are they on this side or the west side of the bay?—A. They are on the east side. I do not know of any on the west side.

Q. Do you know the names of the parties who fish those pounds?—

A. I do not know the names, but I know them personally. I cannot recollect their names now. I see them every day.

By Mr. MORGAN:

Q. Do the steamers that visit the coast here for fish supply the markets or the factories with fish?—A. I do not know of my own knowledge that they supply anything but the factories. I have heard others say that within the last few days they were sending fish to market. Whether that is the case or not I do not know myself. My opinion is that they have not formerly sent fish to the market. I think they have ground them up as they caught them, with their menhaden; all kinds.

Q. Their principal business is to catch fish for oil and fertilizer?—A. Yes, sir; first oil and then use the refuse for fertilizer.

Q. If they send anything to market it is a mere incident and not the principal purpose of their work?—A. Yes, sir. My reason for thinking that is, that they would have to keep them so long before they got them to market that they would not be good. It takes them some time to take up these purse nets.

Q. When these fish are hauled up by these purse nets you speak of, they are dumped into the hold of the ship are they not?—A. Yes, sir.

Q. No refrigerators or tanks for the purpose of keeping them alive—preserving them for food?—A. No, sir.

Q. At what season of the year does the menhaden usually appear on this coast?—A. They appear here about the first of June. I have seen them in May.

Q. The large schools come in about the first of June?—A. No, the large schools are later; as late as September.

Q. At what season of the year do they usually disappear from the coast?—A. In October I do not think you will see many; as soon as it becomes cold. They swim on the surface and as soon as the water becomes cold they seem to disappear. I do not know where they go.

Q. You do not know whether they burrow, as some fish do?—A. My opinion is, they go south; I do not know.

Q. You think they leave the shore entirely?—A. Yes, sir.

Q. Do they vary much in size when they come in these schools, large and small fish together?—A. No, sir. My experience is that they are very nearly of a size; seem to be of one spawning, more particularly so than any other fish. I do not know as I ever thought of it before, but such is the fact.

Q. You would not be able to detect, then, among a school of menhaden, that there were really any young fish?—A. No, sir.

Q. At all events you could not say that there would be fish of one or two or three years?—A. I have seen as high as three thousand bushels hauled ashore at one time. That was at Port Monmouth. They pulled them ashore with horses. They told me they sold them for fertilizers. That is about the first I ever saw. Speaking of their size makes me recollect they were all about of a size. I could not see any difference; there was very little difference.

By the CHAIRMAN:

Q. They were like so many bushels of beans?—A. Yes, sir. They sold them around the country, and now I am satisfied along that shore they could not catch three thousand bushels in a hundred years.

By Mr. MORGAN:

Q. Have you any knowledge what the food of the menhaden is?—A.

No, sir. I think they live upon what we call suction, and I think that is what they are doing on the surface; that is, I think they feed on the spawn of different kinds of fish that float on the surface; that is my opinion. I never read anything of the kind and judge only from my actual experience. They seem to be sucking something while on the surface. Frequently when I have been at sea, when it is very calm, I would see them come close to the bow of the boat, and they would seem to me to be perfectly still, yet their gills would be working as though they were actually feeding. There is always floating upon the surface fish and spawn, and such things for fish to feed on.

By the CHAIRMAN:

Q. Insects too, are there not?—A. Yes, sir; of all kinds. You can see them with a magnifying glass. I was out in a yacht a few days ago and the surface of the water was entirely covered. You put your hand in the water and it was just like oil.

By Mr. MORGAN:

Q. Have you ever seen the menhaden feeding on the jelly fish?—A. No, sir, not particularly; but I presume they do.

By Mr. CALL:

Q. To what do you attribute that oily feeling?—A. To the jelly fish floating on the surface.

By Mr. MORGAN:

Q. Have you any way of determining in your own mind as a matter of opinion whether the schools of menhaden come in shore in consequence of being frightened by the bluefish, or whether they come in in search of food?—A. My opinion is that when you see large quantities of menhaden running close to the shore, which we used to see a few years ago, especially at Long Branch, you will always see a school of mackerel. If they come ashore or close into the surf so as to show themselves, you will see a school of mackerel, and the old fishermen at the time I speak of, ten or twelve years ago, would take their squids and throw them out and pull them in as fast as they could; but you do not see that now; you do not see them in along the breakers.

Q. Do you mean menhaden or mackerel?—A. Menhaden.

Q. You think that when the schools of menhaden come in close to the shore, they come in because of the fish pursuing them?—A. I think so; some of them lay there bitten in two.

Q. Now, you spoke of seeing them out at sea, lying near the surface of the water, at still water, apparently feeding; how far out was that?—A. This time I speak of was about 4 miles from Absecom; probably off shore not over 4 miles.

Q. You saw a school, of course?—A. A school of them. The water was very clear. They seemed to come right up to the surface, and there they lay with their gills moving as though they were feeding, but what they were feeding on of course I don't know, but my supposition is it is the spawn of different fish and products of the sea that come to the surface.

Q. You are satisfied that the school you made this observation upon was not being chased by other fish?—A. No sir; they were perfectly quiet.

Q. They were there, then, according to your opinion, of their own volition in search of food, and were not driven to that point by a pursuing enemy?—A. No, sir; they seem to seek the shore when they are pursued. They can go in shallower water than such fish as are after them.

Q. Then your idea is that they feed up and down the coast here in the proper season, and when they are assailed by their enemies they run into shallow water for the purpose of escaping pursuers?—A. Yes, sir. I am satisfied that they are frightened; they go in so far that they cannot get out.

Q. The menhaden fishery, I take it, is more profitable within 4 or 5 miles of the main coast than it would be in the inlets and bays—indentations?—A. They do not come into the bays looking for them in quantities. They had a fishery, and have it yet, I think, at Great Egg Harbor. I have stopped there several times. I have seen them land their boats at Egg Harbor just north of the inlet, and I know I have seen bluefish. I have seen good fish in their boats to be ground up, lying dead in the bottom of their boats.

By the CHAIRMAN:

Q. Your State legislature interfered with all that fishing in the bays?—A. Yes, sir, I am satisfied that the fish when they come along the coast want to come in. I think they are a species of herring. Now, all herring like to get near fresh water. They go into the inlets and go up into fresh streams to spawn, and I think the menhaden would do the same thing if let alone, but they have been decreasing year by year; that is, coming inside.

By Mr. MORGAN:

Q. But I understand you to say you have never seen a menhaden except a full grown one?—A. No, sir; I have not.

Q. If they spawned near the coast do not you think you would see a small one?—A. No, sir; not necessarily.

Q. You have no knowledge, I suppose, that they do spawn in the mouths of rivers?—A. No, sir; that is only an opinion.

Q. This purse fishing can be conducted just as well, I suppose, in deep water as it can in shallow water?—A. Certainly, for if they are after the menhaden I am satisfied that the menhaden fish are always near the surface, and they do not want such immensely deep nets to catch them; and they can catch them off shore as well as they can in there.

Q. In purse-net fishing they do not necessarily go to the bottom at all?—A. No, sir; not necessarily.

Q. I suppose they have weights to carry the net down straight, and then it is drawn in at the bottom?—A. Yes, sir, drawn in together; but these nets they are using on this coast are about 60 feet deep, and they must necessarily touch bottom, I know, within 3 or 4 miles of the coast.

Q. The most profitable menhaden fishing is out in deep water, is it not?—A. I cannot say as to that.

Q. When bluefish or any other food-fish are caught in these purse-nets, I suppose it is because they are pursuing their natural prey—menhaden—and they are surrounded by the purse-nets?—A. There is no question about that. A few years ago we could catch mackerel right off shore here. Now if we catch them we have to go 18 or 20 miles.

Q. You spoke of the number of sheepshead being very much reduced of late, and probably because they are frightened away by the purse-net fishing?—A. Yes, sir; I think the sheepshead, after they come on our coast, come in and stay a good part of the season. The water here is shallow in our thoroughfare, and it becomes pretty warm, and they go out in deeper water in the flood tide and come in again.

Q. Do they come in schools also?—A. Yes, sir.

Q. But they have no natural association with the menhaden?—A. No, sir.

Q. They do not feed upon them, and it is only accidentally they are found in their company?—A. They come along the coast in schools. I know that they feed in schools within 2 miles of our shoals here, on what we call the shell-beds—that is, a shell bottom. Old fishermen call it Bear-hole. They catch them there, and sea-bass, and these purse-nets when in that locality and reaching bottom must necessarily take good fish.

Q. Are sheepshead caught in deep water at all?—A. Not a great many of them.

Q. Say 3 or 4 miles from the coast?—A. Not many. It is very seldom they catch them that far off.

Q. They are taken with hook and line?—A. Yes, sir.

Q. What bait is used for sheepshead?—A. What they call the razor here. It is a species of clam. It takes its name from the shape of the shell being so much like a razor.

Q. I understand the principal food of the sheepshead is shell fish?—A. Yes, sir; that is their food.

Q. Are you aware of any other fish being much diminished in quantity of late for any cause—we will say for the reason of there having been too much purse-net fishing—except the bluefish and mackerel?—A. I can speak of the red drum here, because I was here enjoying some sport, fishing for them, two years ago.

Q. Is that an abundant fish on this coast?—A. It has been.

Q. But the quantity is falling away?—A. Yes, sir.

Q. Materially?—A. I went off shore and I think we caught six in an hour or so averaging 15 or 20 pounds apiece, and one of them weighed I suppose over 30 pounds, and they had been taking these red drum every day in quantities here. These steamers came along, and one of them I am told caught four hundred of them; I do not know that myself.

Q. How far out was that?—A. I do not think that was over a mile from shore.

Q. Is the red drum caught in deep water?—A. Yes, sir; they are very fine sport and good fish.

Q. How far out do you usually fish for it?—A. Not over a mile; hardly ever go further than that for red drum. They have been caught as far as 3 miles, but we go just about a mile off.

Q. What do you bait with?—A. We use the menhaden fish; cut it up. Any kind of white bait. Fish bait is very good.

Q. Do you think the reddrum ever captures the menhaden?—A. No, sir; I do not think they go after anything that is in the shape of live fish. I think the drumfish feed principally upon shell-fish. I know the black drum do, and it is the same fish.

By Mr. McDONALD:

Q. It is a bottom feeder, is it not?—A. Yes, sir; I have noticed in some of our inlets here the work of the drum where clams are growing. They know where they are. You see the holes there where the drum have been at work. It is my opinion that they feed entirely on the bottom.

By Mr. MORGAN:

Q. Is it your opinion that if menhaden fishing was prohibited within 3 miles of the shore it would be a protection for the food-fishes?—A. It would be a protection, but I do not think 3 miles would be enough. I think that the fish that go within our inlets would go 3 miles out.

Q. Three miles from shore means 3 miles from the headland; of course you understand that?—A. It would be a material benefit; there is no doubt about that. I am satisfied of it.

The CHAIRMAN. That leaves all your bays and arms of sea. It means 3 miles from the outer shore—the main shore.

The WITNESS. I understand. It would be a very material benefit.

By Mr. MORGAN:

Q. Is there any sure method of catching menhaden, except with seines, out in deep water?—A. None that I ever heard of; I have never seen any other except the gill-net. They use the gill-net.

By the CHAIRMAN:

Q. Take such weather as it is to-day, how long will a bluefish keep in condition to be eaten, without any salt or preservative?—A. I do not think it would keep longer than a night. It would become very soft.

Q. If thrown into these bins on the steamers?—A. If thrown into the bulk it would not keep.

Q. The natural heat of the fish there would spoil them, would it not?—A. Yes, sir; if you lay them out they would keep until to-morrow morning, but to throw them into the bulk I am satisfied they would spoil in two hours.

GEORGE HILDRETH sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. I reside in this city.

Q. How long have you lived here?—A. Sixteen years, or about that.

Q. What is your occupation?—A. I am keeper at present of the life-saving station in this city.

Q. What experience have you had on the question of fisheries during the period of your residence here?—A. I have followed that business a great deal.

Q. For how many years?—A. For 40 years, I suppose.

Q. Fishing for amusement only, or as a business?—A. I have fished as a business most part of the time.

Q. With boats of your own?—A. With boats of my own and nets of my own.

Q. How long is it since you first knew of the fishing with purse-nets for the catching of menhaden along this coast?—A. 1861 was about the first I knew of it. I knew it then by having purse-nets and engaging in that business.

Q. What boats did they use at that time?—A. We used—at least I did—a couple of sloops, built for that purpose.

Q. I am speaking of the menhaden fishing?—A. I am speaking of that too. I had a factory.

Q. And you were engaged in the business yourself?—A. I was engaged in the business myself.

By Mr. CALL:

Q. Menhaden?—A. Yes, sir.

By the CHAIRMAN:

Q. You had sloops you say?—A. I had two sloops built expressly for that purpose, and I had two or three small boats.

Q. What size nets did you use?—A. At that time I used about 100 fathoms in length, and about 15 or 16 fathoms in depth.

Q. What mesh?—A. Inch and a quarter.

By Mr. McDONALD:

Q. You mean square mesh, do you not?—A. Yes, sir, inch and a quarter; that would measure two and a half stretched out the other way.

By the CHAIRMAN:

Q. How small fish could you catch in a net with that mesh?—A. We caught small menhaden. Sometimes we hit on a school of very small ones, and they would mesh in the net and it would be a great deal of trouble to get them out.

Q. How did you land the fish on board your vessels?—A. By, in the first place, pursing them up with the two boats, then run a sloop alongside having large scoops that held half a ton nearly, and with a purchase on the other end; run a scoop down into the net and then hoist on it.

Q. Draw them in in bulk?—A. Draw them right into the hold of the vessel where we wanted them.

Q. What varieties of fish did you catch in that way?—A. We caught everything from a king crab up.

Q. All kinds of food-fish?—A. Yes, sir; all fish that are in our waters pretty much, unless it was rockfish. I do not remember catching rockfish, because they are generally caught inshore.

Q. How long were you in that business?—A. Probably three or four years, something like that. It was in war time and I had an offer for the works, and I sold them to go to Fire Island.

Q. Has the use of purse-seines from that time to the present increased or diminished?—A. It has increased.

Q. How many vessels of different descriptions have you seen fishing at any one time—say within the last three years?—A. I think I have seen as high as nine steamers fishing within the last year. I suppose them to be fishing; I did not go aboard of them; they were that class of boats.

Q. You can tell by the shape of the vessel, can you not?—A. You can tell by the small boats, and by the appearance of the gearing that lifts the fish in.

Q. Have you recently been on any of these vessels using the purse-nets to see personally what they catch?—A. I have never been aboard of them to see what they catch.

Q. How is the supply of food-fish along this coast as compared with what it was at your earliest knowledge of it?—A. It is but very small indeed to what it was some few years ago. You go back to the time when I fished for these menhaden, there is not one-tenth part of what there were then. I have a good purse-net now, a new one, but I have not used it, from the fact that the fish have become so scarce from the steamers coming here and picking them up, so that it is no use to me. I only intended to catch them for farm purposes.

Q. To what extent have the food-fish generally diminished?—A. There is not more than one-tenth of what there was some ten years ago, I think—that is, judging from what I have seen myself.

Q. Have you any opinion as to the cause of the diminution?—A. I have not, unless it is on account of the feed. We do not have the amount of fish we had two years ago. Neither do we have the quantity of these menhaden.

Q. The menhaden are the fish upon which they feed, are they not?—
A. Yes, sir; a great many of the fish feed upon the menhaden.

Q. Do you remember any time when the menhaden were used by the people in the country to corn, and used for food, for table use?—A. In a very small way; very seldom ever used for that purpose.

Q. Some witness last winter stated that many years ago it was quite common.—A. They do up at Jersey, they tell me.

Q. I suppose he was from that section. How close to the shore do menhaden come in ordinarily?—A. I have seen them right upon the beach; seen them on the shore.

Q. That was when they were pursued?—A. Yes, sir.

Q. How near to the shore have you seen these vessels with purse nets?—A. I have seen them within a mile of the shore; about a mile.

Q. Are there any, at present, here?—A. No, sir; I saw one about a mile off here yesterday. I suppose that to be her business by the looks of her boats.

Q. Do you know what quantity of fish they can carry?—A. I do not.

Q. Do you know any other cause for the diminution of menhaden, except the taking them with the purse nets for manufacturing purposes?—A. That is all the cause that I can attribute it to. We had abundance of them here until the steamers began to come here, and, of course, they diminished then.

Q. Abundance of menhaden?—A. Yes, sir.

Q. The bluefish, I suppose, were plenty then?—A. Yes, sir; bluefish were plenty too.

Q. Did the bluefish disappear with the menhaden?—A. Yes, sir; they usually go together.

Q. Have they in fact diminished as the menhaden have diminished?—
A. Yes, sir; they seem to diminish with the menhaden.

Q. Do striped bass ever come here so as to be caught?—A. No, sir; not to catch with a purse net.

Q. Not to be caught in any way?—A. You catch them close along the shore; do not catch them off. They are caught abundantly in the fall of the year here.

Q. What do they feed on?—A. They feed more upon crabs than anything else.

Q. They do not appear much until after the menhaden have gone away?—A. No, sir; not until late in the fall; most of their traveling along is begun in cold weather.

Q. What time do the menhaden appear in the spring; how early?—
A. I think about the 15th to the 20th of April; sometimes earlier, sometimes later.

Q. Depending upon the weather, I suppose?—A. Yes, sir.

Q. And they disappear in the same way?—A. Yes, sir; November; that is, along the tenth of November I have seen them abundant along the coast. I caught ninety thousand in a shore net a few years ago, that would average a pound apiece, in November; that was a shore net.

Q. What use did you make of them?—A. Sent them to the farm.

Q. Used them for fertilizer?—A. Yes, sir.

Q. Suppose the use of purse-nets was prohibited within 3 miles of the shore, what effect, in your judgment, would that have upon the supply of food-fish?—A. That would be hard to tell from the fact that these menhaden would be inshore to-day and off to-morrow. So that I do not think that would make a great difference. Owing to the weather they are not always inshore close to the beach.

Q. But, suppose the purse nets were prohibited from coming within 3 miles of the shore at all?—A. I do not think that would make a great difference, because the fish, though plenty inshore to-day, all you have to do is to wait and they would be off to-morrow.

Q. How far inshore do they use purse nets?—A. They use them in almost any depth of water.

Q. How far, in fact, from the shore do they use them to your knowledge?—A. They generally use them off here in 6 or 7 fathoms; that is, about 4 to 5 miles probably.

Q. Some of the menhaden captains have testified that they take fish as far as 50 miles from shore at times?—A. Not menhaden, I don't think.

By Mr. McDONALD:

Q. Do you consider steamers more objectionable than sailing vessels in the menhaden fishing?—A. Well, in this way, they can make a great many more hauls in a day with a steamer than they can with a sailing vessel, from the fact that they move the steamer to a different position all the time.

Q. What food-fishes feed on the menhaden, in your opinion?—A. The bluefish—mackerel, we call them here—feed upon them more perhaps than any other fish.

Q. Does the trout, or what you call the bluefish here, feed upon them?—A. The trout not so much; they will to a certain extent, but very little.

Q. Why do you think so?—A. We never catch so many trout along with them as we do what you call bluefish.

Q. Why do you think the trout ever feeds on them?—A. I think I have caught the trout where they have eaten them.

Q. You stated that there are not more than one-tenth as many menhaden taken now as some years ago?—A. That is my opinion.

Q. Do you mean that remark to apply to this locality or to all the Jersey coast?—A. I could not answer only right here.

Q. Is not the catch of menhaden on the coast this year quite large?—A. I really have not seen any this year much; not along here.

Q. In the Chesapeake Bay the catch is very large this year; I did not know how it was farther north?—A. They are very scarce. I have seen but very few this season.

Hon. WM. J. SEWELL. Let me suggest that Mr. Hildreth's remarks apply to the catch along here, which is local in its character, for local use.

Mr. McDONALD. That is what I understood.

By Mr. MORGAN:

Q. You spoke of catching young menhaden so soft that they might mash up and fill the meshes of your nets. Have you any means of determining what would be the age of a school of fish of that size?—A. I could not. All I could tell you is I have seen those schools of fish, and with an inch-and-a-quarter mesh almost every one goes through. Sometimes they are smaller than we suppose and go through the net.

Q. That is the same fish, though, you would catch in other schools?—A. Yes, sir, any number; and away afterwards we catch larger fish.

Q. That would tend to show, and I suppose that is your opinion, that the menhaden visits our shores at different ages?—A. Certainly. They prove all that by coming into our sound. You find any quantities of them up a couple of miles from here; sometimes make a haul around the mill and catch several bushels, with ovas in them more than that length [indicating], that get up in that pond.

Q. Is that a salt-water or fresh-water pond?—A. It is neither salt nor fresh; brackish water.

Q. Have you any reason to suppose that the menhaden ever spawn or propagate in these waters?—A. Certainly they do.

Q. They certainly do?—A. Yes, sir.

Q. Now, I would be glad to know any facts that you can state to the committee to establish that proposition, for the reason that the prevailing opinion is that they spawn only in deep water and out towards the Gulf Stream. I would be glad now for you to enter into any details or statement you wish to by which you can establish that proposition that they spawn in these waters inshore.—A. All that I can state is, we sometimes catch these menhaden with the spawn in them—that is, the roe, we call it—and then again the next thing we see, we see the little menhaden in our bays and sounds, not more than that length [indicating]; little fellows.

Q. That would be 2 inches, or something like that?—A. Two or 3 inches long, and then up to a larger size. We catch them in what we term an eel-net five-eighths or three-quarters mesh; they are small menhaden, so that they must breed here.

Q. Are they found with the spawn in them in the spring or the fall of the year?—A. More particularly in the fall; sometimes in the spring, but more particularly in the fall.

Q. As late as November?—A. Yes, sir; that is have the roe. I do not know when they spawn.

Q. Have you taken them in large quantities 2 or 3 inches long?—A. Well, the most I have caught, as I have told you, was in the mill-pond, perhaps 7 or 8 inches long; those little fellows; just haul them ashore and let them go again.

Q. Seven or eight inches?—A. Yes, sir.

Q. What is about the length of a full-grown menhaden?—A. Well, we catch them sometimes weighing a pound and a quarter; but they average a pound. As I said to you, I caught ninety thousand in one haul right opposite Sea Breeze; every one averaged a pound.

Q. What would be length of menhaden that weigh a pound?—A. That would depend a great deal upon the fatness of the fish.

Q. What would be about the average length?—A. I could not tell the measure, but I think about 10 inches. It might be longer or shorter, but I think about 10 inches.

Q. Have you any knowledge of the food upon which the menhaden feed?—A. No, sir, I have not any knowledge of that. They feed upon suction in the water, I suppose, from the appearance.

Q. Are they what we call a sucker fish?—A. Yes sir; there is a sediment in the water that they feed upon.

Mr. McDONALD. They swim with their mouth wide open.

Mr. MORGAN. That could not be for anything else but for food, could it?

Mr. McDONALD. Not that I know of.

Mr. MORGAN. Q. (To the witness.) Is it your opinion that the menhaden come near shore—inshore, I will say—for the purpose of feeding as a rule, or do you think that they are driven in shore by the pursuit of other fishes that prey upon them?—A. That is why I think there is a scarcity. Two years back we used to have them in shore in abundance, and fish would drive them in. Now we do not have them in shore at all. There don't any come in shore. Neither do we have the menhaden come in. I used to come down here in the fall of the year around our beaches and bring my men and nets, and fish would come right

along the shore. We would lay the net right along and haul them to the beach, and have teams and cart them to the farm, but now they do not come ashore.

Q. Which do you think is the most important industry, the catching of the menhaden—I speak with reference to the people at large—the catching of menhaden for the oil and the fertilizer, the manure it makes, or the catching of food fish for the consumption of the human family?—A. Well, there is a great deal invested in the menhaden fisheries.

Q. I know, of course, capital will seek any investment it can make a profit out of, but I am speaking with reference to the great body of the community. The farmers are interested; the consumers of oil are interested in it. They want the manure as cheap as they can get it and as good, and they want the oil as cheap as they can get it. Now, considering the welfare of the great body of the people, I will say around the sea coast and the interior, do you think it is better that the menhaden fishery should yield its prestige or that the food-fish fishery should yield?—A. The only trouble I see about it is that the menhaden are becoming scarcer every year, and the food fish becoming more scarce, and eventually the menhaden will be all caught up and we will have no fish at all; that is, no food fish.

Q. Then it is your opinion that it is necessary to sustain the production of the menhaden and its visits to our coast in order to protect the food-fish that prey upon them?—A. That is the idea exactly.

Q. And if the menhaden is destroyed or driven away, that then the food-fish will abandon our shores?—A. Yes, sir; exactly. Some three years ago, that is, before the steamers came, you could catch any quantity of drumfish, but now you cannot catch them. They seem to be all caught up. You cannot make a haul with a purse-net for the menhaden but what you always scoop up drum with it, and I cannot attribute the scarcity of them to anything but the catching of menhaden.

Q. But the drumfish do not feed on the menhaden?—A. Yes they do. They run right alongside; come from the south with them and go along with them; that is, the red drum, not the black drum. We used to see acres of menhaden and anchor right ahead of them, and you would have all the sport you wanted catching drum.

Q. Approach these shores first and then go up north?—A. I suppose so.

Q. Following the warmth of the water?—A. Yes, sir. Sometimes they staid in Delaware Bay.

Q. Have you ever examined the stomach of the menhaden to see whether there were any bones of fish, or shells, or anything of that sort in it?—A. I never saw anything but a kind of a thick, black substance that they suck in the water. I do not know what it is.

Q. Something that resembles black mud?—A. A little; rather of a yellowish cast. You will see them in the water opening their mouth and shutting it all the time. They seem to be feeding, but how they get it I cannot tell.

Q. Have they any teeth?—A. No, sir; no teeth.

Q. When you fished for them from your sloops and other boats with purse-nets, do you think that you decreased the quantity of menhaden and also of the food-fishes that prey upon them, in the vicinity where you conducted your operations?—A. Undoubtedly. If I saw a shoal of those fish, laid my net around them, and scooped them up, there was very much less, but it was a very small portion of what was in the ocean, of course.

Q. Are you conscious of the fact that your purse-net fishing fright-

ened the menhaden?—A. Yes, sir; from the fact that sometimes they would be very badly frightened when we caught them.

Q. They would escape by diving under your net?—A. Yes, sir; and sometimes if they got to the back part of the net before we got it closed we would not be able to close it.

Q. Are they rapid swimmers?—A. Very fast, very rapid, very quick.

Q. And are really a wary, watchful fish?—A. Yes, sir.

Q. They have a great many enemies among the fish family, have they not?—A. Yes, sir; seem to have.

Q. Fish that prey upon them?—A. Yes, sir; sharks are very hard on them. Sharks follow them up a great deal, and drumfish. Bluefish is the greatest enemy.

Q. Do Spanish mackerel feed upon them?—A. Sometimes you catch Spanish mackerel with them.

By Mr. McDONALD:

Q. You gave two reasons why you thought menhaden spawn on our shores here. One was that the young fish 2 or 3 inches long were found along the coast, and the other was that you found the menhaden with roe in them. These young fish were 2 or 3 inches long, were they not?—A. Yes, sir.

Q. How old do you suppose they were?—A. I suppose them to be fish that were spawned in the spring; and along in September we find them; that is all the way that I can account for it.

Q. But you do not see them in that intermediate time as little fish, do you?—A. Of course I never noticed them until I caught them in a net with five-eighths mesh, which is very small; that is about the first I ever noticed them.

Q. These fish are undoubtedly 2 or 3 months old, and they may have come from a long distance?—A. I would not think they had ever come any distance at all.

Q. I only infer from the shad. I know that the shad when it is five or six months old is not longer than about that. So I presume from its being the same family it is about the same age. Now you speak of finding the roe in them. You find roe in the shad months before she spawns. It is the condition of the roe in the fish that would determine whether it was ready to spawn or not. Have you found them ripe, with the eggs ready to deposit; that is to say, so that they would flow out when pressed on the stomach?—A. That is something I never noticed closely to form any idea or opinion upon it.

Q. It is a point that we are entirely in the dark about, and I thought probably you had some personal observation in the matter.—A. Of course if I had ever noticed I could form some opinion about it, but I never have.

By the CHAIRMAN:

Q. At what season of the year are the menhaden in the poorest condition?—A. We have a run of fish in the spring that are fat, and in the summer we have what we term a summer run that are small and poor; smaller than the early run; and then when they come south again in the fall—I suppose them to be those fish that have gone north—they are very large and very fat; but our summer fish are very poor—contain but very little oil.

Q. They continue to improve until they leave in the fall of the year?—A. Yes, sir.

Q. That condition of the fish indicates, does it not, that they have come from spawning-beds?—A. Really I could not tell you as to that.

Q. Have you ever taken menhaden out of bluefish on opening them?—A. Oh, yes.

Q. And out of sheepshead?—A. No, not out of sheepshead but out of bluefish.

Q. Have you ever taken them out of red drum?—A. Oh, yes.

Q. So that you know that the red drum feed on them?—A. I saw three or four once weighing three-quarters of a pound apiece in one fish.

Q. What season of the year does that occur?—A. Well, in September.

By Mr. CALL:

Q. You spoke of catching great quantities of different kinds of fish when you were fishing for menhaden. What proportion of food-fish would you catch in drawing your seine for menhaden?—A. Sometime we caught a good many food-fish, and another time we caught a very few.

Q. Well, on the average would there be a considerable quantity of food-fish?—A. There sometimes would be quite a number of food-fish amongst them, and other times would be very little; whatever there was within the bounds of the net.

Q. There is nothing in your experience to justify the theory of some of these witnesses, that the menhaden were always found by themselves exclusively; that they were not largely intermixed with the food-fish?—A. On that I can only tell you my experience. I seldom ever made a haul but what I always caught a certain quantity of food-fish. I seldom made a haul but what I caught more or less drum.

Q. Did you fish in shallow water?—A. I calculated to fish in ten fathoms if I wanted to make a haul.

Q. Did your net reach the bottom?—A. Yes, sir; the net was sixteen fathoms deep.

W. W. WARE sworn and examined.

By the CHAIRMAN:

Question. Where is your residence?—Answer. Cape May City.

Q. How long have you lived here?—A. This has been my home since I was born—Cape May City and this vicinity; sixty-odd years.

Q. What is your occupation?—A. Builder; carpenter and builder, at present.

Q. What knowledge, if any, have you on the subject of fisheries?—A. Nothing more than I have gained as an amateur fisherman, and living on the sea-coast, and being along it between here and Sandy Hook, off and on for nearly a lifetime.

Q. How is the supply of food-fish now, compared with what it was when you first became acquainted here?—A. It has diminished wonderfully both in quantity and quality, more particularly within the last five years.

Q. To what cause do you attribute that?—A. I attribute it more particularly to the purse-nets. I can assign no other cause.

Q. The menhaden nets you mean, I suppose?—A. I mean what they call the purse-nets.

Q. How long is it since they commenced fishing with purse-nets on this coast?—A. The first that I recollect, I think, occurred about Little Egg Harbor. There is where the first factory was that I knew. That

I knew when I was superintendent of the life-saving service on the New Jersey coast. I was along it all the time.

Q. Is that this side of Atlantic City?—A. Just the other side of Atlantic City. They had a factory there, and there was the first steam vessel that I knew of fishing.

Q. How long ago was that?—A. That was along from 1872, I think, until 1877 or 1878. There were a few steamers that used to come in there and leave their fish, and it was not only menhaden that they left, but they left all they caught.

Q. For this factory?—A. Yes, sir; food-fish as well as others.

Q. What proportion of the fish caught were what you would term food-fish?—A. Well, they were small, it is true, in proportion to the menhaden, because take a school of the menhaden they are very thick and very plenty. Under those are what we call our food-fish.

Q. Following them?—A. Yes, sir; following them, biting on them.

Q. You mean the food-fish are deeper down in the water?—A. Yes, sir. The menhaden fish is what we term here a top-water fish, and they furnish food for other fishes.

Q. Is it, or not, a fact, as far as your observation goes, that wherever there is a school of menhaden there are more or less food-fish preying upon them?—A. That is almost universal, that there are more or less of what we call here the snapping mackerel, commonly called blue-fish further north. I have seen on this coast along here hundreds, yes, thousands of bushels of the menhaden that have been driven ashore by these snapping mackerel, bitten in two, bitten in pieces and every thing of that kind—been driven ashore and could not get off, laid in winrows. It is not so now, and I can further say that this very summer—and it is really absolute proof of what they have done with our fishing interests here—there has hardly been since the commencement of the season a decent baking-fish, except it be a sheepshead, on the island. The fish they are getting here now come from the bay shore, little bits of things only that long (about 12 inches). They cannot go up there in the sound thoroughfare fishing; that is certain.

Q. Have you seen any of them fishing this year?—A. I have seen them from the shore. I have never been offshore, but I can see them at their operations. Personally I never was aboard of one of their vessels.

Q. Is it your opinion that the use of these purse-nets is causing this deficiency of the food-fish?—A. Yes, sir; it is, I feel well satisfied. Traveling along the coast and heretofore having followed the sea, it is my impression that inside of five years, unless this purse-net business is stopped in some way, we will pay fifty dollars a barrel for our mackerel.

Q. What would be the effect of prohibiting the use of those nets within three miles of the shore?—A. It would help it very materially; there is no doubt about that. That would probably be fair enough on the upper end of this coast, but here our waters are much shallower. We only average here about a fathom to the mile until you run off for ten or fifteen miles. Now, around the Five Fathom Bank is a great fishing-country.

Q. That is about eighteen miles, is it not?—A. Yes, sir; as near eighteen miles as can be.

Q. That is simply a bar in the ocean; it does not come to the surface?—A. No; two fathoms is the shallowest on it.

Q. Now, if a purse-net is drawn in water deeper than the depth of the net itself, it would not necessarily take the food-fish in, would it?—

A. To a certain extent it would, because the lead is heavy enough to sink it.

Q. But suppose it does not go to the bottom; do they lead it heavy enough to draw the floats under?—A. That is what they calculate to do; they calculate to fish bottom; that is the nets they are fishing here.

Q. These purse-nets you say run to the bottom before they draw them up?—A. Yes, sir; they go to the bottom, haul together, and scrape it. Then they make the top of the net fast to the mast head purchase and haul them out with scoops.

Q. Do they do that in water deeper than the depth of the net?—A. I think they do; that I would not say positively.

By Mr. McDONALD:

Q. Would not the menhaden all go over the top of the net in that case?—A. As I understand, they sink the net to the bottom and scrape it; then they haul in those lines.

By the CHAIRMAN:

Q. The point is, whether the menhaden would not run over the top of the nets and escape if the floats are submerged?—A. They would to a certain extent, but the menhaden go down when you frighten them.

Q. Are the purse-nets they use here strong enough to hold bluefish?—A. Yes, sir.

Q. They hold sharks do they not?—A. They hold anything that gets in them. They will hold red drum.

Q. Is the red drum a stronger fish than the bluefish?—A. Oh, yes; the red drum is a game fish.

Q. Do they not, in fact, take up shark in them?—A. I cannot tell about that. The mackerel is not a very strong fish, and they do more biting than they break otherwise, but even that they have not much chance to do when they get in there.

Q. How far out from this point do you go before reaching six fathoms?—A. You will reach six fathoms, I suppose—well, there are places along where you will reach six fathoms within a mile.

Q. Generally, I mean.—A. Generally you will go from two to three miles; two miles anyhow.

Q. What is the depth of the purse-nets?—A. That I cannot tell you. I have only understood that as I have learned it from men who have been more or less acquainted with it.

Q. Do you know any other cause of the diminution of food-fish except the decrease of the menhaden?—A. No, sir; I know no other cause except working up their food, and my theory for believing that to be the cause is that it has not injured them particularly in what they call the Bay and in Marsh River Cove.

Q. Do you believe in the idea that fish may be driven from this or any other coast by fright merely, by a custom that creates in them an apprehension of danger?—A. That is a question I have never thought a great deal of, but there is one thing very certain. I know by fish in our little small bays, what we call the sounds—I know that they have been driven from there.

Q. They will flee from immediate danger undoubtedly, but whether they go far enough to know when the purse-nets are coming and get out of the way?—A. Well, I am satisfied they are driving the fish from here; I am fully satisfied of that. The idea that these purse-net fishermen save nothing but the menhaden is a grand mistake—must be, cannot be otherwise, because when they get them into those nets it would

not matter if they wanted to save them, they cannot take the time to do it. After a fish is wound around in one of those nets a little while, even if they should take him out and throw him overboard he would be no good.

By Mr. CALL:

Q. The fish would die?—A. Oh, yes; they will not handle them carefully enough—could not.

By the CHAIRMAN:

Q. Have you any knowledge of the subject of menhaden of different sizes and ages appearing here?—A. No, sir; I have not.

Q. Or as to where the menhaden spawn?—A. No, sir; I know we have them here probably that long (indicating).

Q. Two inches?—A. Yes, sir; I have known them put away the same as those little Scotch fish are put away—sardines. Right good they are, too. Then along in the fall the menhaden, when they come here, are very fat and have the roe in them.

Q. In the fall of the year they have the roe?—A. Yes, sir. The menhaden come here about in April sometimes.

Q. What is their condition then?—A. They are rather thin; they are not so good.

Q. And they keep improving through the season?—A. They keep improving all the time through the season.

Q. And before they leave in the fall you find the roe in them?—A. Yes sir.

Q. When they come back in the spring have they the roe?—A. I never saw them in the spring with the roe in them; not when they first come; I have been at the factory at Little Egg Harbor, and that was a pretty extensive factory, and I know that they used to come there, and they dumped all the fish they had.

Q. Is that kept up yet?—A. I think it is.

Q. Do you remember who is the proprietor?—A. I do not know who is the proprietor. I know they used to extract the oil and make the fertilizer. It is a pretty extensive place.

MAURICE CRESSE sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Cape May City.

Q. How long have you lived here?—A. Two years.

Q. What is your occupation?—A. I have not any business now.

Q. Have you any knowledge on the subject of fisheries?—A. Yes, sir; I have done considerable fishing on this coast for the last twenty-five years.

Q. You have lived on the coast that length of time?—A. Yes, sir.

Q. Have you fished for amusement or as a business?—A. Both.

Q. How is the supply of fish that are used by the people for food now compared with what it was when you first became acquainted with the coast?—A. It is very much less.

Q. What proportion would you estimate it has diminished?—A. I ran a schooner from this place four years on the banks, ten years ago, and it was not an uncommon thing with a breeze of wind to catch from 500 to a 1,000 pounds of mackerel a day there, and at this time they cannot average 200 pounds, from some cause.

Q. What is your opinion as to the cause?—A. My opinion as to the cause is that the feed is destroyed.

Q. In what way?—A. Well, they prey on the menhaden—bunkers; that is what we catch them with; we catch them rather with a squid, but they will bite to bunker.

Q. Suppose that all to be true, that the menhaden is their food?—A. They cannot live without food.

Q. What has diminished the menhaden?—A. I suppose they are caught up by the menhaden steamers.

Q. Is it your opinion that the use of purse-nets for menhaden by the steamers is what is producing this result?—A. It is, without a doubt.

Q. You have not any doubt about it?—A. No doubt whatever. I was stationed on Five Mile Beach, 12 miles from here, in the Life-Saving Service, and we caught what we call red drum here in the fall of the year in great abundance. We could go off back of Hereford for a couple of hours, and as a general thing we would catch from 6 to 12 red drum in that length of time, all we could make use of and more too. Last fall I fished five weeks and only caught two drum. I went to one of the steamers to get bunker for bait, and asked the man if he had caught much drum. He said he had not caught any that day, but had caught a large quantity the day before. That was ten miles above here, at Hereford. That was last year.

Q. Did he say what quantity he caught?—A. He did not. He told me he had not caught any that day, but the day before he caught a large amount at Hereford, and I saw them fishing there the day before

Q. Now, you know something of the habits of the fish. Wherever a school of menhaden is found and surrounded by a purse-net, is not it a necessity that whatever food-fish are pursuing them are taken in with them?—A. Oh, yes. I have fished a purse-net myself.

Q. When?—A. Twelve years ago.

Q. For whom?—A. Capt. George Hildreth and myself.

Q. You were interested with him?—A. Yes, sir; I was, slightly

Q. You had a factory?—A. He had a factory.

Q. Did he work up the food-fish then?—A. Yes, sir; he would work up anything he caught.

Q. Without some preservative, how long can you keep a bluefish in the summer season?—A. About twelve hours.

Q. Do not they injure before that?—A. Oh, yes.

Q. To keep them in good condition do they not need preservatives of some kind as soon as caught?—A. Yes, sir. Take anything of a cool summer day, and fish caught in the morning I guess would be good enough to eat that supper, but no longer.

Q. If lying separate; but thrown into a bin?—A. They would heat there in four hours; in less time.

Q. The natural heat would produce that?—A. Yes, sir; and then there is the decay. I believe they told me they kept fish as high as three weeks in these menhaden steamers before they go to the factory.

Q. Rotting there?—A. Yes, sir. For instance, I asked them the question, and they said they did not go back until they loaded. If they fell in with small schools, catching ten, fifteen, twenty thousand a day, it takes a good while to load them, but if they make a good haul they load in a day.

Q. How many is a load, ordinarily?—A. That I could not tell you.

By Mr. CALL:

Q. Is the smell very offensive on board ship?—A. Well, it is a pretty strong smell.

Q. I should think it was very unhealthy?—A. They say not; they tell me it is healthy; I could not live there. I own a farm and used to buy it for fertilizer, and, though they say it is not unhealthy, it was fearful to be where it was, I thought.

By the CHAIRMAN:

Q. For the purposes of oil and fertilizers, the catching of menhaden and other fish, I suppose, is a valuable industry to the people?—A. Yes, sir.

Q. Which do you regard the more valuable, that or the right of the people to have food-fish?—A. I regard the right of the people to have the food-fish, and the destruction is very great. Now, I never saw them, but if they should catch a vessel load of what we call bluefish or weakfish, they would put them into the general cargo and boil them up. They would not get much oil, but they would get the refuse, the fish scrap, which is worth twenty dollars a ton.

Q. What season of the year are the menhaden the poorest?—A. In the spring.

Q. Have they any spawn in them at that time?—A. I could not tell you.

Q. At what season of the year are they the most fleshy, most hearty?—A. I think in October; the later the fatter the fish.

Q. They keep gaining until the time they leave?—A. Yes, sir; all the time.

Q. Do you know whether they have spawn in them in the fall?—A. I do not.

Q. But you know they keep growing fleshy all the season?—A. I know you can press double and treble the oil late that you can early.

Q. From the same sized fish?—A. Yes, sir.

By Mr. CALL:

Q. Do they press the oil out?—A. Yes, sir. They are steamed, put into box tanks about as large as this room, with steam pipes, and then pressed.

By the CHAIRMAN:

Q. What do they put with the fertilizer afterwards?—A. They do not put anything with it.

Q. I thought they had to use some acid?—A. They do not.

Q. After the oil is taken out of menhaden by pressure, how is the remainder of the product for a fertilizer compared with the use of the whole fish as a fertilizer?—A. It is just as good and better, because bones are better than flesh as a fertilizer. Oil is, I believe, no fertilizer.

Q. Then your opinion is that for fertilizing purposes it is better than it would be without going through this process?—A. Yes, sir; more bones.

By Mr. McDONALD:

Q. Do you know how deep the water is off here where they fish for menhaden?—A. What depth do they purse them in?

Q. Yes.—A. I have seen them purse them just back of the breakers, and I have seen them purse them in 7 fathoms of water.

Q. That is 42 feet?—A. Yes, sir.

Q. Then the net always goes to the bottom?—A. Yes, sir.

Q. Always?—A. Yes, sir.

Q. In all this fishing along the coast?—A. Yes; it has to go to the

bottom or cannot catch the fish. The nets are very heavy leaded. They open these nets and put half on each boat. They get in the wake of a school of fish, open these boats and one boat rows one way and one the other. They come together before all the net runs out. They have a messenger that weighs two hundred pounds that hooks on both purse-lines, and drop it in, and it gathers every mesh in at the bottom; also the men pull on the corks, and they will gobble every fish that is around—flounders, Spanish mackerel, or anything; they take everything. I have caught Spanish mackerel in a purse-net eight miles at sea. I have caught all kinds of fish.

Q. Would not Spanish mackerel jump over the purse-line? If a net net goes to the bottom, of course it must take in everything that lies in the circle?—A. Yes, sir; but you get a couple of hundred thousand fish pursed in, and if a fish was disposed to get out he would be very much tangled. They soon purse them. It takes less time than I have been telling you about to purse a net.

Q. Do they ever fish in water deeper than the net?—A. Yes, sir; they do.

Q. Then why do not the menhaden escape from the net?—A. How do they escape?

Q. The bottom of the net is open; why do they not drop down?—A. The net will go to the bottom.

By Mr. MORGAN:

Q. Carry the corks down?—A. Yes, sir; but I never saw them purse deeper than 7 fathoms water. I have seen them fish a purse in deeper water, but I never saw them make a haul deeper than 7 fathoms water. I have seen them haul frequently off Hereford. I think their nets are deep enough to sweep 8 fathoms water.

Q. Have you ever seen any young menhaden in these waters?—A. No, sir; I never saw any less than half a pound, I think.

Q. And from that up to a pound?—A. Yes, sir. Yes, I have seen menhaden less than that; I have seen them that would not weigh a quarter of a pound.

Q. When you find them that way is the entire school small?—A. Yes, sir.

Q. No big ones with it?—A. No, sir.

Q. It would be a school of young fish, then?—A. Yes, sir; and you will always find them inside, in the inlets. I have never caught any small ones outside to amount to anything.

Q. They sometimes put up these young menhaden for sardines, do they not?—A. That I do not know.

Q. What is the usual period when the menhaden appear off the coast here?—A. I think in May.

Q. Then they continue on until November?—A. Yes, sir.

Q. You never see them in the winter, do you?—A. No, sir.

Q. You are satisfied they are not here in the winter?—A. No, I am not satisfied they are not here in the winter, but I never saw any.

Q. You would see them if they were here?—A. Yes, sir; they go south in the winter. They catch them down east, and as soon as they go south they chase them clear to Hatteras.

Q. That is the fall fishing?—A. Yes, sir.

Q. Then they come up in the spring of the year, do they not?—A. Yes, sir.

Q. And then they commence down here to fish up the coast?—A.

Yes, sir; our mackerel follow them. As soon as the bunkers come the mackerel come.

Q. By mackerel you mean the bluefish?—A. Yes, sir; that is their prey; these bunkers or menhaden is what they live on. I have seen them by the tons on the Five Mile Beach—half fish by the ton, two hundred thousand—just run ashore by snapping mackerel.

Q. Run right up on the beach?—A. Run right up in a gulley, where the tide left them, and I could have picked up tons bitten right in two. I have seen the water bloody with them, and you can catch mackerel with them. Sometimes, years ago, we used to hook on a piece of bunker and throw off; they use them for blackfish bait.

Q. How long has it been since you saw a school of menhaden in Delaware Bay, here, off this coast?—A. I saw plenty of them, quite a good many of them, last summer.

Q. Along near shore?—A. I saw them make a haul within less than half a mile of the breakers last October.

Q. With steamers?—A. Yes, sir.

Q. Do you know what catch they made?—A. I do not. They were not more than half an hour scooping them up with a net. We went out to them, but how many they caught I could not say.

By Mr. CALL:

Q. They often catch several hundred barrels at a time?—A. Yes, sir; I think, if they make a fair purse, probably they can catch near a steamer load. I have known my brother-in-law, Captain Hildreth, and myself to catch enough to load two good-sized sloops and two purse-boats with one purse, and he did not save more than half his fish. He had nothing to save them with. Night was coming on and he loaded the two caraways and two sloops, and I think he turned out more than he saved.

Q. They were dead, were they not?—A. No, sir; they were not all dead; most of them lived.

Q. What proportion, in that case, of food-fish were found?—A. I do not suppose there was a hundredth part food-fish.

Q. There would be about a hundredth part food-fish?—A. It seems to me there would be; and other times you would not catch probably a basket of good fish in two hundred bushels; then, again, the proportion would be a great deal more. Now I do not see these drum, and I am satisfied the menhaden fishermen drove all our drum off this coast last fall, because there was nothing else to drive them.

Q. What is your observation in regard to the diminishing of the supply of the menhaden the last few years, since the steam fishery commenced?—A. I do not think there is one-tenth of the fish we had here ten years ago.

Q. Menhaden?—A. Yes, sir.

By Mr. MORGAN:

Q. Or any other kind?—A. No, sir; there is not.

By Mr. CALL:

Q. You think this purse-net fishing is destructive of the menhaden fishery as well as the other fish?—A. Indeed it is. We used to catch all the fish we wanted here, in the fall of the year, to supply our farms with fertilizers. Now our fish-nets lie and rot—would not catch a fish.

Q. It is your opinion that the interest of the factories demands some legislation in regard to this purse-net fishing?—A. From the knowledge

I have, I think if this fishing should continue ten years longer, it would not be worth while to fish here.

Q. That is, it would break up the factories and the manufacture of fertilizers altogether?—A. It will break up our manufacture, and it will break up our food-fish. There will be no fish here if the menhaden are caught. If there is no food, the fish will not come.

By Mr. MORGAN:

Q. I suppose in regard to these men fishing off here now it is just a chance whether they make a strike or not, is it not?—A. Yes, sir; I saw a lot off here yesterday; I did not notice whether they were pursuing or not.

By the CHAIRMAN:

Q. There are purse-nets out to-day?—A. There are five outside.

By Mr. CALL:

Q. What do you call outside?—A. Outside of the beach. The most of the fishing I have done this spring has been in the inlets, for sheepshead and bluefish.

Q. There is no inlet right here?—A. Within 3 miles of here—Cold Spring.

By Mr. McDONALD:

Q. Do you mean to say that menhaden are scarce just around here, or scarce outside, too?—A. They are scarce all the way along the coast to what they used to be.

ROBERT E. HUGHES sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Right here, at Cape May.

Q. How long have you lived here?—A. Thirty-seven years; ever since I was born.

Q. What is your occupation?—A. Delaware Bay and River pilot.

Q. Have you ever followed fishing?—A. No; sir; not much.

Q. You say "Delaware Bay and River pilot"; where are your duties?—A. Our duties are to take to Philadelphia vessels that want pilots and to bring them back again.

Q. What knowledge have you on the subject of the fisheries?—A. I have fished considerably aboard the boat. I have seen these menhaden fishers. I have been close to them when they have been fishing; never was aboard, though. I have seen as high as fifteen fishing at a time. I have lain within hailing distance.

Q. Within what period of time; how long since?—A. Last year; never this year.

Q. Steamers?—A. Yes, sir.

Q. How long have you followed fishing for any purpose?—A. In summer, this time of the year, on board of the boat we fish a great deal.

Q. For what varieties of fish?—A. We have what we call the snapping-mackerel; they are a bluefish, I suppose, and then the sea bass and porgies; in winter time, cod, and in the spring of the year, cod.

Q. Do you catch sheepshead?—A. No, sir; not out at sea. We bait for the sea bass and porgy with these menhaden. It is the best bait for those fish. We get our bait from the menhaden fishermen.

Q. What is the best bait for bluefish?—A. They do not use any bait for bluefish; just troll a white rag on the hook is as good as anything.

Q. Do they not bait for them with any food?—A. No, sir; not bluefish; not that I have ever seen.

Q. What is your observation as to the supply of food-fish now, compared with those here when you first became acquainted with these waters?—A. I do not think that there is anywhere near as many.

Q. What proportion would you say they have diminished?—A. When my business does not call me away and I am at home, I fish here in the summer time, and, according to my experience, as soon as ever these fishermen appear, then the fish in our sounds begin to go away. Now, I was down fishing yesterday, and you can catch trout here just about that large (indicating), but before these fishermen came here you could catch trout three or four pounds. After they come they appear to drive the fish away.

Q. Fish the size you describe would go through their nets, would they not?—A. No; I do not think they would. Once we were lying becalmed close to one of the fishing-boats and two of our pilots—they are not at Cape May at present—went aboard. They had all kinds of fish; they had bluefish and trout. They catch them and throw them into the hold of the vessel. They are all used for fertilizers.

Q. How near here is there any menhaden factory now?—A. The nearest one that I know of is at Lewes, Del., 12 miles distant, right over to the breakwater. I think that these menhaden are decreasing. I do not think there are as many as there were three years ago. They are getting quite scarce to what they used to be. Those nets, I believe—the pilots that were on board gave me all the information I have—are 9 fathoms; cannot fish any deeper than 9 fathoms; they go right to the bottom.

Q. They take everything, of course?—A. Yes, sir; they take everything up. We timed them once making a haul, and it takes about one minute, according to our time, to get a scoop-load up, and those scoops would hold about a cart-load. I remember one time particularly there was one of the fishermen that appeared to have no fish in at all, and with one school of fish they loaded that boat and started on their trip. He might have had some in, but apparently he was light.

Q. Caught an entire load in one haul?—A. Yes, sir.

Q. When was that?—A. That was last summer. I could not give you the date, but I think it was somewhere about August.

Q. Have you any opinion as to whether the use of purse-nets is diminishing the supply of food-fish?—A. Yes, sir; I think it is.

Q. Do you know of any other cause for the decrease of them?—A. I do not.

Q. In other words, would the ordinary catch here for private use and for sale for food diminish it?—A. No, sir; I do not think there is any other cause. Now, about three years ago, they used to go right off here and catch plenty of red drum, but they have all gone. They tried them last year and I do not think there was half a dozen caught off here. I have heard—I do not know whether true or not—that they caught six hundred drum at one haul in one of those purse-nets.

Q. Last year?—A. Yes, sir; last year.

By Mr. McDONALD:

Q. For how many years have you been catching the red drum on this coast?—A. They have been catching the red drum for a great many years; ever since I can remember.

Q. Do they catch them north of Cape May?—A. I do not know. I cannot say. I have no way of knowing nor any way of hearing.

Q. It is a southern fish; it strays up here?—A. I have never heard of their catching them.

Q. They have a black spot on their tail?—A. These are a large fish and have kind of a red cast. There are two kinds of drum—red and black.

By Mr. MORGAN:

Q. Have they a spot on their tails?—A. I never examined the tail particularly, and do not know. The fishermen on the bank complain that there is nowhere near as many sea bass as there used to be. I have been aboard of them and they complained terribly for some cause or other. They would not hurt those fish as much as they would the bluefish, because the water is most too deep. It is 13 or 14 fathoms where they fish for those fish, and they would not get hold of them.

By Mr. McDONALD:

Q. But you say they have diminished very much?—A. Yes; they complain.

Q. Then that is for some cause other than the menhaden?—A. Yes, sir; I do not think that is attributable to them.

By Mr. MORGAN:

Q. Have you any mullet in these waters?—A. Yes, sir. They say they catch a good many mullets here. Our mullets are not very large. I saw one of these mackerel fishermen in these sailing vessels load two vessels with one haul of his net. He got two vessels' cargo out of one haul. That was about two years ago.

Q. Mackerel?—A. Yes, sir.

Q. Off the coast here?—A. Off Cape Henlopen 10 or 15 miles.

By Mr. McDONALD:

Q. That was very deep water, wasn't it?—A. They fished, I guess, about 12 or 13 fathoms.

Q. Does the purse-net go to the bottom?—A. Yes, sir.

By the CHAIRMAN:

Q. How is the quantity of striped bass now compared with former years?—A. I do not know whether it has depreciated much or not.

Q. They are a fall and winter fish, are they not?—A. Yes, sir.

Q. And I suppose the best fish caught, except salmon, rate highest, do they not?—A. I do not know the exact price. We do not get many here. Our main fish here are sea bass.

Q. What is your highest-priced fish here?—A. Sheepshead.

Q. What are they worth?—A. About 16 cents a pound here to-day.

Q. That is wholesale?—A. No; by the fish.

By Mr. MORGAN:

Q. How far out have you seen them throw these purse-nets for menhaden?—A. I do not think I have ever seen them over 8 miles from land. This is a great place for them right along this coast. The menhaden are more plenty about the middle of August, when there always appear to me to be more schools of them, but there is quite a lot now. I think they begin to come here in quantities about the middle of June. I do not think they show themselves much before that—the 1st of June. I think they themselves are a good eating fish, but they have a good many bones.

By the CHAIRMAN:

Q. They are used for food, are they not?—A. Oh, yes. They taste almost like a shad.

SAMUEL SKELLINGER affirmed and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. I reside here.

Q. How long have you lived here?—A. I have lived here sixty years. I was born here.

Q. What is your occupation?—A. Pilot.

Q. How long have you followed that business?—A. Thirty-five years.

Q. What experience or acquaintance have you had upon the subject of fisheries during that time?—A. I have had considerable. In our business as pilot we see a great deal of this thing done, and for the last twelve years I do not think there has been one year but what I have been among those that have been following this business.

Q. Following what business?—A. This menhaden catching; not been with them, but I have looked on and seen it done.

Q. Are there more or less of the fish which the people use for food now than there were in former years?—A. Twenty per cent. less; yes, more than that. In the fall of the year it used to be a common thing, and they used to make a good deal of money out of the business of catching the snapping-mackerel that were brought inshore by those menhaden; right along on the back of the breakers was the place they would go to keep clear of the snapping-mackerel, and nets were used for the business of catching the snapping-mackerel; but now there is no menhaden and no snapping-mackerel come inshore at all. I have seen schools of them along the beach at Cold Spring Inlet—as much as twenty wagon loads picked up in one morning—where the snapping-mackerel have driven these fish ashore, and several of the snapping-mackerel were with them where they had come with such force that they could not get back.

Q. Did you find the menhaden wounded—bitten?—A. Yes, sir; a great many of them bitten in two. Now we have troll-lines, one on each quarter, and we often catch those snapping-mackerel, and I have seen them with one bony fish and half of another in them at a time.

Q. Menhaden?—A. Yes, sir; menhaden. Now, if this thing is allowed, I do not think it will be over six years before the fish will be destroyed in a measure, because if they cannot get their regular food they are going for other food.

Q. By “this thing” what do you mean?—A. I believe that the fish will be destroyed.

Q. But “by this thing” what do you mean?—A. This getting of the menhaden.

Q. You refer to the catching of menhaden with purse-nets?—A. Yes, sir.

Q. How long is it since that began here?—A. I have known it for the last twelve or fifteen years.

Q. Has it increased or diminished during that time?—A. There are but two factories that I know of at the present time here—one over at Lewes, back of the breakwater, and the other is at Egg Harbor; but this at Lewes and this eastern factory have gone into it very strongly.

Q. Do they use sailing vessels or steamers?—A. Steamers. I have counted five to eight at one time.

Q. When?—A. This spring.

Q. How long ago?—A. That has been about three weeks ago, and last fall you could see any September afternoon nine or ten. They are the only fishermen that I see have steamers. Now they have two large factories at Cape Henlopen I understand.

Q. The combination have over forty steamers in their service?—A. Well, they must break it up after a while; but the principal part of the fish is inshore.

Q. Suppose they were prohibited from coming within three miles of the shore, what effect would that have?—A. It would have great effect. Now the principal part of the fish are inshore. I never saw them to exceed 10 miles from land, and that was in the month of August. I think they prefer warm water, and the closer in the warmer the water is. Cape Henlopen, inside Delaware Bay, is a neat place for them. If they were not allowed to come within 3 miles of land it would be a great help for the fish, but it would be a good deal better if they could be kept 10 miles off.

Q. Do you know of any other cause for the diminution of the quantity of food-fish except the destruction of the menhaden?—A. No, sir.

Q. Do you know any other cause for the destruction of the menhaden except the use of the purse-nets?—A. No, sir; there is not any other.

Q. You are sure of that?—A. I am confident of that.

Q. This catching of fish for oil and fertilizers is an important industry, is it not?—A. It is of great importance; yes, sir. It is a money-making business, and the fertilizer is of great use.

Q. Suppose the question were addressed to you now: Shall the right of the people to have their food-fish be preserved in preference to the destruction of the menhaden for manufacturing purposes, or shall the menhaden interest triumph, irrespective of the interests of the people? What would you say to that proposition?—A. I should say that the fish should be protected by all means.

Q. For the use of the people?—A. Yes, sir. Now the menhaden is used for bait, and, to show you that fish prefer that ahead of any other bait, it is used by the fishermen with the fishes on the banks, for the blackfish and sea bass, and it is used for the fish to the eastward in preference to all other bait, which shows that the fish prefer that.

Q. The menhaden is a bright-yellow fish, is it not?—A. Yes, sir.

Q. Shiny?—A. Yes, sir; shiny.

Q. What we would call in fresh water a shiner, but not so white?—A. No, sir; not white. It is very brilliant and very numerous. I saw a net laid around what appeared to be a few; you could not see on top of the water a space of the menhaden larger than the head of a hog-head, and the net was so full they could not do anything with it. They had to turn it up and let them out, which showed they went clear to the bottom.

Q. A pyramid of menhaden?—A. Yes, sir. I have been in the station boat we have to take off the pilot, and at one time we went right up to the net where they had them in the net pursed up, and they loaded up all the boats, and I could not tell how many they let go, but it was a sight to see them.

Q. Like the herring, I suppose they are pretty nearly uniform in size?—A. Yes, sir; there is but very little difference in the size of them.

Q. But there is a young of the menhaden, is there not?—A. Yes, sir; but you never see them around here.

Q. Don't you?—A. No, sir; never see any here but what are full-grown; I never did.

Q. Your trips are from here to what point mainly?—A. We go from here to Philadelphia. We go to sea and then take the vessels to Philadelphia.

Q. You go out 20, 30, 40 miles to sea, do you not?—A. Yes, sir; in summer farther a great deal.

Q. Do you use steam or sail boats?—A. Sailing-boats, about 120 tons.

GEORGE FOSTER sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Cape May.

Q. How long have you lived here?—A. About twenty-four years.

Q. What is your occupation?—A. Following the water; boating.

Q. Boating for what purpose?—A. I run a packet from here to Philadelphia and fish in the summer season; have until this season, when I quit it.

Q. How long have you followed that business?—A. I have followed that about twenty-seven years.

Q. What knowledge have you on the subject of the condition of the fisheries along this coast?—A. I think they are breaking our fishing up here; our bluefishing.

Q. That is not the question. What knowledge have you about it; what experience have you had in reference to it yourself?—A. I have followed it, catching those bluefish, these last twelve years out here, and for these last four years they have got so thin we cannot catch them. Now, out on this beach, where these fellows catch with their seines, you cannot go and catch a fish. Five years ago there, with the wind coming offshore, you could catch all you wanted.

Q. How many could you catch then?—A. I have caught as high as eight hundredweight in there. Now you cannot catch a fish. I quit the business.

Q. You quit it by reason of the diminution of the fish?—A. Yes, sir; the scarcity of them.

Q. What do the kind of fish you caught feed on?—A. They feed on these moss-bunkers, we call them—menhaden. The bluefish feed on them and the other small fish feed from the cuttings of them—underneath them.

Q. What is your opinion as to what diminishes the supply of fish here?—A. Why, seining them.

Q. These purse-nets?—A. Yes, sir; these purse-nets; they take away the food.

Q. How long is it since they began to come here?—A. I think about three years ago they came into our beach here, and ever since that there has been no fish there of any account.

Q. Steamers or sailing boats?—A. Steamers.

Q. How many have you ever seen here at once?—A. Seven is the highest I ever saw.

Q. Do you know of any other cause for the diminution of the quantity of food-fish except the catching of menhaden with the purse-nets?—A. No; I do not. They are bound to go where the feed is, and if there is no feed they are not going; that is the cause of their leaving as near as I can tell.

Q. Where do you fish now?—A. Five Fathom Banks about; 18 miles. There you find bluefish.

Q. How deep is the water?—A. Three fathoms is the shallowest water there is on it; about from that to five. It is a ridge running north and south.

Q. How long is it?—A. I should judge 5 miles.

Q. And how wide?—A. About a mile wide, the widest part; from that to three-quarters.

Q. There you catch bluefish?—A. All we catch we catch there now.

Q. Can you catch them there as you used to here on the shore, in quantities?—A. No, sir; not in quantities you cannot. You cannot catch half there you could when they were thick in here.

Q. Have you tried to fish there any time recently?—A. I have not been there this season; not since last season, when I was there every day it was fit to go.

Q. Last season?—A. Yes, sir.

Q. Could you catch them as you used to catch them here near the shore?—A. No, sir; not after the steamer came here you could not catch them. They broke them up from some cause or another—taking the feed away from them. Whenever you take the feed away from them it takes them away. If these seines are not stopped we will have no fishing around Cape May. I tell you that. They hurt our fishing in the sound here, even.

CAPE MAY, N. J., *July 13, 1883.*

WILLIAM F. CASSIDY sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. In Cape May City.

Q. How long have you lived here?—A. I have lived here my entire life. I was born here.

Q. What is your age?—A. I was forty years old the 26th day of last January.

Q. What is your occupation?—A. Carpenter and builder.

Q. Why do you come to testify on the subject of fish and fisheries?—A. I was requested by State Senator Miller to come here and testify because I knew something about it.

Q. What knowledge have you or practical experience have you had?—A. While I am a carpenter and builder, our business in that line is done here through the fall, winter, and spring, and in the summer I engage in the hotel business generally, in the steward's department in the hotel. I am very fond of fishing, and before I commence at the hotel I generally have a few days' fishing, and when the season is over I probably have two weeks' fishing.

Q. How long have you followed fishing?—A. Since I was a boy ten years old I have fished every year all the time I could get.

Q. As a business or simply as recreation?—A. Simply as recreation; never as a business.

Q. What are you able to say as to the quantity of food-fish, as they are termed, now compared with your earliest knowledge; are they more or less abundant?—A. A great deal less abundant than they were five years ago, or ten years ago, or twenty years ago.

Q. Can you give any idea of the proportion of the diminution?—A. I will just relate a little circumstance in connection with my fishing. I was one of the first ones here that ever went into fishing for what you call bluefish and we call snapping-mackerel. We got a net to gill them along the coast here, and we would see them coming after the menhaden; see them jumping. You could see them probably a mile off, and we would get our net ready and lay off ahead of them. From September until the 1st of November we would catch them; some weeks every day in the week, some weeks may be twice in the week, but every fall we would catch all we wanted, all we could use ourselves and all we could sell around home. We caught them for about three years with that net,

and then I got two new nets. Myself and Mr. McCrary were in partnership in that business. After we got the new nets we never made but one catch of any account. I think we caught about 800 after we got the new nets with one net, and with the other we never caught a fish. I have watched for them for two seasons after that, and have not caught any.

Q. Have you any opinion as to the cause of their disappearance?—A. My opinion is that these fishermen with purse-nets after the menhaden have broke them up altogether.

Q. How long is it since they began to fish on this coast?—A. I have never seen them around Cape May until about five or six years ago.

Q. How many vessels have you ever seen fishing at one time?—A. Summer before last I was steward of the hotel at Sea Girt. The coast is very bold there and close to their factories. I have seen at sunrise in the morning, within the range of the eye, 19 of those fishing-boats. I have seen them within 200 or 300 yards of the shore.

Q. Steamers or sailing vessels?—A. Steamers. I have seen them run their nets around a school of fish, purse them, hoist them aboard, and empty them. Of course a fisherman can tell the size of the fish as they go into the hold of the vessel, as they are dumped from the scoop-net. I saw large and small all go in together, everything that was in this scoop, when they pull the trip-line—dump these fish. I saw all sizes go in. Sometimes they would be all small fish; sometimes they would be different sized fish; sometimes very large. I, of course, used to buy the fish for the hotel, and I would order the fish a day ahead. The man I got fish of would say he would have bluefish for me next day if the fishermen got any that day. He would go right to the factory and buy these fish. I think there was a factory he told me, at Shark River, and he used to go there for these fish.

Q. Have you ever been on one of the boats when they made a haul?—A. I never was; no, sir.

Q. Do you know of any other cause for the diminution of fish except the use of the purse-nets?—A. No, sir; I don't know of any other cause.

Q. Is there a market here where fish are kept for sale?—A. In summer; yes, sir.

Q. I mean in the city.—A. Yes, sir; in the city there are two markets for fish in summer, and then there is a stand where fish and market wagons stand.

Q. Do you know whether they have any difficulty in supplying the demands of people?—A. Yes, sir; I know that they have to send to Philadelphia for fish; that the market does not supply the demand; does not begin to.

Q. How long has that been so?—A. I cannot tell the exact length of time.

Q. What fish do they get from Philadelphia?—A. They get the same fish that we ought to catch here.

Q. The same variety of fish?—A. The same variety of fish we ought to catch here. I am in the Stockton Hotel now, in the steward's department, and twice this summer we have had to order fish from Philadelphia. Of course we have to pay more for fish when we order them from there.

Q. Besides, you do not get them in as good condition?—A. No, sir;; we have got sheepshead, bluefish, and weakfish from Philadelphia already this season.

Q. How is it with bluefish; do they require some kind of preservative at once to keep them in good condition, or will they keep fresh without

that? Suppose a bluefish is thrown into one of these bins on a menhaden steamer with the mass of the fish, how long will it keep?—A. Not very long. It could not possibly keep very long in one of those bins, I should not think. I have never seen them in the bins.

Q. The heat of the fish alone would destroy the fish, would it not?—A. I should think so, for they are an oily nature themselves and the other fish are oily.

By Mr. MORGAN:

Q. Have you ever observed what the feed of the menhaden is?—A. No, sir; never inquired.

Q. You do not know anything about that?—A. No, sir; I don't know.

Q. Why do you suppose they come inshore here, commencing the latter part of April or the 1st of May, and continue until the 1st of November?—A. I suppose their food is close inshore, and that brings them in here, but I do not know what their food is. I know that I never heard of but once in a while one being caught with a hook and line, and then it was purely accidental, because I have thrown all kinds of bait in with them where they were very thick, and they would not touch it.

Q. Don't you ever examine the stomach to see what they feed on?—A. No, sir; I have cut them open, but I have no recollection of what was in them. I recollect the entrails are dark and something that looks like the gizzard of a chicken in them. Their entrails are very dark—different from other fish. I don't think I ever found out what their food was if I ever did examine them.

Q. Is there much seaweed off this coast?—A. Yes, sir; there is seaweed that goes out the inlets, and every ebb-tide of course circulates up and down the coast. You go to the mouth of an inlet in ebb-tide and you find what we call sound-grass and cape-grass, seaweed, oyster-grass, every tide.

Q. That comes from the sea?—A. Yes sir.

Q. Nothing grows in the sea?—A. Nothing close inshore of a vegetable nature that I know of.

Q. How far out would you go before you found something of a vegetable nature?—A. I do not know any place except Five Fathom Banks. You find sometimes there a weed that grows on the bottom, and now down here to the southward, about Indian River, there is a vegetable that looks like red corn. It is soft, and after a while it becomes petrified, more like rock.

Q. Are there many jelly-fish on this coast?—A. Yes, sir; a great deal.

Q. An unusual amount?—A. I am not acquainted with other coasts, but I know there is a great deal here.

Q. At what time of the year does a jelly-fish spawn?—A. I do not know what time they spawn. I know that along maybe in the middle of July they commence to be thick in the water and last until probably September—until the weather begins to get cool.

Q. What becomes of them then?—A. I cannot tell you.

Q. They do not migrate, do they?—A. I cannot tell you. I do not know anything about them.

Q. They have very little capacity for transferring themselves from one locality to another?—A. They cannot get along very fast.

Q. They are slow?—A. Yes, sir.

Q. They would not be apt to migrate like the menhaden or shad, or anything of that sort?—A. No, sir.

Q. Now, when the jelly-fish are plentiful in these waters, do you find the menhaden about?—A. I could not tell you about that, because that

is just the season of the year that I am busiest. The jelly-fish, I think, are the thickest about the middle to the last of August, in the hottest weather we have, and then in September again the weather begins to get cool, the nights begins to get cool, and I think they are not as plentiful then as they are in hot weather.

Q. Now describe to the committee as well as you can your observations upon the habits of the jelly-fish, if it has any habits. I mean, now, in reference to its staying upon the surface of the water, how deep in the water it stays, if it attaches itself to the bottom, and anything of that sort?—A. All I know about the jelly-fish is that I have seen them in the water. There are different varieties of jelly-fishes. There are some that are round and some oval, as large as the rim of my hat, and the upper part has a convex surface and the lower part is slightly concave, and there seems to be arms hanging down from the center or near the center of the jelly-fish, and there are red spots in them that look like blood—one variety. Then there is another variety, smaller, that has black spots, or dark spots, not black. Then there is another variety still that are just little round balls, oval-shaped. You take up a bucket of water and pour it on the deck of a vessel and there will be hundreds of these little jellies. I don't suppose they are jelly-fish; don't know that they are jelly-fish.

Q. How large would they be on an average?—A. About half an inch in diameter one way and three-quarters of an inch long.

Q. Do they attach themselves to some weed or rock or shell, and float in the water?—A. I never found them attached; don't know anything about how far down they go. I have always seen them on the surface, and have caught them by throwing a bucket overboard and drawing up a bucket of water and throwing it on deck.

Q. Now, just off this coast where would you say the jelly-fish are most abundant; within a mile, two, three, five miles?—A. I cannot tell.

Q. Do you observe any difference?—A. No, sir; I have seen them right alongshore. I have seen them all along in the breakers and washed up on the beach.

Q. Do you know whether those fish are much under the control of the winds with reference to their distribution?—A. No, sir; I do not. They get themselves up sometimes in the shape that the sailors call Portuguese man-of-war, with a sail, but I do not know as they have any effect on the winds or the winds have any effect on them. I have seen the Portuguese man-of-war twice only.

Q. They are jelly-fish, are they not?—A. Yes, sir; I think in natural history they are called *nautilus*.

Q. Have you ever known of any fish preying upon the jelly-fish?—A. No, sir.

By Mr. CALL:

Q. Have you ever seen any fish eat the jelly-fish?—A. No, sir, I never did.

By Mr. MORGAN:

Q. The jelly-fish has a good deal of oil in it, has it not?—A. I could not say that it has. I never tried to find any oil in them or anything of the kind. I know when I was a boy the boys used to say that the jelly-fish would sting you, and I have always tried to avoid having them touch me or touching them.

Q. That, I suppose, is not so. I suppose the sting-ray would.

By Mr. CALL:

Q. Do you have the sting-ray?—A. Yes, sir.

By Mr. MORGAN:

Q. In all the observations you have made about the menhaden, you have not ascertained anything about what it feeds on, or anything of that sort?—A. No, sir. It has always been my supposition that they were a suction fish that sucked in food from the stuff that collected on the surface of the water. They are a top-water fish, and I suppose there is something that comes out of the inlets that they suck in and feed upon.

Q. Do you think they run inshore in consequence of hunger or because they are chased in by fish of prey, by game fish?—A. I think they come in shore because their food is there.

Q. That is your opinion?—A. Yes, sir. Now, when I used to go across the bay a great deal they used to be more numerous right in the mouth of the bay from here to Cape Henlopen, a few miles up the bay and a few miles out than anywhere else I ever saw them.

Q. They were more numerous when they used to be on this coast than anywhere else you remember?—A. Yes, sir; they appeared to me so. I always thought I saw more there than anywhere else.

Q. Have you any reason to believe that the fishing for menhaden with purse-nets has the effect of frightening them permanently away from the inlet and bay?—A. I don't know that it frightens them away. My idea has been that they were catching them up so fast that they had caught them nearly all up along the coast, because I have noticed the last two years that I have not seen a school of menhaden full grown. They appear to be very small, the size they would not catch at all a few years ago. Standing out on the end of the pier here is the only way I have noticed them for the last two years, and I have seen them and tried to catch them for bait for drum, and all we would catch would be small, half grown. I have not seen any full-grown menhaden off here for two years anyhow.

Q. Have you any idea how long it takes a menhaden to get its full growth?—A. No, sir.

Q. Have you ever seen one that weighed more than a pound?—A. Very little. I should judge that a full-grown one would weigh about a pound. They might in the fall when they are very fat and oily weigh more than that, but I should judge that would be about the weight.

HENRY W. SAWYER sworn and examined.

By the CHAIRMAN:

Question. Where is your residence?—Answer. Cape May City.

Q. How long have you lived here?—A. Since 1848.

Q. What is your occupation?—A. Keeping a hotel.

Q. During that whole period?—A. No, sir; since 1866.

Q. Prior to 1866 what was your occupation?—A. I am a carpenter by trade, and worked at my trade. From 1869 to 1873 I was superintendent of the life-saving stations of the coast of New Jersey, which is where I received what knowledge I have of this fish question.

Q. During the time you were in Government service?—A. Yes, sir.

Q. What years does that cover?—A. From 1869 to 1873.

Q. Have you had any experience in fishing before or since that?—A. Yes, sir; there is no one who lives in this county but what is more or less interested in the fish question.

Q. Now, we are here to ascertain as far as we may whether there is a scarcity of foodfish along this coast, and, if so, what are the causes that have produced the scarcity. You may answer this general ques-

tion in your own way, giving your theories.—A. There is a scarcity of fish which is used for food, which in my opinion is caused by the wholesale slaughter of what is called the menhaden or bony fish—they go by either name with us—by the use which has been made of them for the purposes of oil and for manure by the factories which have been established within the last fourteen years. It is now about fourteen years since the first two factories were established both at Little Egg Harbor and Great Egg Harbor, and during the time that I traveled the coast and went from one station to the other I have seen hauls made, and on two occasions I have seen the fish delivered to the factories. The fish that were delivered at that time were delivered indiscriminately without any regard to what kind of fish they were. Upon one occasion at Little Egg Harbor the character of the fish which was delivered consisted almost exclusively of what is generally termed as weakfish; in Cape May County we call them bluefish. I used to go clear up to Sandy Hook, and on one occasion when I passed the other factory I saw a whole lot of drum, perhaps not less than between two and three hundred—giving an approximate amount, I did not count them—that were delivered at that factory. Those are the two instances which of my own personal observation I can testify to. It happened to be my lot to see that twice, to see a lot delivered at each factory.

Q. When was that?—A. That was in 1872. I think it might have been in 1871. I have never charged my mind with it. I recollect it.

Q. Has the use of the purse seines increased since that time?—A. I think, twenty fold since then.

Q. In this bay you mean?—A. On our coast. It was a rarity at that time. They did not employ steamers, then, at all. They employed, at that time, small schooners, fishing smacks.

Q. How many steamers have you seen on this coast at one time?—A. Day before yesterday we counted seven right here between Hereford Inlet, as far as we could see with a glass, and Cape May light-house. I think there are two or three, now, within sight this morning. Factories are being established now upon every point every year more and more. For instance, two factories have been established now at Cape Henlopen this year. This is their first year, and, as a matter of course, steamers are sent out from this point to catch these fish, and, when the net is laid, it does not make any difference what fish they kill. They do not make any discrimination; they take all.

Q. If they surround a school of fish of all kinds, and draw the purse-net around them, would it be practicable to undertake to separate them, assort them?—A. I do not think it could be done. If it was undertaken to be done, the fish would be so injured that they would die.

Q. Would not that consume more time than they could afford?—A. Of course it would not make it a profitable business, and it would be against human nature to expect such a thing.

Q. Do you know of any other cause for the decrease of the foodfish, except this purse-net fishing?—A. I do not. I know of no other cause but that.

Q. To what extent has the supply of foodfish diminished during your acquaintance here?—A. I should say there is not one-third; well, I do not suppose, one-sixth. That is really a question I cannot answer with any certainty, but I should say the supply of foodfish is not one-sixth of what it was twenty years ago.

By Mr. MORGAN:

Q. What sort of fish is it that you call the taylor in these waters?—

A. I hardly know that I can describe the taylor. It is a large fish. I suppose it would weigh from five to ten pounds, if I am not mistaken in the kind you mean. Fish, you know, have different names at different places. For instance, in bluefish there are different terms. The fish we call mackerel are called bluefish further north.

Q. It is my impression that what you call a snapping-mackerel here is called a taylor in the Chesapeake Bay?—A. I have heard of the taylor, but I can hardly describe it. I think I have seen it, but I am not sufficiently acquainted to say.

Q. In the Washington market they are sold as salt-water taylor and fresh-water taylor. My impression is that they are simply bluefish of different size.—A. Well, we have them here that weight up to ten pounds.

Q. That is, you mean bluefish?—A. Yes, sir.

THOMAS J. HORNER sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Atlantic City.

Q. How long have you lived there?—A. Eight years.

Q. What is your occupation?—A. Captain of a yacht; fisherman.

Q. How long have you followed that business?—A. Since I was six years old.

Q. What is your age?—A. I was thirty-five the 6th day of July.

Q. Where have you been engaged mainly fishing?—A. In Little Egg Harbor Bay the greater part of my life; for eight years I have fished every summer at Atlantic City.

Q. Has the supply of the fish used by the people for food increased or diminished during your experience?—A. They have decreased. They have also increased in these last four years. Previous to that they diminished. When I first followed fishing if we did not catch a hundred fish a day and come along the street with less than that the old fisherman's song was sung to us. I think it is seven or eight years ago that father and I built the first fish factory that was ever built on the coast of New Jersey.

Q. You mean a menhaden factory?—A. A menhaden factory. It was built for a man that belonged in Connecticut. We were the contractors to build the house. The first load of fish that came to that factory was a load of menhaden; the second load was a load of weakfish, food-fish, a full load. The next load that came to that factory was a load of drum-fish. They were thrown into the waste heap as the weakfish were. I said to my father then, "Father, we have done something we ought not to have done. We have done something that we thought was going to benefit the community which will never benefit it." "Why," he said, "boy, how you talk." "Well," I said, "it is so. In less than three years from now in our little village where we used to get fish given to us for nothing we will pay ten cents a pound for them." In less than three years we could not catch a fish unless we pulled it out from under a sod where he had hidden himself. Then myself and others tried to get a law through the legislature of New Jersey, which we did, and to day, since that law has been passed, you can catch all the fish in our channels you want. We ask no better fishing than we have got in Atlantic City now, from the first day of June until the first day of September, and the very instant they cast those nets in those waters then our fish are gone again, and we cannot catch them unless we go outside.

By Mr. MORGAN:

Q. You say you ask no better fishing than you have from the first of June?—A. They stop the net fishing on the first of June, and then the fishing begins.

By the CHAIRMAN:

Q. You mean your law stops it?—A. Yes, sir.

By Mr. MORGAN:

Q. Do your observations apply to bluefish; do you mean you catch bluefish?—A. No, sir. These are what we call bonito, flounder, weakfish, and blackfish, kingfish.

Q. What I want to get at is this. All these fish that you have named as being plentiful inside are fish that always make for the inlets, are they not?—A. They are, if they are let alone in there.

Q. They are fish that naturally resort to the inlets?—A. Yes, sir.

Q. They go in there to feed?—A. Yes, sir.

Q. And go up the shallow waters?—A. Yes, sir; the creeks and shallow waters.

Q. Run back to feed in the marshes?—A. Yes, sir, some. The smaller fish of course go into the shallower waters.

Q. Now, as I understand you, your New Jersey law has had no outside effect to protect the snapping-mackerel, the bluefish proper?—A. Not outside, no, sir. I am coming to this outside fishing in a minute.

Q. That is where I want the distinction in your testimony?—A. Now, last summer, I think it was the first or second day of August that I caught the first fish that was caught at Atlantic City outside the beach. The second day I was out we could catch all we wanted, and the third day, and so on until the middle of the month, and we had lots of fishing. One day I was out with a party and we were catching fish right smart. I looked up the beach and saw eight of these menhaden fishermen coming down, steamers. I said to my party then, "Now, gentlemen, if those steamers cast their nets anywhere around us I will not assure you a fish, but if they go on we will still have the sport we have now." One of them came within 300 yards of me, and cast his net among a large school of bunkers. In less than fifteen minutes after he cast his net there I never caught a fish. After that I never caught a fish and on that range I never caught them the whole summer, and the more they came in September to fish, the scarcer the fish got.

Q. Did they continue to fish during the summer?—A. Continued to fish until we could not catch one.

By the CHAIRMAN:

Q. They kept fishing until the season when the menhaden go away?—A. Until November I think.

By Mr. CALL:

Q. Do you fish in your yacht with line?—A. Yes, sir. Now they scoop everything there is on the bottom; they take the feed on the bottom, I mean.

By the CHAIRMAN:

Q. They all go to the bottom, do they?—A. Yes, sir; they all go to the bottom and scrape up everything that is on the bottom. They have what they call a tom that weighs 150 pounds, I think, and they cast that overboard, and that runs around their lines and they work around and take everything up right clean; fish right on the bottom.

Q. What nets did they use when they began the manufacture?—A. They call them purse-nets.

Q. The nets used were purse-nets and the vessels were sailing vessels?—A. Yes, sir.

Q. They had to pull the nets in by hand?—A. Yes, sir.

Q. Now it is all done by machinery on board the steamers?—A. I think it is, aboard these steamers.

Q. And done much more rapidly, I suppose?—A. Much more rapidly; yes, sir.

Q. Whose factory was it that you built?—A. James E. Otis'.

Q. Is the business continued by him yet?—A. Yes, sir; they have three factories right close together where they used to have one, in Little Egg Harbor.

Q. Do you know how many fish they use there?—A. I do not. There are four factories there, one back on the main land.

Q. About what quantity do they use in the season?—A. I could not tell, but I think, if I am not mistaken, one boat told me once that they caught three millions. If I am not mistaken one boat caught three million in one year.

Q. One of the boats?—A. One of the boats; I will not be positive about that.

Q. How many is the most you ever saw fishing there?—A. I saw fourteen, I think, is the highest.

Q. You have seen fourteen at one time?—A. Yes, sir.

By Mr. CALL:

Q. How can they tell how many fish they catch?—A. They have a car that holds so many thousand; they estimate them by the car.

By the CHAIRMAN:

Q. Do you know of any other reason for the food-fish being scarce except the use of these purse-nets?—A. No, sir; no other reason. We had plenty of fish before they came. They catch sheephead and all kinds of food-fish, and my opinion is the same as it was in regard to the fishing inside there, that if something is not done we will not have food-fish to supply the demand, nor one-third enough. I spoke of the three years when they went up from fifteen to twenty cents a pound. Now you can buy lots of them for three cents a pound inside.

Q. What are bluefish worth a pound now?—A. About ten cents a pound.

Q. And weakfish?—A. That is what I had reference to. All fish are about one price.

Q. What are sheephead worth?—A. Sheephead I think are about 12.

Q. And striped bass?—A. Ten.

Q. What is salmon worth?—A. We catch none here.

Q. Do not they have any here?—A. No, sir.

Q. They are not brought to your market?—A. No, sir.

By Mr. MORGAN:

Q. Do you know what the menhaden feeds on?—A. I could not say.

Q. You do not know?—A. No, sir; I do not know what they feed on. They feed on suction of some kind in the water; they have no teeth.

Q. What kind of feed do you think they feed on; you say you do not know, I ask your opinion about it?—A. Well, I do not know; I have seen them when they have been cut open with something inside similar to green moss.

Q. Seaweed of some kind?—A. Yes, sir; kind of a green moss.

Q. Something that grows on the bottom?—A. No, sir; I think they get everything they eat on the surface of the water.

Q. Does this moss float on the surface?—A. Yes, sir.

Q. Floats on the surface and grows in the sea without any root?—A. Yes, sir; I think the feed the menhaden gets raises from the bottom, they skim it off the water.

Q. Do you know anything about the jelly-fish?—A. No, sir; no more than to see them along the surf.

Q. In the surf?—A. Yes, sir.

Q. Do you find them out at sea too?—A. Yes, sir; see lots of them at sea.

Q. Do you mean a great amount?—A. Yes, sir; great quantities of them.

Q. What time of the year do you see them?—A. I have seen them all times.

Q. In the winter?—A. Yes, sir; I have seen them in the winter-time. I will not be positive what part of the coast I have seen them in the winter. I have traded from Hatteras to the Penobscot River and Bangor, and I have seen them along in certain times of the year, but what part of the coast I will not be certain.

Q. Do you know any fish that eats the jelly-fish?—A. I do not. My opinion is that there is no fish that eats them.

Q. None at all?—A. No, sir.

Q. Upon what is that opinion based?—A. Because they are something that I think a fish would not eat on account of their slimy, stinging nature.

Q. Stinging?—A. Yes, sir. You touch them on your flesh anywhere and they will smart just the same as a mustard plaster. We never touch one if we can avoid it. For that reason I do not think a fish would eat it.

Q. When you speak of the quantity of jelly-fish that you have seen off the coast here, do you mean to say that it is a very great quantity?—A. I have seen them so thick in front of the Burlington County line that the boys on the beach could not go in bathing for them.

Q. How are they now?—A. I could not tell. I have seen several this season but not any quantity.

Q. Do they vary much in size?—A. Sometimes they are very large.

Q. When the sea is rough does it wash them about a good deal?—A. I have seen them all washed to pieces.

Q. Just by the waves?—A. Yes, sir.

Q. They are tender, then?—A. They are very tender; you can take one in your hand and it will all fall to pieces.

Q. Oily?—A. No, sir; it is kind of a gummy nature.

Q. What season of the year is the jelly-fish most abundant here?—A. In the summer-time, warm weather.

Q. How late do they stay?—A. I have seen them here as late as November.

Q. In the winter-time you do not know whether they go to the bottom or go off?—A. No, sir.

Q. Have they any means of moving from point to point?—A. Yes, sir.

Q. They can swim?—A. They can swim just the same as any other fish.

Q. But not rapidly?—A. Not very rapidly, no, sir. They have a bunch something like that [indicating] and it expands. They will shut themselves up in that shape [indicating] and then they will expand and push

and close again; that is just about the motion they have. I have watched them and seen them swim many times, just about 3 or 4 inches each time they expand, something similar to a snail motion.

Q. Does the movement occur at the time of the expansion?—A. At the time of the expansion.

Q. Just as they expand they move on?—A. Yes, sir.

By the CHAIRMAN:

Q. Can they move at all unless they are on the bottom?—A. Yes, sir; right in the water.

By Mr. MORGAN:

Q. They have the means of directing their line of motion?—A. Yes, sir; they can direct their line of motion the same as any other fish, not very swift.

Q. You do not know any use in the world that they are applied to?—A. No, sir.

By Mr. CALL:

Q. Have they got any eyes?—A. I do not know.

Q. Do you see any evidence of life about them other than their motion?—A. Nothing, only just their motion.

AMASA BOWEN sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Atlantic City.

Q. How long have you lived there?—A. I have lived there about twenty-eight years.

Q. What is your occupation?—A. It has been oystering and fishing, and going to sea some from my boyhood. This last 13 winters I have spent in the life-saving station. I have charge of the life-saving station at the present time.

Q. Are you in charge of it now?—A. I have charge of it at the present day; yes, sir.

Q. What we want to know is whether the fish for the people, food-fish as they are termed, are more or less plenty now than they were years ago?—A. They grow scarcer, I think, every season; I am certain they do.

Q. What proportion have they diminished since you first became acquainted with the subject?—A. Well, ten or fifteen years ago I could go up the channel and catch drumfish, and take an evening tide and you might go up the channel and you could hear them the whole time drumming, as we call it. Now you might go up, backwards and forwards, the whole season and you will not hear a drumfish in the channel. They are entirely done away with, excepting once in a great while you catch one in the surf. We used to see them in the Great Bay.

Q. What drumfish do you speak of?—A. The black drum.

Q. Are they good fish to eat?—A. Yes, sir; very fine fish.

Q. How is it with the bluefish?—A. I used to take a morning like this with a good breeze of wind and the sea smooth and go out and catch forty to a hundred bluefish. Four years ago I followed it sailing a boat and seldom ever caught a fish, would not get more than eight or nine the best of days; sometimes none. These last two summers I have not followed it at all.

Q. Has the price of fish increased in the market there?—A. I do not know that it has much. There are a great many at it now fishing for the market, and I do not know as the pay has increased very much.

Q. Are all the fish that are needed there caught there now?—A. Pretty much. Once in a great while there is a storm or something so that they don't all get out fishing and they are scant of fish.

Q. What has led to this decrease of fish?—A. It is the supposition that it is these mossbunker fishermen.

Q. Do you think it a mere supposition?—A. I could not tell particularly. I have the same idea myself. Our people think so. I have that opinion.

Q. Do you know of any other cause?—A. I cannot account for it in any other way.

Q. How long is it since they began to use the purse-nets there?—A. It has been some eighteen years ago since they began to fish from Turtle Island, I guess.

Q. Has the use of the purse-nets been increasing since that time?—A. Yes, sir.

Q. How many have you ever seen engaged at once?—A. I suppose you could count seventeen or eighteen steamers some days last season besides the sailing vessels. I suppose there have been twenty-five to thirty sailing vessels and steamers in sight at one time off Atlantic.

Q. In sight of the city?—A. Yes, sir; right off the bar.

Q. How close to the shore?—A. Within two hundred yards of the bar.

Q. Was that the best fishing ground before they came?—A. That is about the best for weakfish. We seldom ever go over two or three fathoms of water; sometimes seven or eight.

Q. Do you know what they caught?—A. They caught then all kinds. One night a steamer come into the inlet because of a northeaster, and I was talking with one of the men on deck. He said they were loaded and ready to go up, but they would make a harbor that night. Their load ran more than one-half to weakfish. He said he would be glad if they were out and they had the other fish in their place. He said when they caught them they had no time to assort them.

Q. So they were taken to the factory?—A. Yes, sir; they were taken to the factory.

Q. How many factories are there on this coast, New Jersey?—A. There are three at Little Egg Harbor, and one at Great Egg Harbor. There are none this side of there I think. How many there are above I cannot say. I believe there is another building at Great Egg Harbor.

Q. What did you do with your boat?—A. I used to sail parties, fishing.

Q. But when you found you could not make fishing profitable, what did you do with it?—A. After I got charge of the station I sold my boat.

By Mr. CALL:

Q. You attribute the decrease in the fish, then, to the menhaden fishing-boats?—A. I believe it is that, yes, sir. I cannot testify that I know it to be that, but that is the best of my knowledge.

Q. What is the difference, in your opinion, between the quantity of fish now and what was here before the menhaden fishing-boats commenced?—A. Well, there is the weakfish—

Q. Is there half as many or quarter?—A. Yes, sir; the weakfish holds out better than any. The bluefish, scarcely any would be caught along this coast since they came here.

Q. What do you call the bluefish?—A. Some call them the snapping-mackerel.

Q. What do you call the weakfish?—A. Speckled trout some call them.

Q. You do not call the weakfish bluefish here, do you?—A. No, sir.

Q. You think the bluefish have entirely disappeared?—A. Yes, sir.

Q. Are there half as many weakfish as formerly?—A. Yes, sir. You cannot tell so much about it, because there are as many fish come in as there used to be. There are a great many fishing; some go and do not catch any, and some will catch a great many inside. Since they broke up the seine hauling inside, it is good fishing.

Q. The fish, as I understand you, come from inside?—A. The fish all come along the outside, but they go up these channels in the evenings.

Q. And you catch them in the channels?—A. Yes, sir. Bluefish, though, are seldom ever caught inside; they are mostly out in the ocean. As to the black drum, I know that when I was up along the Great Bay you could go out a day like this and see acres and acres floating on the water, and now they have disappeared. Now there is not one.

Q. You attribute that to the menhaden-fishing?—A. I know that that is so, because they take up fourteen hundred at a haul and take them to the factory.

Q. What do you think of the quantity of menhaden as compared with formerly?—A. They are not so plenty as they used to be. They used to be in the bay, but you see very few there now.

Q. What is the difference, according to your opinion, in the quantity now as compared with formerly?—A. Now, there are not more than two-thirds of the menhaden in the bay—two-thirds less, fully.

Q. What do you attribute that to?—A. That must be because they are caught up.

Q. By the menhaden steam fishermen?—A. Yes, sir.

Q. Have you any idea where the menhaden spawn; where they come from?—A. No, I have not.

Q. Have you any knowledge of what they feed on?—A. I never knew what they do; never knew them to bite any kind of bait; never knew one caught on a hook; never heard tell of it that I know of. I have caught them while trolling for bluefish by hooking them outside.

J. J. GARDNER sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Atlantic City.

Q. How long have you lived there?—A. Twenty-seven years.

Q. What is your occupation?—A. My avocation now is the business of insurance and real estate. In early life I was a fisherman.

Q. How many years did you follow it?—A. About five.

Q. Have you had any experience in fishing since?—A. I fish every summer, more or less, by way of pleasure.

Q. So that you have kept up an acquaintance with the condition of the fisheries there?—A. Yes, sir.

Q. We are here to inquire, first, whether the quantity of food-fish has increased or diminished during this period of time. What do you say upon that question?—A. I think it has materially diminished, especially as to some kinds.

Q. What proportion would you estimate? If you make distinctions, name the different varieties of fish.—A. The fish which in the waters of our county could always be most certainly relied upon for supply are

what are locally called weakfish. They have diminished in supply, but less perhaps than others. Kingfish, or heck, have diminished until they are almost a rarity now. The drumfish there used to be a certain supply of in May and June of every year, particularly our inside waters would be full of them.

Q. The black or red drum?—A. The black drum principally. The red drum seldom would come inside. I have not heard of a black drum inside for seven years. I have not heard of one being caught in the channels for a number of years; now and then one or two are caught along the beach, in the surf.

Q. Are there any other varieties you can name?—A. The bluefish I think are much more scarce than they used to be.

Q. Have you any opinion as to the cause of this diminution? If so, state it.—A. A large number of those fishes, in my judgment—a judgment, however, based upon hearsay and common report—are caught up by the purse-nets from the steam vessels. The drum, I think, they have almost exterminated on our coast.

Q. Do you know whether they go to the bottom with their purse-nets?—A. I do not know, but where they fish a good deal of the time they must go to the bottom, because they fish near the beach where the water is shallow.

Q. Has that business of using purse-nets diminished or increased?—A. Judging from what we see, it is continually increasing.

Q. How many have you ever seen at one time on your coast?—A. I saw twenty-one steamers in one day; counted them.

Q. When was that?—A. I cannot say whether it was last summer or last summer a year; but within two years.

Q. And any sailing vessels at the same time?—A. Not with us. There are factories within ten miles each way of us. Those sailing vessels are seldom noticed off with us.

Q. How many menhaden factories do you know of on the coast?—A. I know of three, two at Little Egg Harbor and one at Great Egg Harbor. The large number of vessels which we observe are not fishing for factories on the New Jersey coast. They come from the east; doubtless as far up as New York.

Q. They come from Rhode Island, as they themselves have testified. The Churches send their vessels here. Aside from the diminution of food-fish by being caught and used in manufacture, would not the destruction of the menhaden alone have an effect to diminish the food-fish?—A. The destruction of the menhaden alone would have the effect of diminishing the bluefish. It would have the effect of diminishing the red drum, and probably the large weakfish. In fact, all fish that bite well to fish-bait, which includes even the sea bass. One other thing about the dragging of nets about these waters which I think is very imperfectly understood. It is my opinion that the food-fishes could be driven away from this or any other coast without ever catching—that is to say landing—one of them, simply by laying a net around them and hauling them together, even if you turned them out. The fish is wild; they go from fright. I know that when I followed the business of fishing and when we thought it was right, although I have since helped pass a law in the State to prevent it, we would lay a net around the sheepshead grounds in the water of Atlantic County and while attempting to land it on the steep bank get it fast under a sod and lose every sheepshead, and yet there would be none caught for weeks or more on that ground; possibly one, a stray one, a stranger, but practically broke it up.

By Mr. MORGAN:

Q. What is the food of the black drum?—A. The food of the black drum in so far as we know is principally clams and mussels.

Q. They are found more abundantly in the inlets than out to sea, are they not?—A. No, sir; they are found more abundantly at sea. They come in to feed along the surf, but we have out in the ocean a mud bottom that is full of these little sea clams, and you find them there. The black drum, besides eating clams and mussels, more particularly is a fish which more than any other food-fish that I know of will lie on top of the water. What their food is there we do not know, as we do not know very much about the food-fishes after all; but the black drum, when not feeding, more than any other fish that I know of, I repeat, will lie at or near the surface of the water.

Q. Do you know where the spawning ground of the black drum is, whether it is off-shore or deep water?—A. I do not know. I never saw a black drum caught in these waters weighing less than six pounds. I heard of one weighing only three, but did not see it.

Q. Do you know anything about the spawning ground of the weakfish?—A. No, sir, not to know; and yet we are reasonably sure that the weakfish spawn here in our waters. The weakfish comes in in May, with the large roe ripe enough to spawn.

Q. Does it go out without it?—A. It goes out without it.

Q. Where does the red drum spawn?—A. I do not know. I never knew a red drum to be caught inside of the beach.

Q. The snapping-mackerel, where does that spawn?—A. I do not know; do not think they spawn in these waters.

Q. Where does the menhaden spawn?—A. That is also a mooted question. My own opinion is, but I cannot give it as testimony, that these fish that you have mentioned, that is, the drum of both kinds, the menhaden and the bluefish, spawn in the Gulf. In fact, there are evidences that the fish that inhabit this coast in many instances go South, as I suppose, really go off to the gulf—warm water.

Q. The Gulf Stream?—A. Yes, sir.

Q. Have you any knowledge at all of the food of the menhaden?—A. Knowledge; no.

Q. You never examined it to ascertain what they feed on?—A. No, sir.

Q. Do you know whether, in swimming, they keep their mouths open or shut?—A. They keep their mouths open most of the time.

Q. In swimming?—A. Yes, sir.

Q. You infer, I suppose, that they do that in order to get feed?—A. I do. This salt water has in it at all times, certainly in warm weather, invisible to the naked eye, an amount of spawn of the shell-fish much greater I suppose than any one who has not investigated has any idea of, particularly the spawn of the barnacle, which adheres to ships, vessels generally. I think it is safe to say that you may pump a thousand gallons of salt water in a tank and insert in it rods now, and there will be attached to those rods in the fall a half bushel of small barnacles. That much spawn will be in that quantity of water which will attach itself to those rods and grow in that time to a small size. I simply mean to say that the quantity of spawn invisible to the eye in the salt water is astonishing.

Q. Do you know whether there are any sea plants or mosses in the waters off this coast upon which fish feed?—A. I do not know of any. I am not positive about it, but I have thought I have found in the weak fish what we call cabbage, sea cabbage.

Q. Have you ever seen anything of the kind in menhaden?—A. No, sir; I never examined the menhaden with anything of the kind in them.

Q. The testimony goes to show very strongly that the menhaden make up into these waters comparatively poor, and go off fat, with the roe pretty well developed. Does that agree with your opinion?—A. It does.

Q. And experience?—A. And experience. I never knew a menhaden to bite any solid substance. The herring and shad occasionally will.

Q. Do you know any fish that feeds upon the jelly-fish, or upon the spawn of the jelly fish?—A. No, sir.

Q. That ought to be pretty rich food, ought it not, for fish?—A. Yes, sir; I should suppose it to be very rich.

Q. Is there a great deal of it in the waters here?—A. There is.

Q. And does that appear in the winter or summer time?—A. In the summer.

Q. And disappears in the winter?—A. I do not recollect ever seeing jelly-fish in the winter.

Q. If there are fishes that feed upon that food it is simply to supply something else, is it?—A. It is.

Q. Or upon the spawn of it either if it has a spawn. I suppose it propagates by spawn?—A. I suppose so.

Q. The reason of my inquiry is that I find that that exists in a larger mass here, it appears, than elsewhere?—A. That exists in a larger mass than anything that is possible to repeat. We find with the large mass of food, the substance after all is the invisible spawn in the salt water, of shell-fish, and more especially the barnacle. The water is literally impregnated with it.

Q. You speak of the legislation of New Jersey upon this question. You are a member of the Senate of New Jersey?—A. Yes, sir.

Q. Was there a decided vote upon the passage of the bill prohibiting the purse-net fishing within three miles of the shore?—A. There was quite a decided vote upon it, and yet the vote was not so strong as it would have been, because it was understood that the attorney-general was going to give an opinion that it was unconstitutional.

By the CHAIRMAN:

Q. He did do so, and the governor adopted it?—A. He did do so, and the governor adopted it.

Q. There were three bills, were there not?—A. Yes, sir. The first thing was, of course, to extend the county lines. You see the county lines all stop at the sea shore, and in order to get jurisdiction we must first run the county lines out and then pass the bill.

By Mr. MORGAN:

Q. This subject of the loss of food-fish on your coast is exciting great attention in all parts of the State?—A. Yes, sir.

By Mr. CALL:

Q. Is that the theory, that the State had no power on account of the county lines?—A. That is what the attorney-general finally decided. I was, perhaps, the only person who took the other side of the question in the argument; that is, who attempted to argue it.

Q. He held that the county line was necessary to give the State power to legislate?—A. He did not hold that, that I know of; but we wanted all our present fish laws to apply, and they all provide for trial before the courts of the county in which the offense is committed.

The CHAIRMAN. The term county line is used as synonymous with State line in that connection.

Mr. MORGAN. The State would be apt to exercise jurisdiction on any part of its territory.

The WITNESS. I have not the case at my finger's ends, but just that sort of a difficulty occurred in enforcing the clam law in Raritan Bay in this State. The case had to be brought before a circuit of some county, and no county court could take jurisdiction, because the county line had never been run over that territory. It would be very easy to provide, of course, that some other court would have jurisdiction, but it seemed to be the regular way, more in harmony with the system, to extend the county lines.

By Mr. MORGAN:

Q. I understand you to give it as your decided and fixed opinion that the purse-net fishing is the real cause of the continued decrease in the quantity of food fishes that are on your coast here?—A. Yes, sir; that is my opinion, and that it is more perhaps by fright than the amount that are taken and destroyed. When menhaden are found here upon the coast and there is a fleet of steamers, as I have seen, numbering more than twenty, following them right up, the matter of that many steam vessels in one group in shallow water would frighten them away themselves, if it was not for the nets.

Q. How near do they come to the shore?—A. Just as near as the fish come, provided there is water enough to float them. They follow them right up.

By Mr. CALL:

Q. They follow them day after day, do they?—A. Yes, sir; day after day, until they load them.

By the CHAIRMAN:

Q. Are you of the opinion that the menhaden run to the shore to escape pursuers?—A. If they come all the way to the shore. The menhaden, I think, allows itself to drift very much with the currents after it comes to the coast.

Q. Have you ever seen them mangled; cut to pieces?—A. I did, on one occasion, see them driven on shore at Absecom beach, in quantities greater than I would like to undertake to estimate, and the bluefish were there with them. That was a very large school fleeing from bluefish.

Q. And they were injured; cut to pieces?—A. Numbers of them.

By Mr. CALL:

Q. Does not the porpoise pursue them? You have porpoises, I suppose, in great quantities?—A. Well, we have some porpoises, but not great numbers. I do not think the porpoise pursues them. The comparative number of sharks or porpoises, or any such fish in these waters, is so small that all they could eat would be comparatively few, and they do not seem to be satisfied with that kind of food; there is other food they like better. The shark and porpoise will leave the menhaden to go inside, apparently preferring crabs or something of that kind.

Q. Have you stated anything about what you think would be a proper remedy for the injury caused by the menhaden fisheries to the food-fish; whether a law prohibiting the catching within a certain distance would be effectual?—A. A law prohibiting the fishing within a certain distance of the shore would be beneficial. A law limiting the

time that they would fish would be beneficial. Of course, to stop it altogether, which is perhaps impracticable, would be the best thing. In so far as the coast of New Jersey is concerned, it would be sufficiently protected if steam could not be used in the business. The sailing vessels could do us very little harm. They cannot move with great rapidity; they cannot make many hauls in a day; they cannot follow these fish off and off and off and make a harbor again that night, no matter where the wind is, and they are not near so frightening a thing themselves as a steamer is.

By Mr. MORGAN:

Q. Do these steamers lie out on the ocean at night or come in?—A. They do both. If the sea is a little heavy, the weather a little bad, or if the tide happens just to suit them, they run into the harbor at Atlantic City.

By the CHAIRMAN:

Q. Have you had any there this season?—A. I have not seen one inside, that I remember. I have seen a number outside. If steam was not used in the business, we think we could stand all the damage they could do with sail-vessels.

By Mr. MORGAN:

Q. I suppose you are still of the opinion that your State has jurisdiction?—A. That is my individual opinion; but apparently, in the face of the attorney-general, it does not amount to anything. I gave my views at length once before a legislative committee, and at the conclusion of it the counsel who represented the menhaden men said to me quietly: "You are right; there is not any mistake about that, but on questions of this kind the United States court never allows itself to be ousted of jurisdiction; so we have you." That seemed to be his view. My recollection of the opinion of Attorney-General Stockton is that it is very forcible in the mass of authorities, but that all those decisions were based upon assumptions of false reasoning. That may sound like big language, but they did not seem to me, any of them, to go to the beginning.

The CHAIRMAN. All concede that the State has jurisdiction over the waters within the bays or streams, or what is termed the *fauces terræ*; that is, so much of the ocean as is covered by a line where you can see across from point to point with the naked eye; that seems to be the theory.

The WITNESS. I never could see how the courts, if they go to the bottom of it, get away from this view. I think that each of the thirteen colonies took sovereign jurisdiction, and when the courts take it away from us they must point out by what act we surrendered it. We have never done so. They say we have not got it, or, in other words, the United States have it; but they do not tell us how or where they got it.

SAMUEL G. GANDY sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Cape May Court-House, 12 miles from here.

Q. What is your occupation?—A. I am a ship carpenter by trade, fishing part of the time, oystering part of the time; I have no regular business.

Q. How long have you followed the business of fishing?—A. Ever since I was a boy, more or less of the time.

Q. Where have you usually fished?—A. About our bays and outside along this sea-coast.

Q. Along this coast?—A. Yes, sir; in the bay here.

Q. Are the fish the people use for food more or less plenty than they were when you first knew of the condition of things here?—A. Well, I can say they are a good deal scarcer now than they were when I was a boy, or ten years ago.

Q. What difference would you estimate?—A. It would be a pretty hard job to tell what the estimate would be, because years ago some kinds used to be very plenty, and now there are none at all.

Q. What do you think has produced the change?—A. I think these nets along the shore had a good deal to do with it.

Q. The purse-nets?—A. Yes, sir. They work right along these inlets where the fish are apt to collect, and they break the schools and drive them into deep water all the time.

Q. Frighten them away?—A. Yes, sir; and catch them up together.

Q. Do you know whether they catch the food-fish?—A. I have seen some of them caught; yes, sir.

Q. I mean for their factories?—A. I have seen good fish put into the factories.

Q. What kind of fish?—A. The principal part that I have seen was pigfish; not along here; I have not seen them caught much.

Q. Where was that?—A. I never took the pains to go aboard of them. I have been fishing right close to them every year, and when I have been along down below here I have seen steamers come in with them and have looked at the cargo and have seen more of them any other, and some weakfish.

Q. What kind of a fish is the fish you first mentioned?—A. They are a small-sized fish.

Q. A good eating fish?—A. They call them hogfish down in Virginia. I have seen more of them caught than any other.

Q. How many of those steamers have you ever seen here on one occasion?—A. Well, from twenty to twenty-five. They would not be likely to concentrate, so you could see more with your eye; but if you go from beach to beach you could see them all along. Now, this morning I was down to our bay and could see them working right on our fishing ground, where we have been fishing for years.

Q. How many did you see this morning there?—A. Five or six. Yesterday I counted as much as eight or nine.

Q. Do you know whether they are catching fish this morning?—A. They would not be there if they were not. Last fall while we were fishing they were catching them then very plenty.

Q. Has the quantity of food-fish greatly diminished?—A. Yes, sir.

Q. You spoke of there being much less fish than when you were a boy, or less than ten or twelve years ago?—A. Yes, sir; there are scarce any now. You rarely see any fish now in some places where they used to be plenty.

Q. Do you know of any other reason for the decrease except the use of purse-nets?—A. I do not.

Q. The fish you do catch are healthy—apparently in as good condition as they were formerly?—A. Yes, sir.

Q. There is no disease among them?—A. I never have seen any disease. I do not know anything else to make them scarce.

By Mr. MORGAN:

Q. Do you know what the menhaden feeds upon?—A. I do not know that he feeds on much of anything but mud, slime, or a scum that is on the water; that is about all. You never find anything in them.

Q. And yet they get fat?—A. Yes, sir.

Q. They fatten on this coast, do they not?—A. Yes, sir. I never saw any bait that they take up—no kind of small fish or anything like that, and they will not bite the hook—no kind of bait and you never find anything in them but mud, except slime or scum or something like that.

Q. You find no remnants of shells or anything of that kind?—A. No, sir; nothing of that kind;

CHRISTOPHER LUDLAM sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Cape May Court-House.

Q. What is your occupation?—A. I am in the Life-Saving Service, and I make a practice of fishing.

Q. How long have you followed fishing?—A. Ever since I was old enough to fish. I have lived on the coast all my life. I have followed fishing all my life.

Q. What is your age?—A. Thirty-four.

Q. How long have you been in the Life-Saving Service?—A. About three seasons.

Q. Where are you located?—A. At Anglesea Station, No. 36, near Hereford Inlet.

Q. You have heard the questions put to the other gentleman who is with you, and can tell us all you know about the supply of food-fish from your first knowledge here to the present time, and the reasons why they have diminished, if you have any opinion about it?—A. My experience is that fish of certain kinds are a great deal scarcer. For instance, striped bass are a fish that are almost gone; they are very scarce. Weak-fish I believe grow scarcer yearly. There used to be for years a run of what we call snapping mackerel, bluefish properly, small-sized fish probably a pound to a pound and a half, come in our inlets and through our bays and thoroughfares. For years there used to be no scarcity of them at all. For five years I do not think I have seen a school of that kind of fish in our waters. That class of bluefish seems to be gone.

Q. They are the bluefish that inhabit the ocean waters, are they not?—A. Yes, sir; they are the smaller size.

Q. What do you think is the cause of it?—A. It is my humble belief that the purse-net fishing has more influence to break them up than anything else.

Q. Do you know whether they catch food-fish on those menhaden boats?—A. I cannot say that I know. I hardly ever go aboard of them. I see them fishing day after day; see them dipping the fish out of the nets and dumping them into the hold.

Q. Do their nets go to the bottom?—A. Yes, sir; they go to the bottom. They fish with us in shallow water, from three to seven fathoms; probably not as shallow as three fathoms.

Q. How many have you ever seen engaged in fishing at one time?—A. I do not know that I ever saw but about nine. I have seen that many, probably more. I do not take pains to count them.

Q. Are they engaged in fishing the present season?—A. Yes, sir; they are fishing now.

Q. How long is it since that class of steamers first came upon these shores for fish?—A. I do not hardly recollect. I do not think we had

steamers on our coast here longer than five years ago; probably not so long.

Q. What did they use before that? A. They used mostly open boats and small sloops and schooners; go out of the inlets fishing with small boats.

By Mr. MORGAN:

Q. Do you know what the menhaden feed on?—A. No, sir. I suppose they live by suction. What they get is more than I can tell you.

Q. They will not bite a bait?—A. I never knew them to.

BERKLEY, N. J., *July*, 16, 1883.

J. K. RIDGEWAY sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. I reside at Long Beach, opposite Barnegat.

Q. What county is that in?—A. Ocean.

Q. How long have you lived there?—A. I have lived on the beach seven years; in the village, thirty-nine years.

Q. What is your occupation?—A. My occupation was formerly fisherman. For the last seven years I have been keeping a club-house on Long Beach, as the agent for a board of underwriters.

Q. Is that a restaurant and club-house?—A. No, sir; it is owned by a party of brokers in Pennsylvania and New York—petroleum and stock brokers, and other gentlemen from Philadelphia.

Q. Do you fish more or less every year?—A. Yes, sir.

By Mr. CALL:

Q. What is the club-house for; what do they do?—A. Fish and shoot.

By the CHAIRMAN:

Q. A sporting club, I suppose?—A. A sporting club.

Q. The main object of our inquiry is to ascertain first whether there has been an increase or a diminution of the quantity of food-fish found in these waters along the New Jersey coast?—A. There has been a great decrease, especially for the last four years.

Q. Can you give an estimate, or opinion of the rate of decrease; the extent of it?—A. No, sir; I could not, except—. I scarcely understand your question.

Q. As to what rate of decrease; what proportion of decrease?—A. For what time, since when?

Q. Any length of time you choose to name; fix your own time.—A. Well, ten years ago, to go back that far, the bay and sea were both almost alive with these menhaden, and at that time there were thousands of these bluefish to be caught almost anywhere along the coast, and rockfish and striped bass; now there are none of either menhaden, bluefish, or bass of any account. I was formerly with a crew of six men fishing along this coast; followed it for five years and made it pay.

Q. As a business?—A. As a business. I shipped my fish to the Philadelphia and New York markets.

Q. What in your opinion is the cause of this diminution of fish?—A. It is from the constant fishing of these purse seines around the inlet.

Q. How long is it since they began to use those purse seines?—A. They were using them along here eight years ago, but they increase every year, I think, and now last year I counted as high as twenty-one steamers a day that loaded within less than two miles of the place where I reside.

Q. Do you know anything as to what they catch?—A. I have no certain knowledge; they catch anything they happen to surround, of course; they pick up everything.

Q. Whatever they surround is necessarily caught, is it not?—A. Whatever they surround they catch of course.

Q. Do their seines go to the bottom?—A. Their seines go to the bottom, anywhere along the coast where they are fishing.

Q. How near the shore have you seen them fishing?—A. On the outer bar, less than three hundred yards from the shore last week.

Q. How many have you seen at any one time this year?—A. Seventeen.

Q. Where were they from?—A. North, Sandy Hook, Fire Island, somewhere along there, I suppose.

Q. They all went north with their cargoes?—A. Yes, sir.

Q. Do you know that they were loaded up?—A. I do.

Q. About what tonnage were the vessels?—A. I scarcely know the tonnage of those steamers. I do not know what their carrying capacity is. They are the ordinary-sized fishing steamers, some quite large and some quite small. It is hard to determine what their carrying capacity is; I suppose probably two thousand bushels, the large ones, or more.

Q. Do you know of any other cause for the diminution of fish than the fact that they are being taken in quantities by these steamers?—A. No, sir; I do not.

Q. Has there ever been any malady in the fish here, disease that has led to their destruction within the range of your knowledge?—A. No, sir; not that I am aware of. At one time there was a terrible rush of these bluefish on the coast, and they drove thousands of bushels of these menhaden ashore, but that was somewhere between twelve and fifteen years ago.

Q. They simply forced them on the beach?—A. They simply forced them ashore, mostly menhaden.

Q. When was that?—A. They forced them into the coves where we had oysters planted, kept them hemmed in, and the bluefish kept there and left them there on the oysters and killed hundreds of bushels of oysters.

By Mr. CALL:

Q. Destroyed the oysters?—A. Killed the oysters where they laid and decayed, such quantities of them.

By the CHAIRMAN:

Q. What season of the year is the best time to catch striped bass?—A. We can catch them in the bay in August. I have gone fishing until there was no fish in September; fish for about thirty days, from thirty days to six weeks. For the last three years I have not put my net out.

Q. Striped bass are the most valuable fish you catch, are they not?—A. Yes, sir.

Q. Higher in the market than any fish except the salmon?—A. No, sir; salmon and sheephead and striped bass, I believe, are about the best. The sheephead do not feed on that kind of food, though; they feed on mussels and crustacea.

Q. Do striped bass feed on menhaden?—A. Yes, sir; the larger striped bass feed on menhaden almost exclusively.

Q. And menhaden were always plenty here as long as you remember until these steamers came?—A. Yes, sir.

Q. Every season?—A. Every season; and bluefish were plenty every season.

Q. They come and go together, do they not?—A. Yes, sir.

Q. That is, the bluefish follow?—A. The bluefish follow the menhaden.

Q. Is there any use made of the menhaden by the people?—A. Very little now, except late in the fall; they get very fat then, and the poorer class of people salt some of them for winter use.

Q. Salt them for family use?—A. Yes, sir.

Q. I am told that many years ago it was quite common?—A. When they are first salted they are a very good fish, indeed. I think quite equal to the shad.

Q. What time do they come in the spring?—A. It depends very much on the weather; generally the latter part of April.

Q. What is their condition then?—A. Generally thin.

Q. That indicates that they come from spawning somewhere, does it not?—A. The first fish we catch have the roe in partly spawned.

Q. In the spring?—A. Yes, sir; ready for spawning, partly spawned.

Q. Do you think they spawn here?—A. I think they spawn at sea principally; some of them spawn here. By the latter part of August we see schools of the young fry about an inch and a half or two inches long.

Q. Is not the roe in them in the fall before they leave?—A. There is a roe probably an inch long; the formation of the roe commences.

Q. Do you know the time of the growth of the roe?—A. No, sir; I do not.

Q. But you are quite sure the roe forms before they leave in the fall?—A. Yes, sir; I have cut them open in the fall and they would have this little formation of roe in them.

By Mr. CALL:

Q. You have no very definite opinion, then, as to whether they spawn here or out at sea?—A. I should say that the summer breed of them spawn after entering the bay from the numbers of schools of fry that we see in the creeks and rivers all the way along our coast here.

Q. Do you think they generally spawn in the bay here along the coast?—A. They either spawn about the time they are coming in or just before; so that the fry come in, a great many of them, although I have seen them both outside and in the bay.

Q. Your opinion, then, is that the menhaden constitute the bait for the food-fishes generally?—A. Yes, sir.

Q. And that the destruction of the menhaden is a destruction of the food-fish on the coast?—A. Yes, sir; undoubtedly.

Q. Would it be practicable to fish with these deep nets out in water deeper than the nets are, where they would not touch ground?—A. For menhaden?

Q. Yes.—A. Yes, sir.

Q. They could fish successfully, then, without coming so close to the shore?—A. Yes, sir; I think they could. It is a deep net with a drawing string, as it were; draws up the same as an old-fashioned purse, and they drop a couple of irons to the bottom to sustain the weight of this, and then pull directly up on it.

Q. Would not the fish escape underneath?—A. A portion of them might, although the menhaden are not a wild fish at all. You can row a boat as near as that room to them without scaring them off.

Q. Then, it seems to be your opinion that the present mode of fishing will eventually destroy the menhaden fisheries themselves?—A. Yes, sir; it will eventually destroy not only the menhaden fisheries, but with that the food-fish of our coast along here.

Q. How far up the coast are these menhaden found?—A. Well, they were found I do not know how much farther than Massachusetts. I have seen plenty of them there all along that coast.

By Mr. McDONALD:

Q. What has been the success of the menhaden fishing this year?—A. From the appearance of these steamers, the early part of the season was good fishing.

Q. How would it compare with last year and the year before?—A. That I do not know.

Q. The returns will show that; but that is your observation, that this is a better season than the last two or three?—A. No, sir; last year they came repeatedly for some two or three weeks and loaded every day. This year I notice that they will come down and partly load and go on as far south as I can see, and some of them return without any load at all, or with only a part of a load; others loaded.

Q. This is the point I want to get at. If the menhaden are taken in considerable quantities and are taken close inshore, why do you not find food-fish with them?—A. One great cause is that the bluefish and striped bass are not very close; these nets scare them away.

Q. By bluefish you mean what?—A. I mean the snapping-mackerel, the horse-mackerel.

Q. They call it bluefish at Cape May, too?—A. They call weakfish bluefish at Cape May; they call the sea trout at Cape May or weakfish bluefish.

By the CHAIRMAN:

Q. How heavy do the bluefish run; what is the average weight and what are the extremes of weight?—A. We have them from the fry—or did have until the last two years—from the fry up to fifteen pounds.

Q. By the fry you mean a pound or half a pound?—A. No; less than a quarter of a pound.

Q. What is the length and width of a bluefish that will weigh 15 pounds?—A. The length of a bluefish, I think, would be 28 to 30 inches, and the width probably 7 to 8.

Q. Now, as they lie in a flat position, what color are they on the back and on the side; what do they look like? Suppose they are lying on the side, do they shine?—A. The under portion of the fish shines but very little.

Q. I ask because we went over to Delaware Breakwater to the factories and I saw them shoveling in large fish 2 feet and a half long and 8 or 10 inches wide?—A. Last year at Egg Harbor down here they caught a schooner or a sloop load—I think it was a sloop load—of these drum-fish; those they ground up with the menhaden for fertilizer, except about a ton out of probably thirty tons.

Q. Do you know what quantity of menhaden these two factories at Little Egg Harbor use?—A. I do not.

Q. You say they have increased the works?—A. They have been increasing the works.

Q. The capacity of the works you mean?—A. The number.

By Mr. CALL:

Q. What do the menhaden feed on?—A. I think they feed on the animalculæ in the water. I have never been able to find any other food in them.

Q. No vegetable substance?—A. No vegetable or fleshy substance.

Q. Do the farmers in the country catch them to any extent?—A. They caught sometimes three or four hundred bushels, and would use them for fertilizers; they have not for a number of years; they made such a terrible stench they have stopped.

Q. They have abandoned the use of them?—A. Yes, sir.

Q. Do you suppose that is because they can get the manufactured fertilizer, or because of the difficulty in getting the fish?—A. I do not know; but one reason why our farmers speak against them is by reason of this terrible stench they made.

By the CHAIRMAN:

Q. It was thought it made the region unhealthy?—A. Yes, sir.

By Mr. CALL:

Q. They are not used to any extent, then, for that purpose?—A. No, sir.

By Mr. McDONALD:

Q. Is there much seine fishing in the bays and inlets along this coast?—A. Yes, sir; there are a good many nets around here.

Q. Is not that a very destructive mode of fishing for the striped bass?—A. Yes, sir; I should think it was; so much so that, although I own some nets on this coast, I would like for one to see it abolished.

Q. Is pound-net fishing allowed here in the inlets and bays?—A. No, sir.

Q. It is prohibited by law?—A. Yes, sir. They drift over these sheephead grounds a great deal with large drift nets, and what they catch does not amount to much, but they drive the rest of the fish away. If it was only what they caught it would not amount to anything at all, but the nets going over this ground drive nearly all the fish away; so that if they go where men are catching, say, from ten to twenty-five a day, the next day they will not catch a fish, and probably for ten days afterwards. Some nets will not get often more than three to five hundred pounds off that ground, although they may sweep 2 or 3 miles of it, drifting their nets with the tide.

By the CHAIRMAN:

Q. Have you ever noticed whether, after one of these purse-nets has been fishing over a piece of ground, the menhaden return to it the same season?—A. I should think they would, yes, sir; particularly at sea. I do not know why not.

Q. Do they in fact; do you know how the fact is?—A. Yes, sir; I know that they frequent the same ground.

Q. You do not understand my question. My question is this: After they have once been over the ground, fished it thoroughly with purse-nets, is it a fact that the menhaden return?—A. No, sir; they do not. I judge from the fact of their being swept clear up on the eastern coast and not returning there.

By Mr. McDONALD:

Q. You mean on the coast of Maine?—A. Maine and Massachusetts.

Q. Are they not there this season?—A. Not to any extent. Nearly all the steamers have to fish the Jersey coast.

By the CHAIRMAN:

Q. They did not catch any fish north of here last year?—A. One steamer caught one hundred and eighty barrels of weakfish near Fire Island last fall; they were used for fertilizers, most of them.

MARK H. BUZBY affirmed and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. I reside in Barnegat.

Q. How long have you lived there?—A. This is the second summer I have spent there. I have been on the coast six summers; four summers down below, on the same beach, within a few miles of where I now am.

Q. What is your occupation now?—A. I keep the Hotel Oceanic.

Q. Have you ever had any experience in fishing?—A. None except what I see from others. I have had none of my own; I am no fisherman.

Q. What do you know about the supply of food-fish, whether they are increasing or diminishing?—A. From my experience, what I would see of other people catching, they are diminishing considerably.

Q. Do you find any difficulty in getting what you want for your hotel?—A. We get no bluefish; where we used last summer to get plenty, we have had none this summer.

Q. Did you last summer have plenty?—A. Yes, sir; at times we had some very fine runs of bluefish last summer, and there have not been any in this summer.

Q. Do you know anything about the cause of it?—A. No, sir; I do not know the cause, only you see a great deal of the menhaden fishing going on, and we suppose they are taking the food-fish away; that is only a supposition with us, of course. We see a great many of them fishing all the time in front of us; sometimes as high as ten or a dozen steamers at a time. Around our inlet is a great place for fish.

Q. How many have you seen at a time?—A. I have seen as high as ten this year.

Q. Do you know what they catch?—A. No, sir; I have never been aboard of them.

BENJAMIN W. RICHARDS sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. I reside in Philadelphia.

Q. What is your business?—A. I am connected with the Laurel Hill Cemetery Company as treasurer.

Q. What experience, if any, have you had in fishing?—A. I have been visiting this coast for many years, probably since I was quite a little boy.

Q. Name the number of years?—A. Twenty-five or thirty years.

Q. Annually?—A. Yes, sir; every summer.

Q. Fishing for sport, I suppose?—A. Yes, sir.

Q. At what points on the coast?—A. I for many years visited the Little Egg Harbor Bay, Tuckerton Bay, and Barnegat Inlet, and for a number of years past I have been going regularly in summer, and sometimes in the winter, in the Barnegat Inlet.

Q. What is the result of your observation as to whether the varieties of food-fish are diminishing or increasing?—A. From my observation they are diminishing very much. My early recollection is that in the

bays, the mackerel, as we call them, at that time were very plenty during the summer season, and about Barnegat particularly; during the latter part of May and the month of June they were very abundant indeed, but for the last four or five years the decrease has been very marked indeed, very marked.

Q. You are speaking of Spanish mackerel?—A. No, sir; I am speaking of bluefish, as they are called; some call them snapping-mackerel, some call them bluefish. The smaller mackerel we used to catch in the bay were called snapping-mackerel; the larger mackerel we caught just outside of the inlet were called bluefish or horse mackerel by many people. I have noticed a great diminution in the number of those fish within the last five years. I have also noticed that the number of vessels and persons engaged in taking menhaden, which I believe are the food-fish of the mackerel and other fish, has increased very much.

Q. What is that?—A. I have noticed that the number of persons, the number of vessels, engaged in the taking of menhaden has increased very much. At first there were a few little sloops and schooners engaged in it. Now there is quite a large number of steamers. I have counted seventeen at one time in front of Barnegat, in the neighborhood of the light-house; all steamers built, I believe, expressly for the purpose of taking menhaden.

Q. How many have you seen at any one time?—A. Seventeen was the number I counted.

Q. This year or last?—A. This year.

Q. At what point?—A. In the neighborhood of Barnegat light-house; near that.

Q. That is north of Little Egg Harbor, is it?—A. North of Little Egg Harbor, yes, sir; northeast.

Q. Do you know anything about those factories at Little Egg Harbor?—A. I have been over there, but not within the last three years. The time that I visited there, there were three or four small vessels, sloops and schooners, engaged in taking these menhadens, bringing them in, supplying this oil factory with fish.

Q. Do you know where the steamers that come in such quantities go with their cargoes?—A. I do not, except from hearsay. I believe they belong somewhere in the neighborhood of New York or Sandy Hook.

Q. Do you know what direction they go when they leave here?—A. They go up the coast; you see them early in the morning coming down from Sandy Hook, and in the evening going back in that direction.

Q. Do you know of any other cause for the decrease of the fish?—A. No, sir; with the exception that for some years there was a great deal of netting going on in these bays, gill-nets as they are called, and seines, the ordinary seine.

Q. What fish did they catch?—A. They took every sheepshead and weakfish.

Q. The legislature has stopped that, I understand?—A. Yes, sir. I have noticed also a great falling off in the number of menhaden that you see in the bays. I think there is nothing like the number in this bay, or Tuckerton Bay, or Egg Harbor Bay, that there was five or ten years ago, for they frequently carried on their business in the bay. I have seen them caught there with the purse-nets right in Egg Harbor Bay.

By Mr. CALL:

Q. Have you ever made any observation as to where these menhaden spawn?—A. I have not; I have never had an opportunity of knowing.

Q. You think they are decreasing very rapidly?—A. Yes, sir; I do.

Q. Are there half as many as there were when you first saw them?—

A. I think not.

Q. You are of the opinion, then, that the menhaden fishing interest itself requires some legislation to prevent the destruction of fish?—A. I do; yes, sir.

By Mr. McDONALD:

Q. Is the gill-net fishing in the bay pursued to as large an extent as it was four or five years ago?—A. I think not; no, sir.

Q. There is a law prohibiting it, is there?—A. There was a law, I believe, passed by the State of New Jersey a few years ago restricting it to a certain extent, applying it to certain counties; whether that law has become a general law I do not know. I recollect attending a meeting at Trenton at which there were representatives from various counties along the shore, at which it was proposed to pass a law restricting fishing at certain seasons, or a certain kind of net, and I believe there was a law agreed upon by them, but it met with some opposition, I believe, from this very county here. The other counties, Cape May, Atlantic, and Burlington, representatives were willing that some law should be passed restricting it, but this county, I think, was very much opposed to it, but there was a compromise agreed upon and a law was passed restricting it. Previous to that you could go into Barnegat Bay, and you could see in the channel gill-nets staked out all along, so that it was really an impediment to the boats passing to and fro.

Q. How long has that been?—A. That has been restricted within the last three or four years. It is not near as bad as it was.

Q. Were not large numbers of the small striped bass taken in those gill-nets?—A. Yes, sir; they took everything. Those nets were kept there staked down right across the channel, and twice or three times a day the owner of the net would visit it, take out the fish, and set it again. It was not only catching everything in the shape of fish that passed up and down the river, but it was really an obstruction to navigation.

Q. They would catch these small striped bass and bluefish in the bays and inlets, and weakfish, too?—A. Yes, sir.

Q. Now, would not the mode of fishing pursued in those smaller areas of water be more depleting on the fish supply than any catch that could be made by the purse-nets of the menhaden?—A. They would both be very injurious. I do not know that I could say it is worse. Of course it is very bad. They catch everything that comes along, those set nets.

By Mr. CALL:

Q. Have you any idea of the kind of legislation that would be efficacious to protect the fish?—A. I should think they ought not to be allowed to come within a certain distance of the coast; certainly not within three miles of the coast. Anything like purse fishing in the bay should be prohibited entirely. I have seen it in Egg Harbor Bay, and they will take up a school and hardly lose a dozen fish, particularly where the water was rather smooth and they could handle their boats and nets with ease and facility. I think that purse-net fishing was exceedingly injurious. If that could be abolished entirely, not allowed to be practiced within three miles of the coast, it would have very marked effect upon the fishing interests of the country.

Q. You all think that would be a sufficient protection, to prohibit it within three miles of the coast?—A. I should think so.

By Mr. McDONALD :

Q. What is the comparative value, in your estimation, of the food-fish and the product of the menhaden along this coast; which is worth most?—A. I could hardly answer that question. In this way I probably might answer it. I think the number of persons who are engaged along this coast in obtaining food-fish is far greater than those engaged in fishing for menhaden. I think where there is one man engaged in taking menhaden for the purpose of the manufacture of oil, there are twenty, if not more, who are engaged in fishing as a means of livelihood or as employment by those who come to the sea-shore at certain seasons of the year. Now, for instance, that fishery at Little Egg Harbor; I suppose that gives employment to probably a dozen men—I include in that the men who are engaged on the vessels—and they will do damage to the fishing of seventy-five men, say.

By the CHAIRMAN :

Q. Colonel McDonald's question points a little beyond that. I do not suppose there is any doubt of this. If it is found that the menhaden industry, pursued to its end, is going to result in the destruction of the food designed for the people, the menhaden interests must yield to that demand.

The WITNESS. It seems to me that that would be reasonable.

The CHAIRMAN. Here are two interests that clash; one is the right of all mankind to use the inhabitants of the waters for food; the other is the use of capital by a limited number of men to make an article of commerce. Of course it does not need any argument to show that, if following that pursuit of commerce is going to lead to the destruction of the food of the people, it will have to be stopped or checked.

Mr. CALL. Would not you have to find out how large crops the fertilizer has made; that is, made out of the menhaden?

The WITNESS. The refuse is used as a fertilizer, but I do not think, from all I have heard, it is a very favorite fertilizer. Really, the richness is pressed out. All the oil is taken out of the fish; there is nothing left but the refuse.

Mr. McDONALD. The oil is of no value as a fertilizer.

The WITNESS. I do not know; the farmers in this country who used the menhaden used to put two or three in a corn hill; they always thought that the oil that the menhaden contained in that position was the real fertilizing quantity.

Mr. McDONALD. No; I think it has been shown that the oil was of no assistance.

ELIAS NAYLOR sworn and examined.

By the CHAIRMAN :

Question. Where do you reside?—Answer. Tom's River.

Q. What county is that in?—A. Ocean.

Q. What is your business?—A. I keep a restaurant now; have for the last seven or eight years.

Q. What did you do before that?—A. I followed the bay before that for about five years.

Q. You followed the bay; what do you mean?—A. I followed fishing.

Q. You keep a restaurant where you furnish fish for food, I suppose?—A. Yes, sir; a great deal.

Q. Now, what is your observation as to whether the varieties of food-fish are increasing or diminishing?—A. I think they are diminishing.

Q. To what extent?—A. I could not tell exactly how much, but I suppose in the last ten years nearly one-half, or more than that of some certain kinds of fish.

Q. Of what kinds has the decrease been the greatest?—A. The menhaden, I think, the greatest.

Q. Were they ever used as food-fish?—A. Somewhat, yes, sir; in former years.

Q. How used, fresh or corned?—A. They were mostly used as corned fish.

Q. Salted down, packed in barrels?—A. Yes, sir.

Q. How is it with bluefish or snapping-mackerel?—A. There are not so many mackerel now as there used to be; has not been for a few years.

Q. How about striped bass?—A. They do not amount to much. They used to be plenty around here, but there is not hardly any now.

Q. They were the best fish caught, were they not?—A. Considered so.

Q. Have you any opinion as to the cause of this decrease?—A. I do not know what it is unless it is these purse-nets catching up all the fish, food-fish; there is not anything else.

Q. Do you know anything about their operations yourself?—A. I have seen them catch quite a good many; grind them up, I suppose.

Q. How many did you ever see fishing at once?—A. I have not been on the beach much for the last seven or eight years. On the beach I have counted twenty-five to thirty right off here; steamers.

Q. Menhaden steamers, as they are termed?—A. That is what they call them; yes, sir.

Q. Do you know any other reason for the fish diminishing?—A. I do not.

Q. When you fished, what did you fish, for?—A. I mostly fished for eels, potted eels, fykes, a small eel-pot. I fished some with seine, but not a great deal.

Q. Has that mode of fishing diminished?—A. It has somewhat; yes, sir.

Q. What quantity of fish do you use a year in your saloon?—A. I could not tell you; cannot get them half the time; that is the great trouble. If I could get them I would use a great many more. I was paying last week ten cents a pound for snapping-mackerel, and used to get them for three and four; have to get them from New York and Philadelphia most of the time now; we can get here small weakfish and the like of that.

Q. So that you are not only deprived of the use of them at times entirely, but you have to pay a much larger price for them?—A. Yes, sir.

FREDERICK GRANT MYERS sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Tom's River.

Q. How long have you lived there?—A. I have lived there about four years; I have lived South seven years. Before that I lived on the beach here. I lived two miles below here twelve years.

Q. By "South" where do you mean?—A. On the eastern shore of Virginia. I run down there in a small vessel. I went from here South.

Q. Fishing vessel?—A. No, sir; carrying freight.

Q. Did you ever see any menhaden there?—A. Yes, sir.

Q. Plenty or scarce?—A. They seemed to be getting scarcer there all the time.

Q. Are they catching them there?—A. Yes, sir; there is a factory at Back River, where they make the oil.

Q. A large factory?—A. Yes, sir.

Q. Is there one at Old Point Comfort?—A. No, sir. This is seven miles, I think, north of Old Point Comfort.

Q. What do they catch them with there?—A. Purse-nets.

Q. Steamers or sailing vessels?—A. I think they had one or two steamers, but most of them were sailing vessels; eight or ten sailing vessels.

Q. Now, on this coast, what do you know about it?—A. I have seen a good many steamers here.

Q. How many is the most you ever saw here at one time?—A. I could not say exactly; I have seen, I think, fifteen or twenty.

Q. From what direction do they come to this coast?—A. They come down the beach from towards Sandy Hook.

Q. From the north?—A. From the north, yes, sir; and when they load they go back that way.

Q. What effect does their fishing have upon the supply of food-fish here?—A. I think they take away a great many; frighten them off.

Q. Are food-fish increasing or diminishing?—A. Diminishing.

Q. To what extent?—A. I do not think there is one-quarter of the mossbunkers there were twelve years ago.

Q. How is it with the bluefish?—A. I do not think there is one-quarter as many along the coast as there were twelve or fifteen years ago. I followed bluefishing with my father when we lived down on the beach below here; used to follow it in the fall of the year for about two months; September and October.

Q. What did you fish with?—A. We had a seine.

Q. In the surf or in the edge of the rocks?—A. Yes, sir.

Q. Was there any difficulty in catching fish in quantities at that time?—A. No, sir.

Q. Was it a profitable business?—A. My share used to amount to about a hundred dollars a month; I had a one-sixth share.

Q. How would it be now, using the same kind of a seine?—A. I do not think you could make anything; I do not think you could make board.

Q. On the same ground where you used to catch them?—A. On the same ground; yes, sir.

Q. Your share was one-sixth?—A. Yes, sir. I helped haul ashore 8,000 pounds of bluefish at one haul; that was the largest haul we ever made. I have helped haul ashore 4,000 pounds at one haul several times.

Q. How long has it been since bluefish in those quantities ceased to be found here; how many years is it? How many years is it since you came back from Virginia?—A. My father sold the beach in 1870, and since then I do not know so much about it. I know now there is no fish. I was here last summer and this summer so far, and I know there is not near so many fish as there were when we were living on the beach.

Q. They do not bite now as much as they did when you were younger?—A. There does not seem to be one-quarter of the fish there used to be when we were living down below.

By Mr. McDONALD:

Q. You say you fished in October?—A. September and October; yes, sir.

Q. You fished for bluefish that were going south?—A. Yes, sir; going south.

Q. When they were in schools?—A. Yes, sir.

Q. Do you suppose the bluefish spawn here, in these waters?—A. I do not know whether they do or not.

Q. You have never seen them with roe, have you?—A. I do not know that I ever noticed particularly about that. I have seen very small bluefish here, when they were no longer than your finger. I rather think they do.

By Mr. CALL:

Q. What fish feed on the menhaden; are they a food for the other fishes?—A. They are for bluefish. I do not think striped bass feeds on them.

Q. Any other fish besides the bluefish?—A. I do not know of any other, without it is porpoises; porpoises do.

Q. The porpoise eat them, do they?—A. Yes, sir.

By the CHAIRMAN:

Q. Do not sheepshead feed on them?—A. No, sir.

By Mr. CALL:

Q. The bluefish, then, is the only fish you think feeds on them; did you ever see the bluefish catch any of them?—A. Yes, sir; I have. I have seen them catch weakfish.

Q. You have seen the bluefish catch weakfish?—A. Yes, sir; I have picked them up many a time on the surf where the bluefish has bit them in two.

Q. You do not think the destruction of the menhaden would have any effect upon any of the other fish, then, except the bluefish?—A. No, sir; I do not think it would. The bluefish follows the menhaden wherever they go, I think. When there is no menhaden there is no bluefish; that is the way, I have always thought.

Q. Are the bluefish more numerous than the other kinds of fish that people eat?—A. Yes, sir, they used to be; not now.

Q. They used to constitute the principal part of the fish that were caught to eat?—A. Yes, sir; they are a better fish to eat in hot weather; rather a better eating fish.

Q. Now, your idea is that the present mode of catching menhaden with these purse-nets has destroyed the bluefish almost entirely on this coast?—A. Yes, sir.

By Mr. McDONALD:

Q. Have you ever seen any large bluefish in the Chesapeake Bay?—A. I have never seen them but once; we caught seven, I think. One time we ran into a school and there seemed to be a large quantity there; that is the only time I ever saw them there.

Q. Do they ever go into this bay—Barnegat?—A. Yes, sir; I have seen them there.

Q. Do they come much inside?—A. Yes, sir; they used to. I sailed a boat here three years before I went South, during 1870, 1871, and 1872, and we used to catch fish always, from June up to September, inside.

Q. I am speaking of the large ones.—A. We used to catch large ones;

sometimes they were large, and sometimes they would not go more than two pounds.

Q. What do you call a large bluefish?—A. Well, one that would weigh seven or eight pounds. I have caught them outside where they would average nine pounds. The largest one I think I ever saw weighed sixteen pounds. We caught that outside.

Q. Have not you heard of them much larger than that?—A. I have heard tell of people catching them larger than that. I have heard of catching them twenty and twenty-one pounds. I have helped catch a good many, and I have never seen any larger.

WILLIAM HULSE sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. I reside at Bayville.

Q. Where is that?—A. Five miles south of Tom's River.

Q. What is your occupation?—A. Following yachting.

Q. How long have you followed that business?—A. I have been following it for a little over two years, regular yachting. I have followed this bay for thirty-odd years.

Q. Engaged in fishing?—A. Yes, sir.

Q. Thirty years ago what were the principal fish that were caught here?—A. There was bluefish, striped bass, weakfish, barb, mackerel, and all kinds of fish; they used to catch greenhead, sheepshead. Now they do not catch any greenhead and bass, on account of this catching outside here; they do not come into the inlet like they used to, and there is nothing that prevents it but this purse-net fishing, I think. The other day there were fifteen to twenty boats right on the outer bar here.

Q. Now, you have told about the whole story in one answer; that is about all there is of it, is it not?—A. Yes, sir.

Q. That the purse-nets are driving them away?—A. Yes, sir; that the purse-nets are driving them away, without a doubt; and then the purse-nets here in the bay prohibits line fishing a good deal.

Q. Is there no law against pursing in the bay?—A. Yes, sir; I believe there is, but I do not think they live up to it.

Q. Are soft-shell crabs as plenty as they used to be?—A. Yes, sir; they appear to be.

Q. Are oysters as plenty?—A. Oysters are not. The reason of that is because people follow oystering all summer and the whole year round. When the oysters spawn they are working amongst them and catching them.

Q. Do you know of any other reason for this decrease of fish except the purse-net fishing?—A. No, sir; I do not. I do not know what else to lay it to.

Q. Have you fished for bluefish this season?—A. No, sir; there is none to fish for.

Q. It does not pay to do it?—A. No, sir; I have not heard tell of but twenty-five being caught this season.

Q. How is the price now compared with formerly?—A. Do you mean for yachting?

Q. No, the price for fish.—A. I guess the price is about as good as it used to be.

Q. Is it not more; do not the bluefish sell higher than they did twenty years ago?—A. I do not know whether they do or not; there is not much difference; they do sometimes and sometimes they do not. Twen-

ty years ago they did not ship many fish from around here to New York; they used to sell them to wagons and let them cart them through New Jersey and around that way. Twenty years ago if they had shipped them the same as they do now they would have brought as much as they do now.

Q. But they did not, and therefore they did not bring so much?—A. Yes, sir; they did not, and therefore they did not bring so much.

Q. Now, suppose the purse-nets were prohibited from coming within three miles of the shore?—A. I think we would have plenty of bluefish in this bay again.

Q. You think they would come back?—A. Yes, sir.

Q. Do you think the use of these nets has any effect to frighten them away?—A. I don't know. It looks so by their not striking into the inlets. I do not know what else to lay it to.

Q. Have you ever noticed whether fish will bite when it thunders?—A. Sometimes they will; yes, sir.

Q. Well, ordinarily?—A. They will not bite near so well; no, sir; they are afraid of thunder.

Q. One of those purse-nets makes considerable commotion in the water when they make a haul, does it not?—A. Yes, sir.

Q. Together with the use of the steamer?—A. Yes, sir.

Q. The steamer has to keep in motion, does it not?—A. Yes, sir; the steamer does not lay very close to them until they make their haul.

Q. But they do not cast an anchor, do they?—A. No sir; I do not think they do.

Q. They keep their engines in motion?—A. Yes, sir.

Q. Keep in the distance?—A. Yes, sir.

By Mr. McDONALD:

Q. Do you think the bluefish are as abundant outside now as they were some years ago?—A. I could not say; I suppose they are; yes, sir. Now, a year or two ago, before there was so much of this, I fished a few days when the sun would be to the westward, and there would be plenty of them right here. You could stand on the shore and throw off your squids and catch them.

Q. You think it is just a change of location, then; they are further outside than they used to be, and are kept outside by the menhaden steamers fishing?—A. Yes, sir; I think they are further off shore.

Q. If they are as abundant as they used to be, would not you expect the menhaden to be just as abundant?—A. I do not know how that would be.

Q. Your idea, as I understand it, is that there has not been so much diminution in the number of the fish as the effect of this menhaden fishing keeping them off shore?—A. Yes, sir; I think that is the cause of it; the fishing so close to the beach gobbles them, but off shore they go away by.

Q. What sort of nets now fish in the bay?—A. There are all kinds.

Q. Are there fykes?—A. I do not know whether they fish with fykes or not; but all kinds of drift-nets, sheepshead drift-nets, and haul-nets.

Q. By haul-nets you mean seines?—A. Yes, sir; regular seines.

Q. Do not they catch a great many food-fishes?—A. They used to, but don't now for the last two or three years, for they do not come in to catch.

Q. May that not have contributed very much to the diminution of the supply of food-fishes?—A. No doubt but what it has been a help.

Q. You want protection from them as well as from the purse-nets?—A. Yes, sir; I think it would be a good thing to have them all stopped.

Q. You think you could catch enough food-fishes with the hook and line to supply all this shore?—A. Yes, sir; I think it would make it better even for those who own these nets after a little bit; would pay them better. I know parties right from where I live who own seines who would be glad to see all that fishing stopped in Barnegat Bay. They would be willing to destroy theirs and sacrifice them and take to the hook and line.

Q. Do you get any small striped bass in Barnegat Bay?—A. There are a few.

Q. Any large ones?—A. There has been a very few; 25 or 30 I guess is all that has been caught over at Bayville.

Q. Do you find them with ripe roe in them now; those large fish?—A. No, sir.

Q. No roe in them at all?—A. I have not heard of any.

JOSEPH F. REED sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. About 2 miles down the beach. I am keeper of life-saving station No. 14.

Q. How long have you been there?—A. About fourteen years.

Q. At this one place?—A. At this one place; yes, sir.

By Mr. CALL:

Q. Which direction, above or below?—A. Down below.

By the CHAIRMAN:

Q. Do you fish any?—A. Yes, sir; I fished about sixteen years off Long Beach. I followed fishing about thirty years outside here.

Q. What form of fishing?—A. Bottom fish, hook and line, net fishing.

Q. How is the supply of fish the people eat now compared with 25 years ago?—A. I think the bottom fishing on the rocks is pretty good. It is better now this season than it has been for four or five years.

Q. What kind of fishing?—A. Sea bass.

Q. That is what you call bottom fishing?—A. Yes, sir.

Q. How is it with bluefish?—A. Bluefish are scarce; that is because the sea bass are better the bluefish have left.

Q. The bluefish eat the bass?—A. They drive them off the rocks; yes, sir.

Q. With the disappearance of the bluefish the sea bass are coming back?—A. Yes, sir; they stay around the rocks more.

Q. Are they a good fish?—A. Yes, sir.

Q. Are they as good as bluefish?—A. Some prefer bluefish and some prefer sea bass.

Q. Are they as easily caught?—A. Yes, sir.

Q. Are they here in any quantity now?—A. Sea bass are not as thick as they were; the first run has gone, but then they strike on again the latter part of July and the first of August; that is another run; I guess bluefishing though is played out.

Q. Was there ever any mackerel fishing here, except the snapping-mackerel?—A. Blue mackerel, do you mean?

Q. Yes; any ordinary mackerel fishing here, Spanish mackerel?—A. There is plenty of mackerel in the fall of the year.

Q. Now?—A. No; it is not quite late enough now.

Q. In all these years, I mean; I mean do they continue to come here?—A. Oh, yes; Spanish mackerel do; yes, sir.

Q. What season of the year are they caught?—A. September, the latter part of August and September.

Q. Do you know whether the purse-nets catch them?—A. Yes, sir; they scoop in everything they can get. I have seen bonitas, bluefish, striped bass, and weakfish in their holds.

Q. You have seen them yourself?—A. I have seen them myself. I board them every once and awhile off here. I guess I am about the oldest one, and know more about it than any one along the coast as I am about the only one that fishes outside here.

Q. You have taken notice to see what they catch?—A. Yes, sir.

Q. You speak of seeing those varieties of fish in the ship?—A. Yes, sir; I have seen them aboard the vessel.

Q. How long ago?—A. Different times; last fall I saw a striped bass weighing eighteen or twenty pounds dumped right in the hold, I suppose right on top of the rest of the fish.

Q. Do you know how many fish they can take on one of those vessels?—A. They take on from three hundred and fifty to seven hundred thousand.

Q. Averaging about a pound apiece?—A. Hardly at all times. In the fall they average about that, when they are in good order.

Q. Have you ever eaten a menhaden?—A. Yes, sir; in the fall. I own stock in nets now up at Long Branch, and it is not worth a cent on account of this fishing here.

Q. On account of the purse-nets?—A. Yes, sir; they have ruined all the gill-net fishing.

Q. Do you know any other cause for the decrease of fish except the use of these nets?—A. No, sir.

Q. Were they plenty before they came here?—A. Yes, sir; I have seen out on this beach just as far as you could see, north and south and eastward, a solid mass of bunkers.

Q. Floating just on the surface?—A. Yes, sir; just on the surface.

Q. How many years is it since the first menhaden came here?—A. I do not know; I was in the crew of the first purse-net that was fished off this coast. That was off Long Branch.

Q. About how long ago is that?—A. That is about twenty years ago.

Q. They began away at Long Branch, then?—A. Yes, sir; that was the first net that was fished.

Q. How long is it since they came as far south as this?—A. I cannot tell how long it has been.

Q. It was not so early as they commenced down there?—A. No, sir; it is only four or five years since they commenced with the steamers; they used to come down with sailing vessels, but not so far as this.

Q. How long does it take to load a schooner?—A. With one good haul they will load up, and it takes them six hours to go to Barren Island and will be down here by sunrise the next morning.

Q. That is on Long Island, is it not?—A. Yes, sir, Long Island. I have seen twenty-six load right off my house just as deep as they could swim; they had their hatches under, and the water above their gunwales, two or three feet I suppose.

By Mr. McDONALD:

Q. What year was that?—A. Last season.

By Mr. CALL:

Q. How many tons do you suppose one of those boats had on?—A. I could not form any idea; she must have had six or seven hundred thousand fish; six hundred at least.

Q. How many is the most you ever saw of the steamers here at one time?—A. I think there were thirty-three or thirty-four.

Q. In sight of this coast?—A. Likely I might have counted more if I had looked north or south. I just merely glanced over them.

Q. Well, they came here more last year than they ever did before, did they not?—A. Yes, sir.

Q. And are here again this year?—A. They follow the fish right up.

Q. Have you ever noticed when they come on a piece of ground here and haul their net, take in a school of menhaden, whether you see any menhaden on the same ground again the same year?—A. These fish are always on the move; they either go north or south.

Q. Yes; but do they, when the net has once been heaved, come back to the same locality?—A. I do not know; they trade back and forward.

Q. What fish feed on the menhaden?—A. Bluefish.

Q. Any other?—A. Yes, sir; striped bass follow them up, and weak-fish follow them up.

Q. All these three fishes feed on them, you suppose?—A. Yes, sir; and cod will follow them up.

By Mr. McDONALD:

Q. Will not the Spanish mackerel follow them up?—A. I do not think the Spanish mackerel will; I do not think I ever saw Spanish mackerel follow them. There are different feeds; Spanish mackerel has a feed about that long (six inches).

Q. What is it?—A. They call it speerin.

Q. What kind of a fish is it?—A. That is a long slim fish.

Q. White?—A. Like silver, yes; very fine scales; very near the shape of a Boston mackerel.

Q. You speak of the sea bass; it is a black fish is it not?—A. Yes, sir; it is a black fish. There is a black fish too besides the sea bass; they are right along on the rocks all the time. It is pretty hard work for a bluefish to get a blackfish out of those rocks.

By the CHAIRMAN:

Q. Did striped bass used to be plenty here?—A. Yes, sir; any quantity of them.

Q. You spoke of one weighing how much?—A. Eighteen or twenty pounds, I think, as nearly as I could judge. It lay in the vessel's hold.

Q. They used to be caught here of that size?—A. Yes, sir.

Q. How is it now; are there any striped bass of any consequence about here?—A. No, sir; not now.

By Mr. CALL:

Q. Have you any idea where these menhaden spawn?—A. I think they spawn in the bays.

Q. In the bays here?—A. Yes, sir; the bays and rivers.

Q. What is your opinion as to the difference in quantity of the menhaden as compared with formerly?—A. I think they are a great deal more scarce, by half.

Q. Not half as many as there were?—A. Not half as many; no, sir.

Q. You attribute that to the menhaden steam fisheries, do you?—A. Yes, sir; they are the ruin of the whole fishing on this coast, of every bay and every river along the coast.

Q. Do you think they might pursue their occupation profitably three miles outside?—A. They would want about three revenue cutters here to watch them if they saw a big school.

Q. They would come in then anyhow?—A. Yes, sir; they would come in. A big school of moss-bunkers would be mighty taking to them if they could load right up.

Q. Would it be practicable for them to fish in very deep water?—A. They can fish in any depth.

Q. Can they fish in water where it is so deep their net cannot get to the bottom?—A. They can fish in five hundred feet of water if they want to.

Q. Successfully?—A. Yes, sir.

Q. They do not need to have the net reach the bottom, then?—A. They need not; no, sir.

Q. They can catch a school of fish without having the net go to the bottom?—A. Yes, sir; all they have got to do is to lay around them and close the net up; there is no need of going to the bottom at all.

Q. I understand they go off a great distance from shore?—A. Yes, sir; they catch them off fifty miles, that is if they can find them off there.

Q. Your opinion, then, is that the menhaden fisheries will be exhausted unless there is something done to stop this purse-net fishing?—A. Yes, sir; that is my opinion; and it is the curse of this coast too, that fishing is.

By Mr. McDONALD:

Q. In the depth of water they fish with the purse-nets off here the lead line always does go to the bottom, does it not?—A. If the net is deep enough it will go to the bottom.

Q. Well, they fish with about 10 fathoms?—A. I do not know how deep they do fish.

Q. That is what I understand from the testimony that has been given?—A. They can get 10 fathoms off here 10 miles.

Q. So that, practically, if their nets were that deep they would fish on the bottom, and, of course, drag the bottom with the lead line?—A. Yes; they have lead enough to take them down, but the cork don't go to the bottom.

Q. How long are these nets?—A. I do not know; many of them are 250 fathoms long.

WILLIAM T. BAILEY sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Camden, N. J.

Q. How long have you lived there?—A. Twenty years.

Q. What experience have you had on the subject of fisheries?—A. For the last fifteen years I have been coming to Barnegat Bay on an average of twice a summer, fishing for bluefish.

Q. Has the quantity increased or diminished?—A. Diminished.

Q. To what extent?—A. This far this season they are almost extinct in toto; we have not caught one yet. This last three years I have been here all summer.

Q. Fifteen years ago what catch did you have, ordinarily?—A. We used to come down about four in a party, and get about a barrel of fish in say six or eight hours' fishing, and sport in the bargain. It was the sport we were after, particularly.

Q. Have you any opinion as to the cause of the decrease?—A. Yes, sir; my opinion is that this purse-net business is what is cleaning up our bluefish.

Q. What observations, if any, have you made in regard to them?—A. I made observation last summer, and in my absence had another person stand and count. He counted thirty-nine steamers pass the hotel in one day and loading; some did not go all the way down, but loaded there in front of the inlet and went back.

Q. Came from the north?—A. Yes, sir; all of them went back north.

Q. After loading?—A. Yes, sir.

Q. Have you ever observed to see what they catch in fact?—A. Yes, sir; I have been on their boats.

Q. What did they catch?—A. I have seen weakfish and bluefish and bass.

Q. Striped bass?—A. Yes, sir; and menhaden.

Q. Necessarily they must take all the fish their net surrounds, do they not?—A. Yes, sir; clean up every fish.

Q. There is no avoiding it?—A. There is no escape.

Q. Can they catch sharks?—A. Yes, sir; I saw two sharks in one net one day.

Q. How large have you ever caught striped bass here?—A. I have never fished for them.

Q. When was it you observed these varieties of fish that they took in their purse-nets?—A. I observed them last summer. We boarded two last summer, and the summer before I was aboard of two; that was up at Ocean Grove; this summer was here.

Q. Did you observe the different varieties on each occasion?—A. Yes, sir; I am not sure now whether I saw any bass——

Q. By bass you mean what?—A. Striped bass—the year before, but I did the last year at the inlet.

Q. Suppose they stop fishing within 3 miles of the shore, would that give any relief?—A. Yes, sir; the schools of moss-bunkers would come right in, and the bluefish would follow them up. You asked this gentlemen a question about the menhaden returning to water that has once been fished over. It is a fact they go back and forth on each tide. I saw last Thursday seven loaded in front of our hotel and some of them took in a school of fish in the morning and the same ground was swept over in the afternoon, and so near the shore that they had to run a long line out to the steamer to tow them out of the breakers before they could haul them in.

By Mr. McDONALD:

Q. You think the bluefish are as abundant outside now as ever, do you?—A. Yes, sir; we go out and catch them now. There is where we have to go to catch them.

Q. So that there is not an actual diminution of the supply?—A. I do not think there is.

Q. Well, would not you think the menhaden to be as abundant if the bluefish are as abundant?—A. I do not know; I do not know how long the menhaden live, nor where they propagate.

Q. Only where there is plenty of menhaden you expect to find bluefish?—A. We see them from the hotel come in, and we have sufficient evidence of their coming in until there are acres of them, but I defy you to find anything like bluefish; we have not caught one this season.

Q. Have not the menhaden been pretty close inshore this season?—A. Oh, yes; but they fish right around Barnegat Inlet, more I think than anywhere on the coast, and prevent anything from coming in.

ISAAC WORTH sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Eight miles from here down the coast.

Q. What is your occupation?—A. I am a fisherman in the summer season. In the winter season I am in the Life-Saving Service; have been for the last eight years.

Q. How long have you followed fishing?—A. I have followed it for about thirty-five years.

Q. What kind of fishing?—A. Outside fishing and inside fishing both.

Q. How is the fact as to the supply of fish now as compared with former years?—A. Our weakfish are as plenty as they ever were, and I do not know but more so, but our bluefish are played out I guess; there have not been any near us this summer; none at all.

Q. How is it with the striped bass?—A. I expect likely there are some few of them. I have not caught any this season; have not gone for them at all, but I do not expect they are as good. They do not catch as many as usual in the winter-time.

Q. What has caused this change?—A. I do not know anything more than taking the feed from our coast here.

Q. By what?—A. By the menhaden fishermen.

Q. How long is it since they began to run steamers here?—A. It has been about three years, I believe.

Q. How many vessels have you ever seen at once?—A. Last September I was in the station-house, and we have to keep the vessels, every one that passes the coast, and we got forty-five of them that passed our station-house that one day, and repassed and fished right along up it and close to it.

By Mr. CALL:

Q. Steamers or sailing vessels?—A. All steamers. We went off to some of them to see how they caught them and see all about it.

By the CHAIRMAN:

Q. What kind of fish did they catch?—A. Principally menhaden, and any kind that gets in their nets they are going to catch and save.

Q. Well, do they catch them?—A. Of course; cannot help it.

Q. What do they do with them?—A. If they are hurried they throw them all in together, but if they have time they pick the bluefish out.

Q. Do you know what they do with the bluefish when they pick them out?—A. I do not, but I suppose they grind them up, the same as they do the menhaden.

Q. I should not think they would want to pick them out then?—A. Oh, when they have time, I expect they salt them.

Q. What are bluefish worth now?—A. I really do not know. They do not get any up the beach here; I suppose four or five cents a pound.

Q. What is striped bass worth?—A. The last time I heard from New York, twenty-five cents or thirty.

Q. Do you know any other reason than the menhaden fishing for the decrease of fish here?—A. Yes, sir; I suppose there are other causes.

Q. State what?—A. I expect this seine fishing is some hurt to them.

Q. In the bay, you mean?—A. Yes, sir, but I do not suppose that is near the hurt this menhaden fishing is.

Q. What kind of fish do they interfere with?—A. Pretty much all kinds.

Q. Do they get striped bass?—A. Yes, sir; but they catch those fish in the winter season. It does not interfere with that fish much.

Q. I speak of the summer season.—A. Of course you cannot help saying they do interfere with it; but they have to live, and I would never go against their fishing.

Q. How long have seines been used in this bay, to your knowledge?—A. Ever since I can remember.

Q. Still the fish were plenty until the purse-nets came here?—A. Yes, sir.

Q. They never did diminish them so that you could see it?—A. Never saw any difference until now lately, and you do not see much difference in any kind of fish but bluefish.

Q. The greatest decrease is in the bluefish?—A. Yes, sir; there never was more weak-fish in the bay than there is now, I think.

Q. The bluefish, though, are the most valuable fish?—A. Yes, sir; a very valuable fish.

Q. The fish the people like better?—A. Yes, sir; fetch as much in market too; fish that keep better, and you can make more money out of them than most any other fish, without it is sheephead.

By Mr. CALL:

Q. Have you many sheephead here?—A. Yes, sir; I guess there is quite a good many.

By Mr. McDONALD:

Q. Your striped-bass fishing is in the fall, is it not?—A. In the fall.

Q. The menhaden are not here then?—A. No, sir.

Q. What connection, then, is there between the falling off of the bass and the fishing of the menhaden?—A. Well, there has been a falling off now for two years of striped bass, and I lay that to the seine fishing.

JOHN MILLER sworn and examined.

By the CHAIRMAN:

Question. Where do you live?—Answer. I live at Island Heights.

Q. Where is that?—A. That is five miles from here.

Q. What is your occupation?—A. Fishing and sailing boats.

Q. How long have you followed it?—A. I have followed it for nineteen years.

Q. On this coast?—A. Yes, sir.

Q. What do you fish with, lines?—A. Fish with lines off the beach here, and inside fish with poles and nets.

Q. Are the fish more or less plenty than they used to be?—A. Fish are less plenty.

Q. How much less?—A. A good bit; there is not near as many as there used to be, fifteen years ago.

Q. Does that apply to all kinds of fish?—A. Yes, sir; all kinds.

Q. The last witness said weakfish are as plenty as they ever were.—A. There are more inside than there ever was; but outside here there is not near as many weakfish nor bluefish as there used to be, nor bass.

Q. Have you caught any bluefish this season?—A. No, sir; I have not caught one this season.

Q. Have you tried?—A. Yes, sir.

Q. And was unable to catch them?—A. Yes, sir; cannot catch any now; these purse-nets break them up.

Q. How long is it since the purse-nets began to run here?—A. I judge it is about three years ago.

Q. Since the steamers came?—A. Yes, sir.

Q. How many have you ever seen here at once?—A. These sail boats and steamers I have counted fifty at once.

Q. In one day?—A. In one day.

Q. How many of them steamers?—A. There were forty of them steamers.

Q. Did you ever see what they catch?—A. Yes, sir; they catch what we call moss-bunkers, and they catch the bluefish and bass and weakfish and sharks.

Q. You know that they catch them?—A. I have been off to them; I know that they catch them.

Q. And carry them off in their boats?—A. Yes, sir; carry them off.

Q. Do you know of any other reason for the fish diminishing so except the purse-nets?—A. Well, I suppose these nets down below break them up too.

Q. In the bay do you mean?—A. Yes, sir.

Q. They have been in use ever since you can remember, have they not?—A. Yes, sir.

Q. There was plenty of fish notwithstanding the use of the seines in the bay, was there not, until the purse-nets came here?—A. Yes, sir.

Q. Have you seen all those varieties of fish in one catch on a menhaden boat?—A. Yes, sir; in one catch.

Q. Bluefish and——?—A. Bluefish and weakfish and striped bass and sharks.

By Mr. CALL:

Q. How many bluefish have you ever seen caught in one drawing of the seine?—A. I suppose about fifteen bluefish.

Q. Have you seen any large number?—A. No large number of bluefish caught on board of them, but I have seen weakfish.

Q. Have you seen them caught in great numbers?—A. Yes, sir; a pretty good number of them.

Q. Are they generally found in the same school of fish as the menhaden?—A. Yes, sir; the same school.

Q. You find both bluefish and weakfish mixed up with them?—A. Yes, sir; mixed up all together.

Q. Have you any knowledge where the menhaden fish spawn?—A. No, sir; I have not. I suppose they spawn in some rivers.

L. J. WORTH sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Bayville.

Q. Where is that?—A. It is about 14 miles by water, the way we have to go, on the turnpike road from Toms River to Forked River.

Q. What is your occupation?—A. Sailor and fisherman.

Q. How long have you followed fishing?—A. As near as I can tell, about twenty years.

Q. Here?—A. Always here, along the coast, and in Barnegat Bay.

Q. What have you been doing to-day?—A. Been fishing.

Q. Where?—A. In Barnegat Bay.

Q. When have you fished outside?—A. It has been about two years, to make a business of it, but I have fished, or tried to catch bluefish, most every spring and fall and summer when they trade back and forward along here.

Q. What luck did you have?—A. Did not have much luck; used to have good luck.

Q. Years ago you could catch them?—A. Used to catch any quantity; more than we wanted.

Q. Now, you cannot catch any at all?—A. Have not caught one this year. When I was a boy we used to go with a squid and throw it out along the coast and catch them.

Q. What is the price of bluefish now?—A. They are worth, I suppose, about ten cents.

Q. What did they use to sell for when you first remember?—A. When I followed fishing, I remember one time my brother and myself sent 5,000 weight to New York, and we got a postal card to come on and pay the freight; we did not get anything.

Q. You sent 5,000 pounds?—A. Yes, sir; in boxes; paid 50 cents a bushel for the ice; paid \$1 for the boxes, and carried them to the depot, and expected to get a good return, and we got a postal card: "Please come on and pay the freight." The market was glutted.

Q. How long ago was that?—A. About four years ago.

By Mr. CALL:

Q. They must have swindled you, did they not?—A. No; I guess not.

Q. Five thousand pounds of fish ought not to glut the New York market.—A. Yes, but there were so many more fishermen.

By the CHAIRMAN:

Q. Are you sure you caught 5,000 pounds of bluefish within five years; was it not longer ago than that?—A. I do not think it was.

Q. Was it before or after the purse-nets came here?—A. It was before.

Q. Before they began to run on this coast?—A. Yes, sir.

Q. How many of that class of boats have you ever seen here at once?—A. I don't know as I ever counted. It has been about a month ago, I think; it looked as though it was going to be a good day for bluefish along the coast, and there were twenty-seven of them loaded down; that is the only time I ever counted.

Q. Twenty-seven steamers?—A. Yes, sir.

Q. Have you ever been aboard to see what they catch?—A. No, sir.

Q. So that you do not know what they do catch?—A. No, sir; but I suppose they were catching fish, by their works.

Q. Do not they necessarily catch all that is around?—A. I have heard they catch all kinds of fish that are in the water.

Q. But suppose they surround a school of fish so that it forms a purse; I do not see how any can get away.—A. They catch all the fish in the bay; they used to ten or twelve years ago, in the bay, catch everything.

Q. Did they use to draw purse-nets in the bay?—A. Yes, sir.

Q. What for?—A. For menhaden; they used to use them on the land.

Q. They used to gather them for manure?—A. Yes, sir.

Q. Why did they stop?—A. I do not know why; the legislature passed a law; don't know why it was.

By Mr. CALL:

Q. Have you ever seen one of these ships load a purse-net?—A. No I have not seen them; I have never seen the fish; I have seen them go up and down the beach; I should suppose they were pretty well

loaded. I have had men out fishing with me who have told me about fetching in loads in the New York market.

Q. But you do not know anything about it yourself?—A. No, sir; no more than that.

Q. Do you know anything about where the menhaden spawn?—A. I do not know unless it is along in the sea here.

Q. Why do you think they spawn at sea?—A. Well, I don't know where they spawn for my part, unless they do spawn in the sea.

Q. Have you ever seen bluefish or cod or bass, or other fish feeding on the bunkers or menhaden?—A. O, yes; I think I have.

Q. You have seen that?—A. Yes, sir; the bluefish feeds on any kind of fish that is smaller than they are. It don't make any difference what they are, they will bite it if it is a piece of iron, but the menhaden, or bunker we call it, is their principal food. They will leave any other kind of fish and go for bunkers; appear to.

By the CHAIRMAN:

Q. Is not that because they are a bright, shiny fish?—A. Yes; I suppose so. It is a different taste or something that makes them like that kind of feed best.

Q. Are the bluefish, like the menhaden, in poor condition, comparatively, when they come on in the spring?—A. Yes, sir; they are very poor.

Q. Do they fatten up the same as the menhaden?—A. They fatten up in September or October. Then is when we catch them and salt them.

Q. How much do the bluefish increase in weight between April and September?—A. I don't know; probably 3 or 4 pounds; that is, a large one that would weigh about 10 pounds would weigh in the fall 14 or 18 pounds. How much it gains depends on the size of the fish.

Q. How much do the menhaden increase in weight?—A. I could not say; I never heard; but I should judge a pound, probably 2 pounds.

Q. Do they get as heavy as 2 pounds?—A. Yes, sir; they are very fat; that is a large size; the smaller size would not weigh over a pound.

Q. Say the ordinary schools of menhaden?—A. The ordinary schools would not increase as much as that. I have seen menhaden that would weigh 3 and 4 pounds, right along this coast; helped catch them.

Q. Caught them with what?—A. Nets put in the water.

Q. Did you ever catch one with a hook?—A. No, sir.

Q. They will not bite, will they?—A. No, sir; I never knew one to be caught with a hook. They seem to be smaller nowadays then they used to be.

BERKELEY, N. J., *July 17, 1883.*

JAMES T. MILLS sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Barnegat.

Q. How long have you lived there?—A. Thirty-three years.

Q. What is your business?—A. I follow fishing; Life Saving Service in the winter time.

Q. Are you now in the Life Saving Service?—A. Yes, sir.

Q. And have been for how many years?—A. Seven years, I think.

Q. What have you been accustomed to fish with?—A. I sail out with

a yacht; fish for bluefish, weakfish, and striped bass, catch some cod in the fall and winter.

Q. Where do you generally catch bluefish?—A. We catch them out along the beach, and in Barnegat Inlet.

Q. Have you caught any this year?—A. I have not one.

Q. Have you tried?—A. I have, and have not caught a fish. I tried until I got discouraged; saw no signs of them.

Q. How was it twenty-five years ago?—A. I was very small, but fifteen or ten years ago there were lots of bluefish.

Q. That you could catch with a hook?—A. Yes, sir; trolling; catch with a hook.

Q. How are the menhaden now as compared with formerly; are they less?—A. They are very much less; yes, sir. So far as my travels and experience have been, there is not a quarter.

Q. Did the menhaden ever run into Barnegat Bay?—A. Lots of them.

Q. Do they now?—A. Some, but not in large numbers.

Q. Have you ever seen a purse-net from these steamers in there?—A. No, sir; not in the bay. They cannot run in; there is not water enough; they have to come across the bar.

Q. How near the shore have you seen them?—A. I have seen them within 200 or 300 yards of the bar on the beach; say 400 yards; that is pretty close.

Q. How many have you seen at one time?—A. I have seen 18 or 20 in a fleet at a time.

Q. All steamers?—A. All steamers.

Q. How long is it since they commenced fishing here with these steamers?—A. I should say three or four years since I recollect seeing them so plentiful.

Q. Up to that time was there any difficulty in catching bluefish?—A. There was not. We have had good bluefishing. It has been dropping off for the last five or six years, five years anyway. I cannot tell exactly the time, but for the last five years we have not got many. Last year we did not get many, and this year we have not caught any.

Q. Have you ever heard what they catch on these steamers?—A. I never was on board.

Q. You do not know what they catch, then?—A. I have seen them take moss-bunkers, and I have every reason to believe they take other fish that get in their way; they do not seem to be very particular. I have sailed right around so I could talk to them.

Q. You never saw them throw out any fish?—A. Never saw them throw out any, no; they just scoop them right in.

Q. How is the sheepshead fishing?—A. That is only about middling; we are getting some sheepshead. They are troubled with the nets; that is the trouble; they keep bothering them.

Q. What nets?—A. Drift-nets in the channels. They have large nets; they drift the channels in the night; gill-nets that gill them.

By Mr. McDONALD.

Q. That is inside, is it not?—A. Yes, sir.

By the CHAIRMAN:

Q. You think they interfere with the sheepshead?—A. Indeed they do; that is the source of damage.

Q. How is weakfishing this year?—A. We have some weakfish; quite plentiful.

Q. How about striped bass?—A. They are very scarce.

Q. How long since they began to diminish?—A. They have been falling off for the last four or five years.

Q. About the same as bluefish?—A. Yes, sir.

Q. Have you any opinion as to what causes this diminution of fish?—

A. I have thought it was this purse-net fishing.

Q. Do you know of any other cause?—A. I do not know of any other cause.

Q. These seines would not interfere with the bluefish, would they?—

A. No, sir; I should think not; not to any extent.

Q. Or the striped bass?—A. They might take some striped bass; the haul-nets; but it has been my opinion that catching these menhaden is what has caused the dropping off of the striped bass and bluefish.

By Mr. CALL:

Q. Have you any idea where these menhaden spawn?—A. I have thought they spawn in our bays to quite an extent.

Q. What gave you that opinion?—A. I have seen them taken in the spring early with roe that looked to be ripe—nearly in a state for spawning; and then in the months of August and September I have seen them in large schools of thousands, about 3 to 4 inches in length.

By the CHAIRMAN:

Q. Young fish, you mean?—A. Young fish I suppose they spawned.

By Mr. CALL:

Q. What fish feed on the menhaden?—A. Bluefish, striped bass, and cod.

Q. Do you suppose they furnish the principal part of the food of the bluefish, striped bass, and cod?—A. Well, the bluefish and the striped bass we are of the opinion they do.

Q. They live chiefly on the menhaden, you think?—A. It seems that way to me.

Q. What effect do you think the prohibition of fishing within 3 miles of the shore would have on the supply of menhaden?—A. I think if the law was carried out, if it could be stopped, prevented; and be enforced, it would be beneficial, from the fact that, as far as my experience goes, the menhaden are a fish that comes right close along the shores. I have followed the sea along here, and have been back and forward along the coast, up and down, and, as far as my experience has been, the body of the menhaden are close in, within a mile and a half to two miles of the beach; oftener you find them within a mile.

Q. How far out are these boats fishing out here to-day?—A. I should say they are off three-quarters of a mile.

Q. I suppose you have been told they frequently fish out 20 and 30 miles from the shore; do you know anything about that?—A. Not to my knowledge they do not. I have never seen them.

Q. You think they always fish within 2 or 3 miles?—A. That has been the case when I have seen them; they seem to coast right along. It is seldom you ever see them 3 miles.

Q. What do you think is the difference in the quantity of menhaden now and before these steam-fisheries commenced?—A. I do not think there is one-quarter what there was ten years ago.

Q. How is the quantity of the bluefish and striped bass compared with what it was?—A. There is not any, you might say.

Q. They are almost entirely gone?—A. Almost entirely gone.

Q. And you attribute that to the menhaden-fishing with the purse-nets?—A. I do; I do not see any other cause for it. I believe that they

are troubled; that these bluefish are bothered with the nets, and that causes them to leave the coast. I think there might perhaps be food enough for them yet, but it looks to me as if in a very few years there would not be that; but I think they are a fish that easily gets scared, and the hauling of these nets makes them take some other direction.

Q. Have you ever seen them catch with purse-nets?—A. I have; yes, sir.

Q. Did they catch any fish besides menhaden?—A. I was not close enough to distinguish the different kinds. I took them, however, to be menhaden, the bulk of them, but from my experience with net-fishing they would take anything that came in the way; all fish that were mixed up with the menhaden, would be caught.

Q. Is it your observation that the bluefish are to be found in the schools of menhaden in any quantity?—A. Yes, sir; quite often; I have seen them.

Q. And how about striped bass?—A. The striped bass I have never seen moving in the schools of menhaden, but I have helped to take them right near by, and their stomachs would be filled with menhaden; so that was evidence they had been feeding on them.

Q. How about the cod?—A. They, as a rule, are a fish that live further off shore and on the bottom; they are a bottom fish, and all I know about them is that I have found menhaden in them in cleaning them.

Q. You have never seen them in the schools?—A. No, sir.

By Mr. McDONALD:

Q. Are the menhaden abundant off this coast this season?—A. I have not seen very many.

Q. Would you expect these steamers to be out here in numbers unless they were in abundance along the coast; they would not come here if they could not catch them?—A. Of course they are looking for them, and they take more or less; there is some, of course; they get some fish; I do not know how large a number.

Q. Your idea is that the bluefish run with the schools of menhaden; follow them up and feed on them?—A. They have been doing it heretofore.

Q. If you find the menhaden out there in quantities you would expect to find bluefish with them?—A. Formerly we have.

Q. But now you do not?—A. I have not been finding them; no, sir.

Q. Have you been fishing outside lately, or just in the bay?—A. I have not been outside lately; no, sir.

Q. Is there any fishing for bluefish outside along this coast now?—A. I have heard of very few being taken.

Q. I mean are they trying to take them?—A. Yes, sir; occasionally yachts go out from our place to look for them.

Q. How do they fish for them, by trolling?—A. They troll for them.

Q. They do not chum for them here?—A. No, sir; not down our way.

Q. Your experience runs back twenty-five years; have you known of any other years of scarcity for the bluefish before these steamers came on?—A. No, sir.

Q. You mean they were abundant uniformly before the steamers came on the coast?—A. Yes, sir.

Q. While you did not have the steamers until within 7 years you had quite a large number of sailing vessels engaged in this same business, had you not?—A. I believe there were; I did not notice them particularly.

Q. Fishing in the bay not only, but outside?—A. I have understood

there were, but at that time I was younger and did not go outside to know much about it.

Q. Well, using the same kind of nets as these steamers do, would not you expect the effect of the purse-seine fishing to be the same with sailing vessels as with steamers, as to frightening them off?—A. To a certain extent, but there are more steamers. It is carried on so much more extensively that it has that effect.

Q. As I understand, the steamers are not allowed in the bay now?—A. They do not come in; there is not water enough in our inlets.

Q. Is not there a law prohibiting their coming in?—A. I cannot say about that.

Q. The first purse-nets used to be in Barnegat Bay, did they not?—A. Not in Barnegat Bay; they have been taking them some in Egg Harbor; so I have been told; not to any very great extent; they were taken in sloops some, with purse-nets.

Q. How does the weakfishing compare now with what it was 10 years ago?—A. I cannot say but what the weakfishing is just as good as formerly.

Q. Has it increased as the bluefish have fallen off?—A. I do not know but what it has, if there is any difference. If there is any difference I think they are rather more plentiful.

Q. Then one effect of driving off bluefish seems to have been to increase the weakfish?—A. That seems to be the impression.

Q. Do you know that the bluefish feed on the weakfish?—A. I think they do; yes. I have caught them with weakfish in them.

Q. So that there has been some compensation, then, for the loss of the bluefish in the increase of the weakfish?—A. Well, comparatively small.

Q. What is the importance of your sea bass here; do you catch many of them?—A. Not to any very great extent; we get some very few around the rocks.

Q. Are there not sea-bass grounds outside?—A. I have been told so. I never fished around the banks.

Q. How does that fish compare now with what it was four or five years ago?—A. I do not know of my own personal knowledge, but I have been told it was not as good; I don't know about that.

Q. Your impression, then, is that the most falling off has been in the bluefish?—A. Bluefish and striped bass.

Q. In fishing for striped bass did not they use to take large numbers of the smaller bass in the coves?—A. Yes, sir; they have.

Q. With the nets?—A. I have been told they take them; I don't know anything much about that. I know they took quite a number with the nets.

Q. Well, you find the small striped bass close to the shore as a rule, do you not?—A. Yes, sir.

Q. You do not find them outside; they take to the shallow water inside?—A. As a rule.

Q. So the gill-fishing, then, would be more apt to injure them than the purse-fishing; I mean the seine-fishing and net-fishing inside?—A. I think it would.

Q. How about the sheepshead fishing?—A. That is not so good, owing to the drift-nets they are using.

Q. Does not that fluctuate very much from year to year; do not you sometimes find them in large numbers, and then a falling off, and then an increase again?—A. Not without being troubled with the nets.

Q. You think it is a pretty steady run?—A. A pretty steady run in Barnegat Bay. It has been for a number of years.

CHARLES L. TILTON sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Down here about two miles on the coast, at a place called Reed's Beach; Squam Beach; it has two or three names.

Q. How long have you lived there?—A. I have lived there three years.

Q. Where did you live before that?—A. Right across Barnegat Bay, at Cedar Creek.

Q. How long have you lived in this county?—A. About thirty-eight years.

Q. All your life?—A. Yes, sir.

Q. What is your business?—A. Fishing.

Q. Fishing for what kinds of fish?—A. Fishing for bottom fish with hook and line, and with nets off the beach.

Q. What descriptions of fish?—A. Bluefish, weakfish; that is the principal part of the fish we fish for.

Q. Sheepshead?—A. Once in a while; not very often for them.

Q. Have you caught any bluefish this season?—A. Have not caught but four with a hook and line.

Q. Have you tried?—A. Yes, sir.

Q. Tried in the ocean?—A. Yes, sir.

Q. How far out?—A. Standing right on the beach is where I fished this season.

Q. You have not been out with a boat?—A. Yes, sir; went once, but did not catch a fish.

Q. How far did you go from shore?—A. About two and a half miles.

Q. Did you see menhaden?—A. No, sir; I did not see any that day.

Q. Are there many near the shore this year?—A. No, sir; not very many.

Q. Not so many as there used to be?—A. No, sir.

Q. How long is it since the bluefish were scarce?—A. They have been falling off now for several years; there are not near as many as there were when I was a boy. I know there were plenty of them then.

Q. How long is it since these purse-nets began to run here?—A. I do not know as I am able to tell you how long. There have been more of them for the last three years than there were before.

Q. How many have you ever seen here at once?—A. I have seen over thirty. I will not say exactly the number, but I have counted over thirty.

Q. Have you ever been on them to see what they catch?—A. Yes, sir.

Q. What do they catch?—A. They catch bunkers, bluefish; I have been aboard of them and picked out bluefish among the bunkers.

Q. In the bins?—A. Yes, sir; right in the steamer.

Q. Any other kinds of fish?—A. I did not see any other kind.

Q. How many bluefish did you ever see in one of them?—A. I do not know exactly; we got eighteen, I know, out of one; they gave us eighteen; we could see more in there we did not get.

Q. When was that?—A. That is two years ago, I think, this summer.

Q. Have you ever been on them on other occasions?—A. No, sir.

Q. Only that one time?—A. That one time is the only time.

Q. If you can get bluefish from them in that way I should suppose

you would board them?—A. I do not suppose they would care about giving us fish.

Q. They do not like to have you do it, then?—A. No, sir.

Q. Did they make any objection the time you were there?—A. No, sir; they did not make any objection, but I would rather not bother them anyway.

Q. You can remember, then, when the bluefish were plenty?—A. Yes, sir.

Q. How many could you catch in a day?—A. I could not tell you now. I know when I was a boy there used to be plenty of them; caught lots of them.

Q. How old are you now?—A. I am thirty-eight.

By Mr. CALL:

Q. Have you any knowledge of where these menhaden spawn?—A. No, sir; I don't know as I have; they spawn, I suppose, somewhere along here in the sea and bay.

Q. Have you any idea of the quantity of bluefish that is caught by these purse-nets in the schools of menhaden; do you suppose there are many bluefish among them?—A. Sometimes I guess there is a good many.

Q. How many have you ever seen them draw in a purse-net?—A. A good many times; I could not tell.

Q. I mean when you have been near enough to tell what kind of fish they caught?—A. I have seen them several times last summer; been right close by them, so I could see them scoop them out with their nets.

Q. Could you tell what kind of fish they had?—A. They would catch bunkers, most of them; we could not tell what kind of fish they were.

Q. You have not any personal knowledge, then, as to what other kind of fish they catch when they catch menhaden?—A. No, sir.

Q. What is your opinion as to the quantity of menhaden now compared with what it was formerly?—A. I do not think there are near as many.

Q. Half as many, or quarter?—A. I do not think there are more than half as many as there used to be.

Q. Are the menhaden found near the shore, or far out?—A. Sometimes they are close in and other times they are off quite a piece.

Q. Do you think it would be practicable for these menhaden fishermen to fish profitably and successfully more than 3 miles from the coast?—A. I should not think they ought to come in closer than 3 miles.

Q. Do you think they could carry on their business and catch further than 3 miles off?—A. I guess they catch them as far as 3 miles off. I suppose there ought to be times when they could catch fish that far off.

Q. Does not the deep water interfere with their catching them when they get beyond the depth of their seines?—A. I do not think that makes any difference to them.

Q. You think they could catch menhaden with the water deeper than the seine?—A. Yes, sir; I don't think it would make any difference.

Q. It is not material, then, for the seine to go to the bottom?—A. No, sir; I do not think it is.

By Mr. McDONALD:

Q. Is the scup or porgy taken on this coast in any quantity? It looks something like the sheepshead, barred like the sheepshead, only it is a heavier, clumsier fish.—A. I don't know as I ever saw any of them.

Q. You have never seen a fish in its general appearance like the sheepshead ; it has not large teeth like the sheepshead, but the same general shape ?—A. We have what we call the porgy here, something the shape of the sheepshead.

Q. That is the fish. Is that taken in any great quantity on this coast ?—A. They are taking quite a good many above ; not so many down this way.

Q. How do they catch them ?—A. With a hook and line.

Q. They are not taken in Barnegat Bay ?—A. They catch small ones.

Q. You do not count them of any particular value ?—A. We do not count them here like they do up above here.

Q. How many pounds have you ever seen them ?—A. I have seen them weigh 2 pounds ; a pound and a half to 2 pounds.

JOHN W. PETTITT sworn and examined.

By the CHAIRMAN :

Question. Where do you reside ?—Answer. On the beach here.

Q. Name the place.—A. Highland Beach.

Q. How far from this hotel ?—A. It is about half a mile, probably a little over.

Q. How long have you lived here ?—A. I have always lived on the beach.

Q. What is your business ?—A. Fisherman.

Q. How long have you followed it ?—A. All my life ; at least twenty years.

Q. Can you remember the time when you could catch bluefish with ease ?—A. Yes, sir.

Q. How long ago ?—A. From twelve to fifteen years ago.

Q. How is it now ?—A. Bluefishing is very poor ; has been for some time along this way.

Q. For how long has it been poor ?—A. The fishing has been failing four or five years, getting worse every season.

Q. When did the purse-nets begin to come here ?—A. As near as I can remember, I have seen them three or four years.

Q. Has the bluefish disappeared since that ?—A. Yes, sir ; they are getting scarcer all the time.

Q. Have you caught any this season ?—A. No, sir ; have not caught but two bluefish this season.

Q. Have you tried ?—A. Yes, sir.

Q. Where ?—A. Down where I live, off shore.

Q. How far out ?—A. I suppose, 2 miles ; two and a half, along there.

Q. What did you bait with ?—A. Did not have any bait ; fished with a squid.

Q. That is what you used to catch them with ?—A. Yes, sir.

Q. The same bait you have been accustomed to ; did you ever try menhaden to bait them ?—A. Yes, sir.

Q. What success did you have with them ?—A. I caught them freely.

Q. Have you tried menhaden to bait with this year ?—A. No, sir.

Q. You might catch them, then, with that bait ?—A. I do not know ; there don't seem to be any ; we could not find any where we were off.

Q. How many did you ever catch in a day ?—A. I have caught with squids, standing right ashore there, as high as three hundred.

Q. Just fishing from the shore ?—A. Yes, sir.

Q. Just throwing out a line ?—A. Yes, sir ; with a squid.

Q. How long is it since you caught any in that way?—A. That has been some eight years ago since I caught as many as that. Almost every summer I catch a few, but very few in that way.

Q. How many have you caught this season?—A. Only two this season.

Q. How is it with the striped bass?—A. Have not caught any.

Q. Are they more or less plenty than formerly?—A. They are scarcer than they used to be some years ago; a good deal.

Q. They remain here after the bluefish leave, do they not?—A. Yes, sir.

Q. What do you suppose they feed on?—A. I do not know; they feed on little fish along the shore here.

Q. Did you ever see young menhaden here in the waters?—A. Yes, sir.

Q. How small?—A. I have seen them not over 3 inches long, and I do not know but I have seen them shorter than that.

Q. Did you ever notice whether there was any roe in them in the fall before they leave?—A. Yes, sir.

Q. You have seen that?—A. Yes, sir.

Q. Did you ever see any roe in them in the spring, when they first come on here?—A. Yes, sir; from the first to the middle of May you see roe in them, and about the middle to the last of May they spawn.

Q. What is their condition when they first come here?—A. Not very good.

Q. How are they before they leave in the fall?—A. They are good then; get fat.

Q. Is it the same with the bluefish?—A. Yes, sir.

Q. They come on poor and gain through the season?—A. Yes, sir.

Q. Do they go away about the same time?—A. Yes, sir.

Q. About what time of the year?—A. About the last part of October and first part of November.

Q. It depends upon the weather, does it not?—A. Yes, sir.

Q. They leave as soon as it gets cold weather?—A. Yes, sir; as soon as it begins to get cold they leave.

By Mr. CALL:

Q. You think the fish spawn here, then, on this coast; in the bays?—A. Yes, sir; I think they do.

Q. You find the roe in them when they first make their appearance here in the spring, in a condition to spawn?—A. Yes, sir.

Q. What do you think of the effect of this purse-net fishing for the menhaden on the supply of food-fish?—A. I think it hurts it a good deal.

Q. What effect do you think it has upon the menhaden?—A. I think they are catching them up a great deal, and there is not as many as there used to be. I've seen in times back more in one day than you see now in a month.

Q. Do you think there are half as many as there were?—A. I do not think there are half as many; I am satisfied there is not.

Q. It is your opinion, then, that in course of a few years the purse-net fishing will destroy the menhaden entirely?—A. Yes, sir; they have nets now very small and they are making nets still smaller.

Q. They are making the nets smaller; diminishing the size of the mesh?—A. Yes, sir.

Q. So as to catch smaller fish?—A. Yes, sir.

Q. Do you think the bluefish and the cod and the striped bass feed

exclusively on the menhaden?—A. Yes; bluefish do, and bass. We generally catch cod and large weakfish where they are; they generally follow.

Q. You find codfish and bluefish and bass following the menhaden?—A. Yes, sir.

Q. Where you find menhaden you find plenty of those other kinds of fish?—A. Yes, sir.

Q. That is your observation during the time you have been fishing?—A. Yes, sir.

By Mr. McDONALD:

Q. What sort of net-fishing is followed in the bay itself; what sort of nets are used?—A. They use what they call a crawl-seine, about 140 fathoms long, with a small mesh in the middle and get larger toward the end. Now, this time of the year they fish for weakfish and sheepshead down around the inlet and all kinds of fish they can catch.

Q. Do they fish any gill-nets in the bay?—A. Some; not as much as they used to.

Q. Any drift-nets?—A. Not that I know of.

Q. The crawl-nets you refer to are staked out, are they?—A. Yes, sir.

Q. Staked at one end and float with the tide?—A. Yes, sir.

Q. Are many striped bass taken by the haul-seines?—A. In the winter season, yes, sir; they catch them principally then.

Q. Large or small ones?—A. They catch some good sized ones, but they are not very large.

Q. Pan fish, are they?—A. Yes, sir.

Q. Do you attribute the falling off in the striped bass fishing to the purse-net fishing or to the haul-seines, or to both?—A. I do not know hardly. I suppose they both injure them some; but this time of the year, in the summer-time, the striped bass generally hang around the inlet, and drawing the seine there generally drives them out; keeps them out of the bay.

Q. The smaller striped bass you find closer in shore, do you not; you do not find them outside?—A. What we call the small bass generally come in the bay here.

Q. And stay here all summer?—A. Yes, sir.

Q. How large have you caught striped bass?—A. I have caught them sixty-four pounds.

Q. How long ago was that?—A. About six years ago.

Q. Has there been any of that size fish caught here recently?—A. No, sir.

Q. From some cause they have disappeared?—A. Yes, sir.

Q. What season of the year was it when you caught that?—A. That was in June. I caught it with a squid on the outside of the beach.

Q. Right where the menhaden run?—A. Yes, sir.

Q. Is there any fish as valuable as they are in this market?—A. Yes, sir; the Spanish mackerel is as valuable, and more so.

Q. Sell for more than striped bass?—A. Yes, sir; most of the time.

Q. How is the supply of Spanish mackerel?—A. There are not many along this coast.

Q. Did there used to be?—A. No, sir; it never was very plenty.

Q. Never was very plenty here?—A. No, sir.

Q. That is the reason, I suppose, for their commanding a good price?—A. Yes, sir.

Q. How is the price of bluefish now?—A. Bluefish, I believe, fetch a very good price now.

Q. How compared with former years?—A. They fetch a better price now than they have in times back.

Q. How much higher?—A. Well, they are 3 or 4 cents more a pound than they used to be.

WILLIAM H. MILLER sworn and examined.

By the CHAIRMAN :

Question. Where do you live?—Answer. I live over here about 3 miles, at Island Heights.

Q. On the Atlantic coast?—A. Yes, sir; I have lived there about two years.

Q. How long have you lived in this vicinity?—A. I have lived on the beach here about thirty-three years.

Q. Did you ever follow fishing?—A. Yes, sir.

Q. How constantly?—A. Oh, not much. I followed fishing with gill-nets; just haul-fishing.

Q. Did you ever follow bluefishing?—A. That is what I call it; blue-fishing.

Q. Where?—A. I suppose about two miles and a half up above here.

Q. In the ocean?—A. Yes, sir; we fished outside.

Q. How far out from shore?—A. I suppose it is about 3 miles.

Q. Formerly was there any difficulty in catching bluefish here?—A. There was not in those times; that is some time ago.

Q. How is it now?—A. You cannot hardly see one now, nor hear tell of one around here.

Q. Have you caught any this year?—A. No, sir;

Q. Have you tried?—A. Yes, sir; I have been looking for them; have not seen them; no chance to fish for them.

Q. Have you any opinion what produces the scarcity of bluefish?—A. All that I can give is the scarcity of food-fish.

Q. What makes the scarcity of food-fish?—A. I cannot tell without they are caught up by these purse-nets now. They are a fish that follows these menhaden; they live on them, and if there is nothing of that kind for them to come after they don't come.

Q. Have they diminished more rapidly since the purse-nets came here?—A. They seem to.

Q. So that it is difficult now to catch bluefish?—A. Yes, it is pretty near out of the question.

Q. How is it with the striped bass?—A. I do not see that they hurt that at all.

Q. Have you caught those this year?—A. No, sir; I do not fish for them, but others catch them. I do not think there is any difference.

Q. They are more valuable than bluefish, are they not?—A. Yes, sir; them and this perch; I do not think they hurt any other fish but the bluefish.

Q. What kind of a fish is the perch; you do not mean the weak-fish?—A. Oh, no; they are a winter fish.

Q. I am speaking of summer fish?—A. Yes, sir; well, I do not think they hurt anything but the bluefish. They do not catch bass; they do not interfere with them, but all the interference is with the bluefish.

Q. Their seines go to the bottom unless they get beyond the depth of them, do they not?—A. Yes, sir; they go to the bottom, but bass is a fish that don't live out there; he lives on these points, close in shore.

Q. On the rocks?—A. Yes, sir. Are you speaking about the striped bass or sea bass?

Q. I was speaking about the striped bass.—A. They live right along shore.

Q. How is it with the sea bass?—A. They do not interfere with them; they are away off on the rocks.

Q. Well, there is a black bass; how about that?—A. That is a fresh water fish; lives in the fresh water.

Q. What is the fish they call the sea bass?—A. That is a kind of a black fish.

Q. Does it live on the rocks?—A. Yes, sir.

Q. Do they feed on the menhaden?—A. No, sir; they live on something they get off the rocks, shells or snails or something.

Q. Do you know any cause for the decrease of bluefish except the use of these purse-nets?—A. No, sir; I do not.

Q. Do you think that is the cause?—A. I do not know of anything else that should be the cause.

Q. The fish are healthy, are they not?—A. Yes, sir.

Q. There has been no disease that has carried them off?—A. No, sir; they are a fish that will go where they have got something to go for.

By Mr. McDONALD :

Q. You think, then, the only hook and line fishing that is interfered with by the purse-net fishing is the bluefishing?—A. I think so.

Q. What, in your opinion, has been the cause of this great falling off of the striped bass?—A. I don't know. I do not see but what the striped-bass fishing is just as good. Some seasons the fishing will be better than it is other seasons.

Q. Have you known any periods of scarcity of the bluefish before this purse-net fishing became so large?—A. Oh, yes.

Q. You have known them to fall off to a very small number?—A. Yes, sir. Now, twenty-five years ago bluefish was very plentiful here. Many a time I have gone over here and caught as high as a thousand weight with a squid just flung off the beach; they kept dropping off; fishing was not so good, but you always could get all the fish you wanted until now within a few years.

Q. You think there is some other cause for the disappearance of the bluefish?—A. Well, there were some seasons it would be very good fishing along here, and some seasons it would not be so good; the fishing you would think would be very slim, which it would.

Q. What time do the bluefish generally strike in here?—A. Generally commence by the first of September or October; that is what we call fall fishing, but when they come from the southward they come along here in May—the latter part of May or June; about the first of June.

Q. You do not expect any bluefish before about the first of June?—A. No, sir; I do not look for any before that time. You might occasionally strike one before that time, but hardly ever.

Q. How late have you ever known them to make their first appearance for the season?—A. I do not know that I can tell you.

Q. Ever as late as this?—A. No; never as late as this; always before this. There has always been plenty of fish, but this season there don't appear to be any. I guess there has not been a half dozen caught off here this season; that is, fishing with a squid off the beach.

EUGENE LONGSTREET sworn and examined.

By the CHAIRMAN :

Question. Where do you live?—Answer. I live at Manasquan, Monmouth County, New Jersey.

Q. How long have you lived there?—A. I was born there and have lived there all my days when I have been at home. I am a sailor by profession.

Q. What is your age?—A. Thirty-six.

Q. How far is Manasquan from here?—A. It is 12 miles north of here.

Q. What is your business?—A. Sailor.

Q. Have you ever followed fishing?—A. I have.

Q. For how many years?—A. I do not know exactly. I have followed fishing altogether probably four years—that is fall fishing for bluefish.

Q. Are the bluefish more or less plenty than formerly?—A. I have been sailing a yacht out of Squam Inlet for fifteen summers except this year; my parties all depend on catching bluefish, and that has made our sailing and yachting, and now I have had to leave there; we have no bluefish; fewer than I have ever known.

Q. That is, at your point?—A. At our point.

Q. Where do you find bluefish now?—A. We hear of but very few being caught along the coast this side of Chincoteague, the eastern shore of Virginia. These menhaden boats do not fish very much south of Chincoteague.

Q. How long is it since the menhaden boats began to come here?—A. I could not say exactly; the menhaden fishermen have been on the coast probably eight years, but they have not injured our bluefish so much as they have within the last four years—the steamers. The sailing vessels did not do damage because they could not catch a school of fish at any point they wanted to. If they happened to have a head wind the fish would go faster than they could, but the steamers can overtake them if they can sight them; they can surround them where they see a track in the water.

Q. Have you seen any steamers this morning?—A. I counted ten off here this morning.

Q. How near the land?—A. The closest one I saw was half a mile from the shore. I have seen them so close that when they laid their nets they had to run a line to the steamer in order to get deep water enough to purse it.

Q. Have you ever been on them when they made hauls?—A. Yes, sir; a good bit.

Q. What kind of fish do you know of their catching?—A. I have got out of their boat—sometimes they gave them to me, sometimes I bought them—weakfish, bluefish, and mossbunkers, which was their principal fish. There are none of these mossbunkers but what are mingled more or less with weakfish and bluefish.

Q. Do you know of any other reason for the disappearance of the bluefish?—A. I do know exactly; that is, I think I know; catching the bunkers takes their feed away and where there is no feed there are no bluefish in the fall of the year. That is the only sign we have. When we saw a school of bunkers raise we were sure we would have a school of bluefish; wherever the bunkers are the bluefish go, and weakfish also. We have lain, in fall fishing, for a week watching the bunkers. I have seen thousands of acres of them just flapping in the water;

then we lay quiet; we do not put out. We can tell the minute the bluefish strike them. When they come around they start, and they form just the same as a vessel's bow going; then we lay our nets and get the bluefish.

By Mr. CALL:

Q. How can you manage to catch the bluefish without catching the bunkers?—A. The mesh of the bluefish-net is large enough to let the bunkers go through.

Q. What size mesh do you use to catch bluefish?—A. That I could not say.

Q. Well, about what size?—A. I am not positive; I think about a 3-inch mesh for gilling bluefish.

Q. The bunkers will go through that?—A. The bunkers I know go through the mesh we catch the bluefish with.

Q. They go through what you call a bluefish-net?—A. Yes, sir.

Q. Will the weakfish? Do you catch bluefish and weakfish in the same net?—A. It is very seldom that we gill weakfish.

Q. It is the gill-nets you take bluefish with, then?—A. Yes, sir; but that is all done away with; there are no bluefish in the last three years to set a bluefish-net for.

Q. It will not pay the expense of doing it?—A. No, sir.

Q. What are you doing this season?—A. I am sailing a yacht from this pier—Berkeley.

Q. That is your place of business?—A. Yes, sir; it has been this summer.

Q. From the pier here in the bay?—A. Yes, sir.

By Mr. McDONALD:

Q. How do you know that the bluefish are plenty off Chincoteague?—A. I have been coasting up and down there for about eighteen years, and any time that we pass at this time of the year we never have any trouble in catching all we want with our squids, trolling off the vessel; but for the last three or four years it is very seldom we get a mess of bluefish north of that in trolling up with the vessel.

Q. Do not the menhaden boats fish all the way down there?—A. They fish, but not so constant; there are not enough to drive the fish; they have got a larger space of ground; the fish have a better chance; but there are so many boats here, probably thirty sloops, and here are ten steamers in sight this morning, about, that they are overlooking every foot of ground from here to Barnegat.

By the CHAIRMAN:

Q. How many have you ever seen at once?—A. I never counted more than I have this morning; they are close together this morning, but they are not near as close in as I have seen them. I have seen their boats positively filled and they had to let their boats go on the bar. I saw three of the men overboard and they lost their lift of fish by being so close on the bar they could not haul their nets.

By Mr. CALL:

Q. What is your opinion as to where these menhaden spawn?—A. That I have not the least knowledge of.

WILLIAM P. CHADWICK sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. I live about 4 miles above here, on the beach. I am keeper of the Life-Saving Station there.

Q. By above, do you mean north or south?—A. North; about 4 miles north of here; I think it was the first station established on the beach.

Q. How long have you lived there?—A. Twenty-five years.

Q. What is your occupation?—A. Wrecking, fishing, gunning, everything; all about the water.

Q. What do you know about the supply of food-fish along here compared with former years?—A. Take it now and twenty years ago, there is not any to what there was then; it is merely nothing.

Q. Have they materially diminished within a few years?—A. Yes, sir; a great deal; one-half I think.

Q. What is the cause of it, in your opinion?—A. My opinion is it is these oil factories that are the instigation of it; they catch the food up and they drive the other fish away. What they do not catch they drive away.

Q. Frighten them away?—A. Yes, sir.

Q. Have you caught any bluefish this year?—A. I have not caught one. Two of my boys did about two weeks ago; one caught eight, and the other fifteen; that is all they have caught this summer.

Q. How long is it since these purse-nets came here this season?—A. They come about the first of May. They do not stop here when they first fish, they go on down to Cape May to get the fish as they come on; they fish there from two to three weeks and then come here. They go down to meet them and follow them up.

Q. And keep fishing them as they come up?—A. Yes, sir.

Q. Where are these boats that catch fish here from?—A. Long Island; they have got two factories there. There is a factory at a place called No Man's Land, I believe.

Q. There are several at Barren Island, are there not?—A. There is one at Barren Island; yes, sir. I have never been to any of those factories and do not know anything about them.

Q. Have you ever been aboard of one of these vessels when they were catching?—A. I never was near enough to see them but once. I was very close then; right by the net. They were catching menhaden and some few weakfish and striped bass and sheepshead, that they hauled in; they did not dump those in with the other fish; they took them out and put them on deck; I don't know what they did with them; I did not stay until they got the fish all out; I do not know what they did with them after I left.

Q. Nor whether they threw out all that variety of fish?—A. I think not.

Q. You could not tell as to that?—A. No; I could not tell exactly.

By Mr. CALL:

Q. How many bluefish, weakfish, and sheepshead were there?—A. I saw them take out three or four sheepshead and three or four bluefish; I suppose about enough for their own use. Of course I asked no questions, and did not go aboard to see.

Q. Do you know any other reason, except the purse-nets, for fish being so scarce?—A. No, sir; I do not.

Q. The result is that fish are dearer than they were formerly, are they not?—A. Yes, sir; we used to get them for 1 cent and 2 cents a pound at the highest, and now I am paying 7 cents, and cannot get them at that.

Q. Do you know whether places of public resort here have to send to New York or Philadelphia for fish?—A. Oh, yes; they had to send to New York and Seabright for fish that I am buying now.

Q. That is, there is not enough caught here now to supply the home consumption?—A. No, sir; there is not enough fish caught with hook and line, that is bottom fish, from my place to Barnegat Inlet, to supply the houses on the beach.

Q. How far apart are these life-saving stations?—A. From 2 to 4 miles; they differ a little; they are calculated to be 3 miles, but some of them are 4 miles.

Q. Do you keep a list of these menhaden boats that pass your station?—A. Yes, sir.

Q. How many have you ever seen at once?—A. Sixteen I caught once.

Q. When was that?—A. That was last fall; that was the most I ever saw.

Q. How many is the most you have seen in any one day this year?—A. I think I saw ten yesterday; I saw seven this morning.

Q. They can reach here without going in sight of you, cannot they?—A. No, sir; I can see them.

By Mr. McDONALD :

Q. Do you know from how far north these steamers come?—A. No, sir; I do not know how far the furthest factory is; it is pretty well up, though. They used to come away from this place that they call No Man's Land, and then away from Tiverton, but I am not positive as to where their places are.

By Mr. CALL :

Q. Do you know anything about where these fish spawn; you said something about going south to meet the fish?—A. All I know about their spawning is what I see in the bay here. Those menhaden go up in the heads of all the bays, up in the headwaters, and spawn. They spawn in our bay, up in the head of the bay, in the spring. The large ones used to come in that weighed a pound; when those big fish came the head of the bay, along in September, would be full of little menhaden. You would see thousands and millions of schools of them; the water would be all of a tremble with them, but you do not see any there now; they do not spawn, but they did those days, say ten years ago.

Q. Then these fish that the boats go south to meet, you suppose to be coming from where they spawn now, do you?—A. I think a great many of them spawn north. I think they spawn by the headwaters. When they go up in fresh water they go clear up, and in the latter part of August you will see thousands of these little young menhaden about that long (indicating). I have seen them haul nets up there.

Q. What time of the year was that?—A. About the latter part of August and in September, and then I see them when they go out, the first of October.

By Mr. McDONALD :

Q. When they are first hatched they cannot be more than a fraction of an inch long?—A. No, sir; they are very small.

Q. And fish of the size you speak of must be two or three months old?—A. I think they spawn in the latter part of July.

Q. Did you ever see very young schools of them?—A. Yes, sir; not longer than that (an inch).

Q. Are you sure they were menhaden?—A. Oh, yes; I was born with them, and know what they are.

Q. Do you have the alewife up in your bay?—A. No, sir.

Q. It does not run in your bay at all?—A. No, sir; I do not think I

ever saw them there. I saw plenty of them in the southern rivers; never saw any here.

By Mr. CALL:

Q. You said awhile ago that when these boats in the spring of the year crossed over direct to Barnegat to meet the fish, that would seem to indicate that the fish were then coming from the south to the north?—A. Yes, sir; they go south in the fall and come north in the spring. They all go in October or November. You never see them much later than the middle of November; sometimes, if it is warm, you see them the latter part of November.

Q. And they come here before they have spawned in the spring?—A. Yes, sir; in the spring. You understand when they come north they are very thin. If you get them in October outside here, when we could catch them with a set-net to sell, they were fatter than a shad, and almost as good as a shad salted. I have caught and sold as high as twenty-five thousand in a day.

Q. To eat?—A. Sold them to people on the mainland, barrels and barrels of them. I have sold for 50 cents and 75 cents and a dollar a hundred.

By the CHAIRMAN:

Q. They corned them?—A. Yes, sir; for their own use. Now they cannot get one for money.

By Mr. CALL:

Q. Would they use them if they could get them?—A. Yes, sir; there are hundreds of people that live back in the country would rather have them than bluefish.

By Mr. McDONALD:

Q. Well, the factories do not pay more than 75 cents a hundred?—A. Yes; they use them for oil and we use them for food; that is the difference. When I first commenced fishing I had two nets; I had a bluefish net and a bunker-net, as we called it then——

By the CHAIRMAN:

Q. Just give the size of the meshes.—A. We used 3-inch mesh for gilling menhaden, but these fellows use a very small mesh; an inch and a quarter or inch and a half bar makes a 3-inch mesh.

Q. What do you say about the nets they are now using?—A. The net they use is a very small mesh; they catch everything; they catch all the little ones. I was just going to give you a little idea of the fishing now and when I first commenced fishing. I had two nets, one bluefish-net and one mossbunker-net that I used to set out ahead of a school and gill. I have gilled as high as twenty-five thousand in a day in it, and once or twice we gilled that many in one gill, and sold them; and I have caught as high as ten or eleven thousand pounds of bluefish in that one net in a day, and sold them as high as from about 2 to 3 cents a pound, and I did sell some for 4 cents along late in the season when they were getting scarcer.

Q. And the mossbunkers you sold by the hundred?—A. Yes, sir; from half a dollar to 75 cents and a dollar. If they were scarce I have sold them for a dollar.

Q. How many would fill a barrel?—A. I think it takes about two hundred and forty for a large barrel.

By Mr. McDONALD :

Q. What direction are the menhaden heading when they first take in here?—A. Heading north.

Q. Coming right up the coast?—A. Right up the coast towards Sandy Hook and Long Island. They come right along the coast. Our shad come right along here when they go to New York. As I was telling you about the fishing then and now; I have fished eleven years, until they came down with these nets in schooners. Even before they had the steamers you would see twenty or thirty schooners, and they caught fish right in where we were and broke our fishing up.

By the CHAIRMAN:

Q. Schooners broke it up?—A. Yes, sir. There were six of us, and we had two boats. We used to commence fishing about the 1st of September and stop about the 1st of December or middle of November. We used to sell from \$1,400 to \$1,600; \$1,600 was the highest I think we sold, and then I could go, along from the first of June, sometimes the middle of May, at high water, over to the beach most any time and catch all the fish I wanted; weakfish.

By Mr. McDONALD :

Q. How many in your crew?—A. Six.

Q. That was \$200 or \$300 a share?—A. It was. I think, with our expenses out, we cleared a little over \$300 apiece right along in the fall.

By Mr. CALL:

Q. What length of time?—A. We fished eleven years.

Q. Three hundred dollars for what length of time?—A. About two months.

Q. For two months you would make \$300 apiece?—A. Yes, sir; about that; some times more. I suppose I caught more bluefish with a squid right off the shore than any man in the State of New Jersey. I caught 1,600 pounds in a day.

Q. You had a boat, had you not?—A. No, sir; right along on the sand. There has not been that many caught in two years now from Squam to Barnegat.

By Mr. McDONALD :

Q. You stated that the hook and line fishing had fallen off here very much; do you mean that remark to apply to bluefish only?—A. All kinds.

Q. How is it with regard to weakfish?—A. There are no weakfish to what there used to be. We used to catch in the bay all the way up to my place and above, and right by my land I could go down and catch fish that would weigh 2 and 3 pounds, but there are none there now. I do not believe we have caught one in three years.

Q. How is it with the sheepshead?—A. There are no sheepshead up with us; there used to be, but there are none now.

By the CHAIRMAN:

Q. They do not feed on menhaden?—A. No, sir; not sheepshead, but large weakfish do.

LIFE-SAVING STATION,
Long Branch, N. J., July 18, 1883.

WALTER S. GREEN sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Long Branch.

Q. How long have you lived here?—A. I was born here. Forty-five years, I believe, is my age.

Q. Are you the keeper of this life-saving station No. 5?—A. Yes, sir; have been in the business 24 years.

Q. How long have you been keeper?—A. I have been at this house now 4 years.

Q. What has been your business, principally, since you arrived at manhood?—A. Fishing; that is about all, and farming. I have got a farm back here.

Q. Have you devoted a good deal of time to fishing?—A. Yes, sir.

Q. What were the principal fish that the people used to catch in an early day, say fifteen years ago?—A. Bluetfish, sea bass, blackfish, weakfish, and we caught a great many mossbunkers in the fall of the year.

Q. What did you do with the mossbunkers?—A. Sold them back all over the country to salt.

Q. What did the people do with them?—A. They salted them away for winter use.

Q. They pickled the fish?—A. Yes, sir.

Q. Were they regarded as a good fish?—A. Splendid fish; everybody liked them.

Q. Have you ever eaten them?—A. Yes, sir; rather have them than any fish that swims.

Q. You mean salted?—A. Yes, sir.

Q. You do not mean fresh, do you?—A. Yes, sir; catch them to-day and throw a little salt on them. If you get them corned, I would rather have them than Boston mackerel.

Q. How is the supply of these varieties of fish now compared with what it was ten or fifteen years ago?—A. We do not get any mossbunkers at all; we do not catch the bluefish along the coast here; we used to catch them here every day pretty near with the hook and line.

Q. How about the weakfish?—A. We catch quite a good many weakfish now.

Q. And sea bass?—A. They vary different years; some springs they catch lots of them, and catch them in the fall, a few.

Q. Striped bass?—A. We do not catch as many of them as we used to. I remember my father used to come down here just before sundown with a bone squid, sheep shank, and catch as many as he wanted.

Q. How large have you ever seen any caught?—A. I caught two myself; one weighed 22 and the other 32 pounds.

Q. Have you any theory as to what causes this diminution of fish here?—A. The mossbunkers?

Q. All kinds of fish.—A. The purse-nets are destroying mossbunkers, and, of course, that keeps the bluefish away.

Q. Does it not keep striped bass away?—A. I don't know how it works on the striped bass.

Q. How long is it since the purse-nets began to come here?—A. Really, I do not know how long it has been; I could not tell exactly.

Q. Have the menhaden and bluefish diminished perceptibly since they began to fish here?—A. Oh, yes, I should think so, in size and number.

Q. When the menhaden first come in the spring what is their condition?—A. They are not very fat.

Q. They grow fat until they leave in the fall?—A. Yes, sir; they go east; they spawn in the bays here and then they come back just as fat as they can be.

Q. You think they spawn here, do you?—A. Not here, but in the bays east of us. I have seen the fat that thick [indicating] on the back.

Q. By that you mean quarter of an inch thick?—A. Not quite quarter of an inch.

Q. Then they are not good for oil when they are caught early in the season?—A. No, sir; they want those big fat ones to make oil out of. Now they are very small, little poor ones.

Q. What kind of craft do they use here in fishing with purse-nets?—A. They have steamers and sail vessels.

Q. Where do the sail vessels operate now?—A. They are mostly in the bay now.

Q. What bay?—A. New York Bay and Little Egg Harbor; I saw them down there summer before last hauling in Little Egg Harbor.

Q. You saw a sail-boat haul a purse-net there?—A. Yes, sir.

Q. How many of those steamers have you ever seen pass here in one day?—A. I never kept count of them, but I will guarantee fifty; there may be a hundred and fifty for all I know; a steady string of them.

Q. Well, these that are just coming back now went down this morning, did they not?—A. Maybe they went this morning, and maybe they went last night. They are going all the time.

Q. To and fro?—A. Yes, sir.

Q. Where do they go?—A. They go to these factories; I do not know exactly where they are; on New York Bay somewheres.

Q. Suppose they were prohibited from catching within 3 miles of the shore with the purse-nets, what would be the effect of that?—A. Of course it would be effective. They would soon learn to run for all these inlets. If they were let alone in the bays here, of course, they would go to spawning.

Q. Did you ever see young menhaden here?—A. I have seen them very small. I have seen them that length [indicating].

Q. Two and a half inches?—A. Two and a half to three and a half; very small. I should judge it used to take about 60 to make a bushel. Now it takes of what they catch now 250 to make a bushel.

Q. What did they use to catch them with when they sold them to farmers?—A. We used to have gill-nets; 6-inch mesh; let the little ones go; could not sell the little ones. A fish wants to be very fat to be good if you are going to salt it.

By Mr. CALL:

Q. What do you mean by a 6-inch mesh?—A. Why 6 inches from angle to angle, stretched out. These fellows fish about 2-inch mesh, and they catch everything.

Q. Six-inch mesh would be very large, would it not?—A. Oh, yes, you are right; I am mistaken. It was a 4-inch mesh or 3½. I was talking about fishing for sheepshead; a 6-inch mesh that is. There is a good deal of difference.

By the CHAIRMAN:

Q. Have you caught any bluefish this year?—A. No, sir; I have not been fishing this year at all.

Q. Why not; is it because it is not any object to do so, or because

you have not had time?—A. Well, it is pretty hard work. I have had time, but do not do anything at it.

Q. Did you used to get bluefish offshore here?—A. Yes, sir.

By Mr. CALL:

Q. They are scarce; difficult to catch, I suppose?—A. Yes, sir; now. Yesterday they caught quite a good many bluefish off shore by chumming, but to-day they did not catch many. I have caught them with a pitchfork right along the beach, and shot them; shot their heads off.

Q. What bait is the best to catch bluefish with?—A. Mossbunkers; that is the only bait you can catch them with.

Q. That is the bait the fishermen use?—A. Yes, sir; use it altogether. We used to use a lead squid the shape of a fish, but they do not bite that any more; do not take it.

Q. That is what you call a squid?—A. Yes, sir.

Q. These menhaden, I suppose, is the fish that is cheapest and feeds the greatest number of people, does it not?—A. It does for the winter, for salt fish; we have sea bass and black bass now and other kinds of fish.

Q. It is the only fish that you put up very abundantly, is it?—A. Yes, sir; they are put up because they are cheap. They used to put up these large bluefish, but we do not catch them in the fall of the year; these fellows from the city keep them off shore.

Q. I understand, then, that your idea is that these menhaden would be the food for the poor class of people?—A. Yes, sir.

Q. Do you regard it as an important means of subsistence for them?—A. Yes, sir.

Q. Now, is there a general demand on the part of the people that there shall be some legislation on this subject?—A. I think there ought to be.

Q. You think there is a general feeling that this menhaden fishing should be restricted in some way?—A. You can ask every man on the coast and he will tell you yes.

Q. The feeling is universal, then, is it?—A. Yes, sir; it is the talk all over. Some said if the Government only gave them the privilege of using guns off here to shoot these fellows they would do it free gratis. There is no question that they will destroy all the menhaden, and then the bluefish will leave the coast.

Q. You are of the opinion, then, from your observation, that the menhaden fishery will soon be exhausted as carried on now?—A. I should think it would be, the way it is carried on.

Q. How long would it be before they exhaust the supply of menhaden?—A. In about two years, because they cannot make any oil out of them now.

Q. You think they have already run off or destroyed the larger ones and are fishing for the smaller ones?—A. They have run off all the larger ones, I understand, and then they do not allow them to go and spawn. It is like shooting game in the fall of the year; every female you shoot you destroy so many.

Q. You are confident, then, that with the present mode of fishing, the menhaden fishing will be destroyed?—A. There is no question about it.

Q. How much do you think they have diminished in quantity during the last eight or ten years?—A. It is hard to say; it is a large number.

Q. Well, compared to what it used to be. You say they were very abundant and now you think there are very few. Do you think there are half as many as there were when you first commenced?—A. I do

not think there is anywhere near as many as there used to be. There used to be acres and acres of them, a regular sea of them. We used to lay our nets for them and catch thousands and sell them. Now I do not believe there is a gill-net on the coast; not that I know of. I gave it up three years ago.

Q. Is it the general opinion here among the fishermen that the menhaden would be exhausted, the supply destroyed, by the present mode of fishing?—A. Oh, yes; it cannot help but be. Of course these purse fellows will quit it for a year or two, until they multiply again, because they cannot make money at it. The fish are so small and poor now that it don't amount to anything. I should think there are other ways to make oil instead of taking food. The oil is good for nothing anyway.

Q. Have you ever seen them draw one of these nets?—A. Yes, sir.

Q. Do they catch any other fish besides menhaden?—A. They catch weakfish; that is about all; they catch a great many weakfish sometimes.

Q. Do they run with the mossbunkers?—A. No; they run into them, and eat them. Sometimes they will lie on top of the water and look like mossbunkers, but it does not make any difference to these fellows; they will catch anything they can.

Q. You think, then, that the purse-net fishing is destroying both the menhaden and the food-fish too?—A. They do not catch so many food-fish; it is the menhaden they destroy, and they are food for the fish; the bluefish feeds on them and the weakfish, too, sometimes.

Q. Do bluefish feed on anything else besides the menhaden?—A. They will feed on anything; that is their principal feed. They are a good deal like a dog; they get hold, they never let go. The mossbunker is their principal feed.

Q. And you think the mossbunker spawns in the bay here in this part of the country?—A. Yes, sir; they go on east and different places; no doubt they spawn in Egg Harbor.

Q. Everywhere along the coast, I suppose?—A. Yes, sir.

By the CHAIRMAN:

Q. Have you any idea, then, why they go south in winter?—A. Warmer water, I suppose; warmer climate.

Q. I suppose a sailing vessel cannot pursue a school of menhaden unless the wind is favorable?—A. No, sir; that is the trouble, and if it looks like a storm a sail vessel has to go into harbor.

Q. And for that reason the steam vessel has the advantage?—A. Oh, yes.

ASHER WARDELL sworn and examined.

By the CHAIRMAN:

Question. How are you employed here?—Answer. I am in what is called the pound-fishery business.

Q. For whom?—A. For myself.

Q. Where is your residence?—A. I live on West End avenue, about 1 mile from here.

Q. At Long Branch?—A. At Long Branch; yes, sir.

Q. How long have you lived here?—A. I have lived here now some forty years; always resided here; was born here.

Q. Have you followed that business all the time?—A. Most of the

time in the summer since I have been old enough I have followed the fishing business.

Q. What kinds of fish did you use to catch about here?—A. We used to catch, when we fished at bottom fishing, sea-bass, porgies, and all sorts of fish.

Q. Striped bass?—A. Very few striped bass. Since we have been in the Life-Saving Service I have hauled a seine for striped bass.

Q. Did you ever catch the menhaden?—A. I have.

Q. What was done with them?—A. They were sold here.

Q. To whom?—A. To the inhabitants of the place; we could get a dollar a hundred for them.

Q. How far out in the country did they go?—A. They went 20 miles; and were salted down for food for the winter.

Q. What kind of a fish were they for that purpose?—A. They were an excellent fish.

Q. What season of the year were they caught for that purpose?—A. The last of October and the first of November.

Q. Shortly before they went away?—A. When they were going south is when they were caught; when they were leaving the north to go south.

Q. They go north of here then?—A. It seems that they go north or east, I don't know which. They go into the bays; our rivers used to be full of them, and then when they begin to go south the worms would be out of the fish. When they first come here they are full of worms; there is a little worm in them, and they go around in the bays and afterwards they begin to fat up, and then, as soon as they get into salt water again, in the ocean, the worms leave them, and then, in the fall of the year, we mesh them with gill-nets; we used to fish with $3\frac{3}{4}$ -inch mesh to gill them.

Q. How many have you caught in a day?—A. I have helped to land 50,000 fish.

Q. In one day?—A. Yes, sir.

Q. And got a dollar a hundred?—A. Yes, sir; our price in the commencement of the season would be a dollar a hundred, and the second week we would get the price down to 75 cents a hundred for them on the beach.

Q. And people come with their teams and take them away?—A. Yes, sir; come and take them back in the country and sell them.

Q. Have you eaten them salted?—A. I have.

Q. Did you ever salt them for your own use?—A. I have.

Q. How long did you keep them?—A. Until the next summer.

Q. All through the winter?—A. Yes, sir.

Q. And they were a good salt fish?—A. A good salt fish. If I could catch them like we used to have them, I would rather have them than the bluefish salted. The only trouble about them is the bones, and if they were the same size as the shad, there is no more trouble than there is with the shad.

Q. The bone is not so objectionable with a fish you boil as it is with one you fry?—A. No, sir; I don't think it is.

Q. And you boil them of course?—A. No, sir; I don't think we ever boil a menhaden; soak them and fry them.

Q. The same as mackerel?—A. Yes, sir; just the same.

Q. Are they more bony than the mackerel?—A. Oh, yes.

Q. What fish have you caught this year?—A. We are not in the hook and line; this is the net-fishing now. The first fish that we commence to catch the first of June is the little butterfish, a little bit of a flat fish,

and then after him comes the sheepshead and also the weakfish; but we can catch very few bluefish in the pound unless we happen to go and lift just the time they go in; they go out. That is the principal part of the fish we are catching; the sheepshead, butterfish, and weakfish.

Q. Have you caught many sheepshead this year?—A. We have caught a good many; we have landed as high as 400 or 500 at one time.

Q. In what depth of water do you fish for them?—A. In 26 feet of water.

Q. What do they feed on?—A. They feed on the crab.

Q. They do not feed on these mossbunkers?—A. No, sir.

Q. The weakfish and bluefish feed on the mossbunkers?—A. Yes, sir.

Q. That is the bait you use to catch them with?—A. That is the bait we use to catch weakfish or bluefish when we are baiting.

Q. What is your opinion as to the cause of the decrease in the fish?

—A. I have no other opinion only this oil business; that is the only opinion I have. I seem to think that is what is causing the scarcity of fish on this coast.

Q. Can you catch menhaden now in any quantity?—A. No, sir; very few.

Q. They are not caught and sold to the people as they used to be?—A. No, sir.

Q. How long since that stopped?—A. To the best of my knowledge, I will say six or seven winters or falls; somewheres thereabouts.

Q. The practice of selling to the people continued up to that time?—

A. Yes, sir, or about the time they began to use these purse-nets.

Q. And since that the people have not had these fish?—A. No, sir; even if they get them, and we may catch a few in the fall, they are not fit to eat.

Q. Why not?—A. They are too small.

Q. The large menhaden, then, are not found here now?—A. They are not found here; no, sir.

Q. How large have you caught them?—A. I have caught menhaden that would weigh a pound and a quarter; a pound and a half. As I said before, we used to fish for menhaden with our gill-nets 3 and $3\frac{1}{4}$ inch mesh. Now, if you find a school to lay around you would not catch enough to pay you to lay around. The fish would go right through a mesh of that size now.

Q. Do you know any other cause for the decrease of fish?—A. No, sir; I don't know of any other cause.

Q. How many of these menhaden vessels have you seen in a day?—A. I have seen, I think, fifty steamers and sailing vessels.

Q. In one day?—A. Yes, sir, in one day. I don't know but what I have seen more than that.

Q. Going which way?—A. Going both ways; some loaded going north, and others coming this way.

Q. Empty?—A. Yes, sir; coming back to load up.

Q. The menhaden go north in the fore part of the season, do they not?—A. Yes, sir.

Q. Do the boats follow them north?—A. They do.

Q. And then in the fall when they start south do these boats follow them?—A. Yes, sir. These boats will go south in the spring of the year to meet them as they come this way, and follow them on up as they come up. As soon as they cannot make a good business of it around in the bays, then they will come outside here again and try.

Q. When the menhaden start to go south in the cool weather do the boats follow them?—A. Yes, sir.

Q. Do you know how far south they go?—A. I do not.

Q. How much is the most you ever made in any one year?—A. At the fishing business?

Q. Yes.—A. Well, that I don't know.

Q. Well, about what amount?—A. About \$600.

Q. How much can you make in a year now?—A. To take the business that I was at then I could not make \$300; not at what we call bottom fishing. Of course this fishing we are at now is altogether different fishing from the bottom fishing.

Q. What is that?—A. That is pound fishing; that is altogether different fishing. The fish we are catching in there are not what we would use bait for.

Q. What do you catch in these pound-nets?—A. We are catching the small weakfish—once in awhile we catch a large weakfish—and the Spanish mackerel.

Q. Is there a ready market for all you can catch?—A. Yes, sir.

Q. Can the fishermen here supply this market, or do they have to send to New York?—A. Part of the time they can.

Q. Can they with bluefish?—A. No, sir; they cannot; they have to send away to get bluefish.

Q. Where do they send, do you know?—A. To New York or Philadelphia.

By Mr. CALL:

Q. Do you call the weakfish another kind of bluefish?—A. No, sir; the weakfish will feed on the menhaden and on these butterfish. Now I will tell you a little incident. You can go out here in our pound, or pocket as you may call it, and haul it up, skin it up as we call it, and there may be, I will say, 500 weight of these butterfish, or there may be a thousand of these small menhaden. If 2,000 or 3,000 weight of weakfish, or that number of bluefish go in there when they are there, you will not find any of these butter fish or menhaden there; they eat every one of them, and land them and you will find them all inside of the weakfish. So that shows that the weak-fish will feed on the menhaden and also the butterfish.

Q. What is the difference between the weakfish and the bluefish?—A. One is a very ravenous fish, and the other is not so much so.

Q. How are they marked; are they marked the same way?—A. Oh, no; a weakfish is kind of blue on his head, and then speckled on his back, and white underneath the belly.

Q. And how is the bluefish marked?—A. The bluefish is a bluish cast all over his back.

Q. Is the bluefish what they call a snapping-mackerel?—A. I don't know the difference. I hear some of them called the snapping-mackerel; there is a snapping-mackerel that will weigh a pound or pound and a half. I also hear them called snapping-mackerel or taylors; but what we call a bluefish will weigh from 5 to 10 pounds, that is what we call a bluefish; but what they call the snapping-mackerel will not weigh more than a pound or a pound and a half.

Q. Are they similarly marked to the bluefish?—A. Just the same.

Q. Only different in size?—A. Only different in size.

Q. And you think these menhaden spawn here in the bays and along the coast, do you?—A. I don't know. I have no way of knowing, un-

less just what I have read. I don't know where they spawn. I could not answer the question where they spawn.

Q. How far north from here do they go; have you any knowledge or idea on that subject?—A. No, sir; I have not.

Q. Is it the general idea here amongst the people on the coast that the menhaden fishery, as now conducted with the purse-nets, will destroy the menhaden?—A. It is, amongst the fishermen.

Q. You think the menhaden would be an important article of food for the people, cheap food, if they were left alone?—A. I do; yes, sir.

Q. How much do you think the supply has diminished; a half or a quarter?—A. It has all diminished; the menhaden supply has all diminished; there are none.

Q. How far out from the shore can these menhaden men catch the menhaden?—A. They will catch them a mile and a half. I think I have seen them haul over a mile and a half from the beach.

Q. Have you seen much of that fishing?—A. Yes, sir; I have, every year.

Q. Have you ever been present when they drew the net?—A. I have.

Q. Did you find on those occasions much food-fish among the menhaden?—A. Yes, sir; large numbers of weakfish, bluefish, bonita; numbers of those fish right in the schools with the menhaden.

Q. You have seen that yourself?—A. I have; yes, sir.

Q. How many fish of that kind would they find, probably, in drawing a net?—A. Well, I could not say.

Q. It varies very much I suppose.—A. Of course; when they scoop they scoop by steam, and take up a barrel at a time, and there may be four or five, five or six bluefish or bonita in amongst that lot of fish they are taking up.

Q. The weakfish and bluefish and bonita are very frequently found in the same school with them, are they not?—A. Yes, sir.

Q. Their habit is to follow them?—A. Their habit is to follow the menhaden.

Q. The menhaden is the most abundant fish to be found on the coast, is it not?—A. I think they are.

Q. A great deal the most abundant, is it not?—A. Yes, sir; I have seen the time here when, as far as your eye could extend north or south, the water would be alive with the menhaden, but it has been five or six or eight years ago since that has occurred.

Q. You consider them a rich and nutritious article of food, do you?—A. I do.

Q. A valuable one to the majority of the people?—A. I speak for myself; I think they are the sweetest tasting fish I ever tasted. I will not except the Spanish mackerel, sheepshead, or any of these choice fish.

Q. They are a fish, then, that are generally liked, you think?—A. They are.

By the CHAIRMAN:

Q. Are bluefish higher or lower than they were formerly?—A. Bluefish have been very high all this season so far.

Q. How large have you ever known a striped bass caught?—A. We have caught a striped bass here that would weigh 60 pounds.

Q. How long since?—A. We caught that striped bass last fall two years ago.

By Mr. CALL:

Q. You think the striped bass has been diminished also by this men-

haden fishing?—A. I could not answer that question; don't know; we catch such a few of them we don't know about them.

Q. They are not an abundant fish and never were?—A. Not an abundant fish, no, sir; not along the coast here.

Q. They are generally caught out some distance, are they not?—A. No, sir; right on the sand, between what we call the bar and the sand; that is where we haul for them.

Q. They do not feed on the menhaden?—A. No, sir.

Q. They are what you call a bottom fish?—A. A striped bass feeds more on what we call a little mullet, a little bit of a fish about as long as your finger; that is the kind of bait the parties who are fishing in the surf here will use to catch striped bass with; get some mullets and they are pretty sure, if there is any striped bass around, to get a bass.

By the CHAIRMAN:

Q. The main season for catching striped bass is after the menhaden have gone south, is it not; later in the season?—A. Yes, sir, about that time; along in November.

By Mr. CALL:

Q. The menhaden leave here, then, in October and November, do they?—A. When we used to fish for them with a gill-net, we commenced the last of October and would fish from three to four weeks; that would end the menhaden fishing.

Q. They leave when the frost comes, do they not—cold weather?—A. Well, yes, they leave at that time, but I have seen a school of menhaden at Christmas.

Q. How many menhaden do you think were ever caught and sold here to the people in any one season?—A. We were fishing two gill-nets at what we call the Lane's End; they were fishing two at Monmouth Beach; two down just below here at Elberon, and two others—in fact they were fishing them all the way down the beach from Monmouth Beach to Barnegat, and they were all catching fish, and the carters took them back in the country, and each one of those nets would average twenty thousand fish a day.

Q. Eight nets?—A. I would say there were eight nets there fishing. I have, I will say, helped land fifty thousand in one net, and, perhaps, the next day we would not catch so many. I have known eighty thousand fish to be landed with one net, but on the average those gill-nets, I think, would land twenty thousand a day, and every one of those fish would be taken back and sold.

By the CHAIRMAN:

Q. And they were large, fat fish?—A. Large, fat fish; the little fish were not salable. Such fish as they are catching now they would not look at all.

Q. Suppose they were prohibited from fishing within 3 miles of the coast?—A. That would stop them; that would be out of the reach of the menhaden.

Q. You think the menhaden would come back here and prosper, do you?—A. Yes, sir.

Q. A great number?—A. Yes, sir.

Q. That fishing would last how long?—A. The height of it would be two weeks, but it would last three or four weeks.

Q. And the fish thus caught were utilized by the farming population for food?—A. Yes, sir.

Q. Any of it used for manure?—A. There would be once in a while

some where the carts did not get back that would be hardly fit for sale, and they would sell them for manure.

Q. Was there any complaint as to the stench?—A. No, sir; no complaint.

Q. They buried them, I suppose?—A. Yes, sir; they would cart them right up and cover them up with soil, and then in the winter time they would dig that over.

Q. And then spread it?—A. Take it up, spread it, or use it, plow it under.

Q. Have you seen the fertilizer the menhaden people make?—A. I have not; no, sir.

Q. Have you seen the oil?—A. I have seen the oil. We undertook to use the oil here. They sent a barrel of it down here to calm the sea in a storm.

Q. How much effect did it have?—A. About as much effect as if you had thrown a gravel stone or a drop of water on the wave.

Q. It is not good oil, then?—A. No, sir.

Q. What is it good for?—A. I do not know what it would be good for. I have known where they have used it on buildings, but it is not much good there; will wash off.

Q. Would any oil thrown upon the water here calm it?—A. No, sir; the wave as it rolls into the beach in shallow water has got to break.

Q. I did not know but trying the experiment with that oil grew from the fact that other oil would calm it.—A. That oil would calm it just as quick in deep water, but where the wave comes into the beach it has got to break.

Q. Why was the oil used; because they claimed to do it?—A. They claimed it would stop the sea from breaking; an experiment is what they had it for; they thought it would prevent the sea from breaking ahead; but they did not take it into consideration that the sea as it came on the shallow bottom had to break.

Q. That is, when this roll of water strikes the bottom it piles and falls over; that makes the breaker?—A. Yes, sir.

Q. The top of the ridge drops over?—A. Yes, sir; they had an idea that it would prevent it.

ROBERT LLOYD sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Long Branch

Q. How long have you lived here?—A. Fifty years.

Q. What is your occupation?—A. Fishing.

Q. How long have you followed it?—A. I commenced, I believe, when I was about twelve years old.

Q. What kind of fishing?—A. I have followed most all kinds of fishing; all the kinds of fishing we have here; bluefishing and bottom fishing, pound fishing, net fishing, with all kinds of seines.

Q. Did you ever catch menhaden or mossbunkers?—A. Yes, sir.

Q. What with?—A. Gill-nets.

Q. In what quantities?—A. Different quantities. We have landed as high as sixty-four thousand in a day.

Q. With one net?—A. Two nets and three boats; that is, we were the firm; the company.

Q. What was done with them?—A. Sold them.

Q. To whom?—A. To people through the country; sold them to carters for a cent apiece, a dollar a hundred, and carters carted them up through the country.

Q. What did they do with them?—A. They sold them to people to salt.

Q. What did the people who bought them do with them?—A. Salted them to eat.

Q. How long could you catch such fish?—A. This would be in the fall of the year when we would catch them to salt; they would salt them for winter use and spring use.

Q. They would last through the winter, would they, for food?—A. Yes, sir.

Q. Are they a good fish to eat?—A. Yes, sir; I always used to have some salted.

Q. You used to corn them for your own use?—A. Yes, sir.

Q. How long is it since you have caught any for that purpose?—A. I cannot tell exactly.

Q. As near as you are able to?—A. It must be six years, I think.

Q. Why did you stop it?—A. Could not catch them; there was none to catch.

Q. What became of them?—A. There were no large ones; there were small ones to be caught, but they were not large enough to sell.

Q. I mean the kind you used to catch for market; what caused them to disappear?—A. We supposed it was those mossbunker boats that caught them up.

Q. They began to disappear when the boats began to fish here?—A. Yes, sir.

Q. Have they been diminishing ever since?—A. I think they have; yes, sir, they grow smaller every year.

Q. How many of those boats have you ever seen in a day?—A. I could not tell; I have seen as high as twenty right around in sight, so that you could stand right on the beach and count twenty.

Q. Steamers?—A. Yes, sir.

Q. Do they have sailing vessels also?—A. Yes, sir; the sailing vessels the majority of time are up in bays.

Q. Towards New York from here?—A. Yes, sir.

Q. I suppose the success of a sail vessel depends upon the wind?—A. Yes, sir.

Q. They cannot pursue a school of menhaden?—A. No, but they can catch the same quantity of fish when they get where they are.

Q. But a steamer would run right to a school wherever they find them?—A. Yes, they come right along here by daylight and before daylight, and go on south.

Q. How far out have you seen them fish?—A. Right in on the bar, so that the steamer would have to come in and tow the boats out.

Q. Have you ever been aboard to see what they catch?—A. No sir; I have been alongside of one of the nets, but never was aboard of the steamers.

Q. Could you see in the nets?—A. Yes, sir.

Q. What did they catch?—A. The majority was bunkers.

Q. What other fish?—A. Weakfish, bluefish. When they lay their nets they catch all that they lay around—sharks, bluefish, sturgeon, or anything.

Q. Whatever the net surrounds they take in necessarily?—A. Yes, sir.

Q. What effect has this had upon bluefishing?—A. I don't know; there are quite a good many bluefish at days yet, but they are away off shore, and years before this they would be right in the undertow; you could stand on the beach and throw a squid and catch two or three hundred weight.

Q. Right from the beach?—A. Yes, sir; they would run mossbunkers into the shore in windrows; you could load up a wagon right along on the sand.

Q. You cannot catch bluefish along the shore now, can you?—A. No, sir.

Q. Have you caught any bluefish this year?—A. No, sir; have not caught five hundred in the season.

Q. Are they higher than formerly?—A. They are higher.

Q. How much higher?—A. They are one-third higher than last season.

Q. Do they get enough bluefish here to supply this market?—A. No, sir; the fish dealers have to buy fish at New York a good many times.

Q. How is it with striped bass?—A. There are no striped bass here.

Q. Did not there used to be?—A. Yes, sir; there used to be. The first fall we were in this station-house we caught some five hundred dollars' worth; we never caught any since.

Q. How much is the most you ever made in one year fishing, take the whole of your experience?—A. That I could not tell you.

Q. Well, about how much? I donot want to burrow into your private affairs, only I would like an approximate estimate.—A. I should suppose \$700.

Q. How much do you think you can make a year now?—A. The way it has been for these last three or four years we have not made half of it in the summer season.

Q. Do you know of any other cause for the disappearance of these fish, the scarcity of them, except the use of these purse-nets?—A. I think there is no doubt but that is what stops the mossbunkers.

Q. That keeps away the other fish that feed on them, I suppose?—A. Yes, sir. Bluefish run mossbunkers, and their biting and eating them, leaving pieces floating around, makes feed I think for other fish; it keeps the others on the ground. Now the bluefishermen cannot get mossbunkers for bait; they are down here to our pound every time we lift to see if we catch any.

Q. The fishermen are?—A. Yes, sir.

Q. Will not the menhaden men let them have them?—A. I don't know; I guess they will not stop. They will let you have them if you get right where they are lifting, making a haul, but they will not stop.

Q. They will not peddle them out for bait?—A. No, sir.

Q. Now suppose they were stopped from fishing entirely within 3 miles of the shore, do you think these varieties of fish would come back here?—A. I don't know; I suppose it would make quite a good deal of difference, because mossbunkers are a fish that generally run close to the shore; always used to.

Q. If mossbunkers were allowed to grow to their former size here, would there be a market for them now?—A. Oh, yes.

Q. People desire to have them?—A. Yes, sir.

Q. They think as much of them, I suppose, as we in New York do of our whitefish for corning?—A. Yes, sir; the people think just as much of them, or used to, and I suppose do yet, as though they had a hog to kill and salt down. They would almost fight for their turn to come in and get a load.

By Mr. CALL :

Q. Is it the general opinion on the part of the people here that there ought to be some legislation to stop the menhaden fishing?—A. Yes,

sir; I have heard it remarked often, and, more than that, I have heard them speak of trying to elect a person to intercede for them.

Q. That is, choose a representative who would?—A. Yes, sir.

Q. Thinking that your legislature could do something?—A. Yes, sir; that is what I mean.

Q. You think, then, that this is a valuable article of food for the poor people; cheap food?—A. Yes, sir.

A. And that these menhaden fishermen are destroying it?—A. Yes, sir; I think it must be that; I don't know what else it can be. There is nothing else that any one can see or think of except that one thing.

Q. You think also that it is injuring the supply of food-fish, too?—A. Yes, I do.

Q. There is a great demand for fish, is there not?—A. Yes, sir.

Q. Especially all through the summer months?—A. Yes, sir.

Q. And these menhaden would furnish a winter supply?—A. Yes, sir.

By the CHAIRMAN:

Q. It was easier to catch menhaden, when they were plenty here and grew to full size, than almost any other fish, was it not—less labor?—A. Well, it was pretty hard work.

Q. Yes, but you caught a great many more?—A. Yes, and you catch them close into the beach.

Q. I mean relatively they were cheaper fish to catch as well as to sell than the bluefish or the other varieties?—A. Yes, sir; I suppose the expense of catching them was not near so much. We sold for \$640 worth in one day.

By Mr. CALL:

Q. How many men?—A. There were fifteen.

By the CHAIRMAN:

Q. How many years ago was that?—A. That was twenty years ago; eighteen or twenty.

Q. And these fish all went among the people?—A. Yes, sir.

Q. For food?—A. They all went into fish wagons and they drove to New Brunswick, Spotswood, Trenton; some away in Pennsylvania.

Q. How far is it from here to Trenton?—A. Fifty miles. I have seen as high as one hundred and eight carters at one time waiting for us to catch fish.

Q. They were caught in a season so cool that they could be carried with safety?—A. Yes, sir; the fall of the year.

Q. You did not catch them for food in the spring then?—A. No, sir.

Q. Why not?—A. Hardly any one salts fish in the spring; any kind of fish.

Q. Were they fit for market early in the season?—A. Yes, sir; but they were not as fat; they were good size; you could pick out some very nice ones, but they were naturally poor.

Q. You have dressed them often, I suppose?—A. Yes, sir.

Q. Did you ever find spawn in them?—A. I think I have.

Q. When, in the fall or spring?—A. It has been so long now I don't know whether it was fall or spring, but I think I have dressed them in the fall with roe in.

Q. As they were going away?—A. Yes, sir; I think it was in the fall.

CHARLES W. CHASEY sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. East Long Branch.

Q. How far from here?—A. It is about $2\frac{1}{4}$ miles; somewhere about that.

Q. What is your occupation?—A. Fishing.

Q. How long have you followed it?—A. About twelve or thirteen years.

Q. Did you ever catch menhaden or mossbunkers for market among people here?—A. Yes, sir.

Q. In what quantities?—A. When I commenced to fish for menhaden they did not catch them as well as they did before. I only fished about four or five falls for them in my life, but I have helped to land somewhere in the neighborhood of twenty-five thousand in a day; two boats' crews; two boats and two nets.

Q. They were sold for what purpose; to whom?—A. Carters came there with wagons and carried them back into the country and sold them.

Q. What use did people make of them?—A. They salted them.

Q. Did you ever corn any?—A. Yes, sir.

Q. Do you like them?—A. Yes, sir, I do so.

Q. How long is it since you corned any?—A. I think it is about six years ago.

Q. Why did you stop it?—A. The reason of it was they got so small they were not worth salt; could not do anything with them, they were so poor.

Q. What caused that?—A. They all laid it to this purse-net fishing.

Q. Was there any trouble catching them until they came?—A. No, sir; no trouble at all.

Q. And they have been diminishing ever since?—A. Yes, sir.

Q. Now with their disappearance how is it with the other food-fish, bluefish, &c.?—A. There used to be times when there was no trouble to stand right on the beach here, in my day, and catch 400 or 500 weight of bluefish right along in the undertow here with squids—a squid is white metal that we use, with a hook to it—and wherever we see a school of menhaden along the beach, we always make calculation there would be bluefish behind; they drive them and we generally go down to the beach, and I have caught as many as 400 and 500 pounds right on the beach with a squid in less than three hours. I have seen them along here right in the surf in the undertow; I have seen them washed right up on the sand; I have seen tons and tons of them come along the beach that way, but have not late years. I did see one school ast fall right down here, but that is all that I did see.

Q. Was that a large or a small school?—A. It was not large to what they used to be; no, sir.

Q. Do you know of any other reason for the change except the use of these purse-nets?—A. No, sir; I do not.

Q. Suppose they were prohibited from catching menhaden within 3 miles of shore, do you think they would come back here?—A. I think they would; yes, sir.

Q. The mossbunkers and the bluefish and all?—A. Yes, sir; from the certain fact that the bluefish feed on the menhaden.

Q. Do you think they would be again made marketable among the people?—A. Yes, sir; they will sell any time when you can catch them and they are in good order.

Q. The desire for them, then, is just as strong as it ever was?—A. Yes, sir.

Q. And they are a valuable food, you say, for family use?—A. Yes, sir; they are so.

Q. How long can you keep them?—A. Keep them all winter.

Q. As long as you keep any corned fish, I suppose?—A. Yes, sir.

Q. As long as you keep mackerel?—A. Yes, sir; provided they are corned right.

Q. Are they as good as mackerel?—A. I like the taste of menhaden as well as any fish I ever ate in my life. I think they are as sweet as any fish I ever ate; the only trouble with them is the bones.

Q. Now what you have stated is the result of your own personal experience?—A. Yes, sir.

Q. You have not talked with anybody about this?—A. No, sir; nobody at all.

By Mr. CALL:

Q. Have you any idea how many fishermen there are in this place?—A. Do you mean fishermen like myself?

Q. Yes; persons engaged in fishing.—A. Right here where I am engaged now, right at this place, there are not a great many; there are only about five or six small boats besides ourselves, but there is any quantity of them below, between here and the Highlands.

Q. They fish for this place?—A. Yes, sir; there are a great many carters; you can see them here any day, any quantity come from Ocean Grove, that way; there are a great many fish used. They bought 2,100 weight of weakfish from us in a day; one man took 1,300 pounds.

Q. There is a demand for all you can catch, then, is there?—A. There is for these small baits. All the bluefish they can catch they can sell here for good prices. Of course, weakfish are not as good a fish as the bluefish.

Q. What do weakfish bring here?—A. We sold them for 3 and 4.

By the CHAIRMAN:

Q. What do bluefish bring?—A. The last that I heard—we do not catch them ourselves—they were selling for 4 cents down at Seabright, and they have been as high as 12 or 15 cents in market, I believe.

By Mr. CALL:

Q. Not considering this particular place, but along the coast, I suppose there is a demand for all the fish that is caught?—A. Yes, sir.

Q. And it is increasing?—A. Yes, sir.

Q. And you think this menhaden fish is an important article of food for the people generally?—A. Yes, sir.

Q. If they were allowed to come here there would be a great demand for them among the poor people?—A. Yes, sir.

Q. How long do you think the menhaden will last under the present system of fishing with purse-nets?—A. I can hardly tell, but the way they have been catching them ever since they have been at it, they cannot last a great while, because the largest you see now is not generally any larger than that long [indicating], not around here that we catch; we catch them in the pound and bail them overboard, and the largest we catch is about that size.

Q. The quantity and size have both largely diminished, have they?—A. Yes, sir; I have caught as high as 15,000 in a day. I do not believe there would be any less than a pound to a pound and a quarter, and I have seen them with fat on them that thick [indicating]; you could scrape it off with a knife.

By the CHAIRMAN:

Q. Quarter of an inch thick?—A. Yes, sir.

By Mr. CALL :

Q. Is not the demand for fish as an article of food greatly increasing of late years ?—A. Yes, sir ; I think it is.

Q. And the supply is being diminished by this purse-net fishing ?—A. Yes, sir ; there is no other reason for it. It never was so before, and it stands to reason that that is the cause of it.

Q. Is there a general desire on the part of the people that there should be some legislation to protect the food-fish and the menhaden ?—A. Yes, sir ; that is the general talk.

Q. Is there much feeling on the subject ?—A. Yes, sir ; that it ought to be broken up if it can be done.

Q. You cannot give any definite opinion as to the quantity of the menhaden now as compared with formerly ?—A. No, sir ; I cannot.

Q. Only the fishing for menhaden for food-fish has disappeared entirely ?—A. Yes, sir ; very near, and it will not be many years before they break it up entirely. There are times when these steamers come up here loaded decks under, you might say, and then there will be days when they go up light, but when they first started in it was every day a load. It did not matter when they came out or how often they came out, they would get a load, and some of them would come out two or three times a day. Some of them are a great deal larger than others, and when I have been fishing I have seen them with boards up on the side and the deck full besides the hold.

Q. Where do you fishermen sell your fish ; altogether here at this place ?—A. Pound fishermen do not ; no, sir ; they sell a good many fish here, of course ; they do not catch enough variety of fish to sell them all here. Our principal fishing here this time of the year is weakfish ; in the spring it is sheepshead, but from about the twenty-fifth of July or the first of August on until the first of October it is Spanish mackerel and weakfish again.

Q. Where do they go then ?—A. To New York and Philadelphia.

Q. There is a demand then from New York and Philadelphia which is being supplied by the fishermen here and elsewhere along the coast ?—A. Yes, sir.

Q. Can you always sell all the fish you catch when they are in good order ?—A. Yes, sir.

Q. There is a demand for all you can catch ?—A. All we can catch ; yes, sir.

Q. And that demand is increasing, coming from the large cities ?—A. Yes, sir ; they send them to New York and they send them elsewhere, a good many of them.

Q. They are put in ice and shipped off through the country ?—A. Yes, sir.

Q. You think it is an important question for the people in these great cities that the fish should be protected on the coast ?—A. Yes ; I do so.

Q. And the opinion is universal that this menhaden fishing with purse-nets and steam vessels is destroying the entire supply ?—A. Yes, sir.

Q. That is the idea of the fishermen is it ?—A. Yes, sir ; it cannot be any other way hardly. You cannot give any other account for it ; I do not see how you can. There were plenty of fish before they commenced ; any quantity of them.

Q. Do you think if there was some legislation to prevent these menhaden boats from fishing within 3 miles of the shore it would be beneficial to these people ?—A. Yes, sir ; I do, because after a while the menhaden would get to trading in. Of course, every fish is kind of cunning.

If they find they have got a little protection in shore, are not bothered, they will come in; there is no question about that. Of course, in a storm or anything of that kind it will take a little time to get in again. They stay in there where they are not bothered.

Q. How far out can these menhaden boats fish?—A. I think I have seen them haul for menhaden over 2 miles from the beach.

Q. Can they fish for menhaden in any depth of water successfully?—A. No, they cannot. If their net does not go to the bottom they cannot catch them.

Q. You think the net has to go to the bottom?—A. Yes, sir; without they can get it shirred up at the bottom before the fish sink. When you lay around a school of fish, generally when you get the net together they sink and if your net is on the bottom you catch them, but if they sink before you get the bottom shirred up they get out and you could not stop them.

By the CHAIRMAN:

Q. They shir the nets very quick, do they not?—A. Yes, sir; they go very strong-handed and do it very quick.

By Mr. CALL:

Q. You have not much personal knowledge of their fishing, I suppose?—A. No, sir; I have not. I never was in that kind of fishing in my life, nor never saw one of their nets myself out of water. I have been around them after they lay out and have seen it that way; that is all.

Q. You never saw them draw the net?—A. No, sir; I never did.

By the CHAIRMAN:

Q. Have you seen what kind of fish they had when they surrounded them?—A. Whenever I saw them they had nothing but menhaden in them.

Q. You never saw any other variety of fish?—A. No, sir. I did hear this year of their catching as high as 50,000 weakfish in them.

Q. What effect has this menhaden-fishing produced upon the class of people who come here to fish for sport, amusement, pastime; this whole shore almost is, in the summer season, lined with people who come here for recreation; how has it affected their privileges?—A. It has affected them the same way that it has ours in one respect. Of course they are not particular sometimes what kind of fish they catch. If they can catch bluefish they like to do it, and the only way they can catch them is by having menhaden, chopping them up, and drawing the bluefish to them; they cannot catch them as they used to, with a squid; they are not here to catch.

Q. Well, it has seriously interfered with their sport, has it not?—A. Yes, sir.

Q. How many people come to this place in the course of a season ordinarily?—A. I cannot tell you.

Q. I did not know but you had seen it is estimated.—A. No, sir; I never did.

Q. You can tell whether it is limited or a very large number?—A. It is a very large number, I can tell you that, but that is all I can tell you.

Q. Do the visitors fish much now?—A. No, sir.

Q. Did they formerly?—A. Yes, sir; I have taken off myself as high as 8 or 10 and got \$2 a piece for them. I have made as high as \$30 a day taking out what we call boarders.

Q. Just for sport?—A. Yes, sir.

WILLIAM GREEN sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Long Branch.

Q. How long have you lived here?—A. Thirty-five years.

Q. What is your occupation?—A. Fishing and bathing. I follow the water all the time pretty much.

Q. And have during that period?—A. Well, when I am not following the water I am not doing anything else.

Q. I mean that has been your business since you have lived here?—A. Yes, sir.

Q. Can you remember a time when it was a custom to catch moss-bunkers or menhaden for a market among people here?—A. Yes, sir.

Q. How largely was that industry carried on?—A. There used to be 4 or 5 or 6 nets fishing right here close by, and then they fished all the way down.

Q. How many would a net catch then?—A. Average, do you mean?

Q. Yes.—A. Of course they would not catch them every day; some days they would catch 30,000 or 40,000, and probably on other days would not catch over 8,000 or 10,000; along in that way.

Q. But they were caught in large quantities?—A. Yes, sir.

Q. And sold to the people in the country?—A. Yes, sir; carters.

Q. What did they do with them?—A. They peddled them out through the country.

Q. What did the purchasers do with them?—A. They salted them down.

Q. For family use, for food?—A. Yes, sir.

Q. Were they good fish for food?—A. I think they were. I know there was a good many of them sold.

Q. Did you ever corn them for your own use?—A. O, yes; always did when I could get them.

Q. How long since you corned them?—A. I have not corned any in five or six years.

Q. Why did you stop it?—A. I could not get them.

Q. What has become of them?—A. I could not say. I suppose they have been scared away by the purse-nets.

Q. Do you know of any other cause for their disappearance?—A. I do not; no, sir. There are plenty of menhaden yet, but they are small. They used to be good sized in the fall, but now you do not get any.

Q. These that are here now are not fit for food?—A. O, no.

Q. They are small and poor both?—A. Yes, sir.

Q. Have you ever been on these purse-net boats when they were catching fish?—A. No, sir.

Q. What kind of fish they catch, then, you don't know?—A. No more than hearsay; that of course I cannot swear to.

Q. How many of those boats have you ever seen here in one day?—A. I have seen from fifty to seventy-five; sail-boats and steamers together.

Q. All at work with these purse-nets?—A. Yes, sir; they had purse-nets aboard. Probably they would not be all at work at once.

Q. What effect has the disappearance of the menhaden had upon the other kinds of food-fish that used to be caught here?—A. We do not have any bluefish inshore now. When I first began to fish we used to catch plenty of them close inshore; now we cannot catch any.

Q. How many did you ever catch in a day off the shore?—A. I never caught a great many off the shore because I never fished much off the

shore. When they came along I used to go in a boat; but I have seen four or five hundred caught in a day; two men 700 or 800 weight.

Q. How many have you caught this year?—A. I have not caught many this year; in fact I have not fished much for them.

Q. Well, since you ceased to catch the mossbunkers to corn them, as you stated, and since their disappearance, have valuable fish been caught here to any extent?—A. No, sir; not along the shore.

Q. What effect has it had upon the privileges of sporting men; men who come to the seaside for recreation?—A. I suppose that has had a great effect upon them, because the bluefish would come along shore and it is a great deal of sport to catch them. Now you hardly ever see them close in.

Q. Do you ever take fishermen out?—A. Yes, sir.

Q. Is that business carried on as it used to be?—A. Well, pretty much the same.

Q. Do they have as good luck as they used to?—A. I do not know that they do; I do not think fishing is as good as it used to be; I am satisfied it is not.

Q. How many bluefish is the most you ever caught in a day?—A. We generally go two men together and could catch 700 or 800 weight.

Q. What use was made of bluefish then when they were caught in such quantities?—A. Sometimes we ship them to New York, but sometimes we sell them to carters. In the fall of the year there is a great many salted when you can get them.

Q. They are corned for food?—A. Yes, sir.

Q. They are a good fish for corning, are they not?—A. Yes, sir; very good.

Q. As good as mackerel?—A. They are allowed to be better when you get them in the fall of the year and they are nice and fat.

Q. When it becomes cool weather I suppose you can carry them around the country without danger?—A. Yes, sir.

Q. Well, that business is all broken up, is it not?—A. Pretty much, yes, sir; as far as net-fishing is concerned. We used to fish for bluefish a great deal.

By Mr. CALL:

Q. Did you ever catch any codfish here?—A. Yes, sir.

Q. Catch them in quantities?—A. Yes, sir; a good many.

Q. Do they corn them here?—A. Not very much; some corn them, but they do not make much of a hand at corning them.

Q. What do they live on?—A. I could not say.

Q. Are they found amongst the bunkers?—A. No, sir.

Q. Mossbunkers, I believe, you call them?—A. Well, that is the old-fashioned name.

Q. The menhaden fishery has no effect upon the codfish then?—A. No, sir.

Q. Is it the general opinion here that there should be some legislation to prevent this purse-net fishing?—A. That appears to be the general opinion. I have heard a great many speak of it.

Q. There is a demand for all the fish that can be caught for food, is there?—A. Yes, sir. When they used to make a business of taking them for food in the fall of the year we never could get enough. If we landed 200,000 on the shore they would not spoil unless it would come a very hot day, and they were out all night, or something like that, when they might not be fit to take up the next day. Once in a while something like that might happen.

Q. Is not the demand for fish for food increasing very much?—A. Yes, sir.

By the CHAIRMAN:

Q. The railroads could carry them now where teams used to do it?—A. Yes; but if they could get them, there would be a great many teams would take them yet.

By Mr. CALL:

Q. And the supply you think is diminishing very largely?—A. Yes, sir.

Q. And you attribute that to the menhaden nets?—A. I do not know of anything else.

Q. That is the general opinion, is it?—A. Yes, sir.

JOHN GOODMAN sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Long Branch.

Q. What is your occupation?—A. Fishing.

Q. How long have you followed it?—A. Seventeen years.

Q. At this point?—A. Yes, sir; right along here, and about three miles from here.

Q. On this beach?—A. Yes, sir.

Q. When you first began were menhaden caught in any quantities by you?—A. Yes, sir; we caught 30,000 and 40,000 weight sometimes.

Q. In a day?—A. Yes, sir.

Q. What was done with them?—A. Sold them to carters.

Q. What did the carters do with them?—A. Took them out in the country and sold them.

Q. To the farmers, the people?—A. Yes, sir.

Q. And they were corned for food?—A. Yes, sir.

Q. Are they good food?—A. Yes, sir; very good.

Q. Healthy fish?—A. Yes, sir.

Q. Did you ever corn menhaden for your own use?—A. Yes, sir; I have corned as high as 3,000 and 4,000 of them.

Q. You used to sell them after you corned them?—A. Yes, sir.

Q. How long is it since you corned any?—A. Eleven years ago, I think.

Q. When did the purse-nets first appear here?—A. I could not remember, but it has been about twelve years ago; twelve or fifteen.

Q. Before or after you stopped corning menhaden?—A. It was before.

Q. Why did you stop corning them?—A. They got poor and were not fit to eat.

Q. And small?—A. And small.

Q. Have they been diminishing ever since?—A. Yes, sir; do not salt any now; growing less and less.

Q. Now, with their disappearance, how is it with the other kinds of fish caught here?—A. They do not catch near as many bluefish as they used to with nets.

Q. What effect does it have on the privileges of men who come here for recreation, sporting men?—A. They do not appear to go as much as they used to off at sea.

Q. Do not have the luck they used to?—A. No, sir.

Q. Did you ever see bluefish caught from the shore?—A. Yes, sir.

Q. What quantities?—A. Do you mean by gill-nets?

Q. In any way.—A. I have seen as high as 30,000 to 40,000 pounds. I helped catch them with gill-nets.

Q. From the shore?—A. Yes, sir.

Q. What did you do with them?—A. Shipped them to New York and Philadelphia, and sold them to carters.

Q. Were they corned?—A. Yes, sir.

Q. Are they good fish to corn?—A. Yes, sir; late in the fall they are.

Q. As good as mackerel?—A. Yes, sir.

Q. Worth as much as mackerel?—A. Yes, sir; I believe they are, and more too.

Q. More than mackerel?—A. Yes, sir; I corned some last fall and got 10 cents a pound for them.

Q. By the barrel?—A. Yes, sir.

Q. Where did you catch those?—A. I caught them off here.

Q. In what way?—A. I caught them with a squid off the beach. It was only once, I believe, last fall.

Q. It was that one school that a former witness stated appeared here?—A. Yes, sir.

Q. With that exception, when have you seen any along the shore?—A. I have seen none since.

Q. Suppose the purse-nets were taken away from here, prohibited from catching fish within 3 miles of the coast, what would be the effect?—A. I think it would be better; there would be plenty of fish in here then.

Q. You think the fish would return here?—A. Yes, sir.

Q. And furnish food for the people?—A. Yes, sir.

Q. Is the market for them increasing?—A. Yes, sir.

Q. It is easier to send them into the country by the railroads than it was to draw them in carts, is it not?—A. Yes, sir.

Q. One witness said the carts used to come from as far as Trenton for them.—A. Yes, sir; and fill up.

Q. From here?—A. Yes, sir.

Q. Did the people desire them; did they wish for this kind of food?—A. Yes, sir.

Q. And is there a complaint that they are deprived of it?—A. I think they always want mossbunkers now to salt, and cannot get them.

Q. Do they complain of the use of these purse-nets?—A. Yes, sir; most of them do.

Q. Do they think there ought to be some legislation to stop it?—A. Yes, sir.

Q. Is that common talk?—A. That is common talk, I believe, now.

TYLEE L. REYNOLDS sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Metedecank.

Q. How far is that from here?—A. It is about 15 or 20 miles from here; I do not know exactly.

Q. Which way?—A. South.

Q. What is your occupation?—A. Fishing.

Q. How long have you followed it?—A. About seven years.

Q. Do you remember when mossbunkers were caught and sold to the people to be corned?—A. Yes, sir.

Q. Was that before you began fishing, or since?—A. Before I commenced.

Q. Is that done now?—A. Not much; we do not get many large enough to salt.

Q. The practice is broken up?—A. Yes, sir.

Q. What has done it?—A. I suppose that these purse-netters have caught them up.

Q. Well, they have disappeared, have they not?—A. Yes, sir.

Q. The menhaden have disappeared from the coast here?—A. Yes, sir.

Q. They used to cover this bay, did they not?—A. Yes, sir.

Q. Do you rarely see any now?—A. There are a few, but not near as many as there used to be.

Q. How many of these boats did you ever see here in a day?—A. Ten or fifteen or twenty.

Q. Steamers?—A. Yes, sir; and sail-boats.

Q. Have you ever been on them when they were hauling in?—A. No, sir.

Q. You do not know what they catch, then?—A. No, sir.

Q. With the disappearance of the menhaden have the other fish lessened also?—A. The bluefish, I think, have.

Q. You live beyond Ocean Grove, do you not?—A. Yes, sir.

Q. What summer resort is nearest the place you live?—A. Point Pleasant.

Q. How large a place is that?—A. It is quite a good sized place, and it has grown very rapidly this season and last.

Q. Are there hotels there?—A. Yes, sir.

Q. Is it a fish market?—A. Fish market there, yes, sir.

Q. Sporting people come there to fish?—A. Yes, sir.

Q. What effect has this disappearance of the bluefish and of the menhaden had upon the privileges of sporting men?—A. I could not tell you.

Q. Can they catch fish as they used to?—A. No, sir; they do not. It is very seldom they catch them along the shore now with the hook and line; off the beach.

Q. Did you ever?—A. Yes, sir.

Q. How many did you ever catch in a day?—A. I have caught as high as a hundred with a hook.

Q. Standing on the shore?—A. Yes, sir.

Q. Since you began to fish, seven years ago?—A. Yes, sir.

Q. How many have you caught this year?—A. Not one, not with a hook.

Q. Well, in any way?—A. I fish with a pound.

Q. Do you catch bluefish in that?—A. No, sir; very few; get a few small ones.

Q. Suppose these boats were prevented by law from coming here?—A. I think there would be better fishing here, because they keep the food-fish away.

Q. Do you think the food-fish would come back so as to be used for food again by the people?—A. I think they would.

Q. Are bluefish good fish to corn?—A. Yes, sir.

Q. Better than menhaden, are they not?—A. Some like them better. I like the menhaden the best.

Q. You prefer a menhaden even to a bluefish for corning?—A. Yes, sir.

Q. Is there a good deal of talk about this menhaden fishing?—A. Yes, sir.

Q. Among what class of people?—A. Among most everyone down in our part of the country; we are all fishermen there.

Q. Farmers and fisherman both talk about it?—A. Yes, sir.

Q. They are opposed to it?—A. Yes, sir.

Q. They think that there ought to be some law to stop it?—A. Yes, sir.

Q. Do you think so?—A. I think there ought.

RICHARD LAYTON sworn and examined.

By the CHAIRMAN :

Question. Where do you reside?—Answer. Here, at Long Branch.

Q. How long have you lived here?—A. About thirty years.

Q. What is your occupation?—A. Fishing.

Q. Have you followed it for that length of time?—A. I have fished thirty years, yes, sir.

Q. Did you ever know a time when mossbunkers, or menhaden as they are called, were used for food?—A. Yes, sir; we used to sell them. We have sold as high as \$600. I remember once particularly, the day before election, we caught 63,000; we landed them on the beach and the boys said, "We won't catch any more because we cannot sell them," and on election day, at nine o'clock, we had not one left. We got \$1 a hundred for every one we caught.

Q. And they were taken out in the country for corning and use by the people?—A. Yes, sir.

Q. Did you ever corn them for your own use?—A. Oh, yes. I don't think there is any sweeter fish in the world when first corned; take a menhaden, then, and they are the sweetest fish that swims in the water.

Q. How long is it since you corned any?—A. It must be five or six years. Ever since these fellows have been at it it don't pay us to do it.

Q. By "these fellows," who do you mean?—A. I mean these fellows with the purse-nets.

Q. Well, you have been deprived of the use of menhaden because they have come?—A. That is it. Now you go up in the country and the people will say, "What is the reason we don't have mossbunkers like we used to." I say, "The reason is that the people catch them up," and if you do catch them there is no size to them. I have caught them weighing $1\frac{1}{4}$ pounds.

Q. Have you caught bluefish in any quantity?—A. I have caught \$600 worth; laid the anchor right on the sand, one anchor on the sand, and laid the net off a bit, with a little bow in it, and caught \$600 worth.

Q. What was done with those fish?—A. The blues?

Q. Yes.—A. They do not come in any more.

Q. What was done with those you caught?—A. Sent them to New York.

Q. Were they used for corning any?—A. Yes, sir; I got \$5 a hundred for them right on shore. All I had to do was to ship them on a sail-boat.

Q. Do you know whether they were ever used for corning among people here?—A. Oh, yes; I guess they were; we used to sell thousands of dollars worth of them.

Q. Are they good fish to corn?—A. They cannot be beat; they beat a Boston mackerel all to pieces. Plenty of people come here, friends of mine, in the fall of the year and say, "I want you to put me up half a barrel of bluefish." I would not give them for all the Boston mackerel there are in the city of New York. Of course, every one has his taste. Now take No. 1 Boston mackerel; he is good. We caught about 400 bluefish yesterday in a boat.

Q. What with?—A. We catch them with what we call still-baiting; chop mossbunkers up to draw them around, and anchor the boat.

Q. It is a great deal more labor to catch them than it used to be?—A. Well, yes.

Q. And it was a great deal less labor to catch mossbunkers than bluefish, was it not?—A. Oh, yes, they come close in shore; did not have to go so far for them.

Q. They sold cheaper?—A. Yes; we used to sell them for a cent apiece. A good big mossbunker made a pretty good meal.

Q. In other words it made cheap food for the people?—A. Oh, yes; there is where the people find fault. I suppose they catch 300 to 400 bushels of those bunkers a day to bait for bluefish.

Q. Where do they get them?—A. They have pounds in the bay up at Port Monmouth, and up about there.

Q. Just for bait?—A. Just for bait, and it is followed for a living; they fetch them up here and sell them so much a bushel.

Q. They are not fit to eat nor to corn?—A. No, sir; we used to pay 20 cents a bushel; now they are 40.

Q. Do men who come here for pleasure have the same privileges they used to have before the purse-nets came here?—A. Oh, no sir; I guess they don't have.

Q. Ladies used to catch them from the shore, did they?—A. I have known ladies come here and take a hook, take a clothes-line, and catch 500 or 600 weight of bluefish; just the women along the beach.

Q. You mean in one day?—A. I mean in two hours.

Q. You can catch one every minute, cannot you?—A. Can catch bluefish pretty fast; those who understand it. The bluefish would be so anxious after these mossbankers that I have seen the bluefish run away up on the sand and the sea go off and leave them kicking on the sand. A bluefish will follow feed; it don't make any difference where it is, if it is a 100 miles at sea. If he comes ashore and finds no mossbunkers to eat he will not stay here.

Q. What feed do they get at sea?—A. Menhaden. They are the sweetest fish that is.

Q. Suppose these seines were prohibited from being used within 3 miles of the shore, what effect would that have?—A. I think that would be first rate, because they catch them pretty close in shore.

Q. How many of these boats have you ever seen in one day here?—A. I have seen fifteen or sixteen of these steamers right along here.

Q. Going south?—A. Going south for bunkers.

Q. And come back when?—A. Come back after three or four hours, loaded.

Q. Were you ever on board of one to see what they catch?—A. Oh, yes; I have been in the factory at Port Monmouth.

Q. How long ago was that?—A. That was last spring two years ago, I think. The property holders complained that they made a nuisance, but they paid the fine and went right on again.

Q. What kind of fish did they manufacture there?—A. Mossbunkers; made oil of them.

Q. Did not they use other fish?—A. Of course; they took everything; little weakfish and everything else.

Q. They use up all they catch, do they not?—A. Yes, sir.

Q. Do you know whether they catch bluefish?—A. Once in a while they catch one, but I do not suppose they grind them up; they eat them themselves.

Q. How is it with shark?—A. There is not much oil in shark.

Q. Well, they grind it up, do they not?—A. I guess they kill them, because they would break the net, but the oil we use is nothing but mossbunker oil. We are paying 10 and 12 shillings a gallon for nothing in the world but mossbunker oil.

Q. Is it not good?—A. They make it good anyhow. There must be a good deal of money in it. There is one old fellow has got fifteen or twenty steamers in this business.

Q. Where?—A. Up east somewhere.

Q. What place?—A. Coney Island, or around there.

Q. Do you remember his name; is his name Hawkins?—A. I think that is the name; yes, sir.

Q. Did they continue this business up here after they fined them for a nuisance?—A. Yes, sir.

Q. What was the complaint of its being a nuisance?—A. The smell, right along there.

Q. It annoyed the community, the people who lived around there?—A. Yes, sir.

Q. How large a place is it?—A. It is quite a little place.

Q. How far from here is it?—A. It is about 14 miles, I think; right north of Red Bank.

Q. Do you hear of any efforts to stop this fishing?—A. I have heard them say they were going to stop it, to send for them to stop it.

Q. Suppose they were prohibited from drawing these seines within three miles of the shore?—A. They would have to quit.

Q. But what effect would that have upon the rights of the people?—A. We would have mossbunkers again, and plenty of them, too, and people would have them for food.

Q. You want to corn some more of them, I suppose?—A. I once owned about \$1,500 worth of boats and nets. I had two mackerel-nets and two mossbunker-nets, and after they got to catching them it did not pay me to keep them, and consequently I have not caught any. You might take a boat and net now and fish until you were gray-headed and you would not catch any fish, and if you did they would be so small people would not have them.

By Mr. CALL:

Q. What was the size of the fish you speak of?—A. I had a net of three and three-quarters mesh.

Q. They would average a pound, then?—A. Oh, yes; they would average a pound, about. Seventy-five would make a big bushel basket full.

Q. Do you know what price these men got who took them into the country?—A. We used to sell them and they had to deliver them, and if they went 15 miles in the country they sold for \$2 a hundred, and so on the further they went. If a man had to stay all night he calculated to get \$2 a hundred.

Q. And that is about what the people expected to get them at, 2 cents apiece?—A. Yes, sir; and that is cheaper than anything else you can eat.

Q. Two cents worth of mossbunker would make a pretty good meal, would it?—A. Yes, sir; I think so. I have heard men say they could eat seven or eight, but I would not want to board them long.

Q. You think it is an important article of food for the people?—A. I think it is, indeed.

Q. And this purse-net fishing is destroying it?—A. Yes, sir; that is what is destroying it. Now, there are a great many people in the country who could afford to buy a couple of hundred mossbunkers.

You say to them, "Why don't you come down and get bluefish." They say, "Well, we could not afford to buy bluefish." We could clean them and put them up for \$5 a hundred.

Q. What are they worth now?—A. Blues have got up pretty near next to Spanish mackerel. There are more bluefish consumed now than any fish we have got in this country. Sometimes they are worth 2 cents a pound, and then they are worth 5, according to the quantity.

Q. How will they average?—A. Four to 5 cents a pound in the season right through. There used to be thirty or forty boats and now there are three hundred. I would like you to see, piled up in a heap, the bluefish that are caught in a year. I think it would be a heap three times as big as the West End Hotel. What makes bluefish so cheap at times is the quantity of them. They go in loads; they will start sometimes as high as 4, 5, or 6 cents, but they calculate to clean the market out somehow or another, and they let them go at any price. Now, I am in the fish business. I agreed to supply the Ocean House this season at 5 cents a pound, and we had to pay more for bluefish last week than we got. We sent to New York and had to pay 10 cents a pound for one lot, but we did not get much; told them they were not there, but they were fish that I would not eat; they have got so they keep fish that I would not eat.

CHARLES RUNDQUIST sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Green's Pond, right here.

Q. How long have you lived here?—A. Two years.

Q. Where did you live before that?—A. I am a sailor. I have been going to sea before that.

Q. What countryman are you?—A. I am a Swede.

Q. How long have you been in this country?—A. I have been here going on eight years.

Q. Have you been a sailor within that time?—A. Yes, sir; most part of the time. I was a fisherman in my own country.

Q. In Sweden?—A. Yes, sir.

Q. Where have you followed fishing here?—A. Down here at this place, and last summer I was down at Seabright.

Q. You do not know about the fishing eight or ten years ago, then?—A. No, sir; I don't know about that.

Q. You only know about the last two or three years?—A. Yes, sir; since I have been on the coast.

Q. Can you catch any menhaden now?—A. No, sir; there are very few.

Q. How is it with the bluefish?—A. Bluefish are very scarce. I have heard all the fishermen say who fished for them last summer, that they never made such a poor season as they did this year.

Q. Have you ever eaten menhaden?—A. Yes, sir; in the fall when they were fat, but never in the summer, because they were very poor.

Q. Are they a good fish to eat?—A. Yes, sir; I like them as good as any other fish.

Q. Do you know what effect these purse-nets have upon the fishing?—A. I think they have some effect upon it.

Q. How many of those boats have you ever seen in one day?—A. I have seen a good many boats, from ten to twelve, right up here towards Seabright, coming up for their loads last summer when I was out blue-fishing.

Q. Have you ever been on them?—A. I have been alongside of them to get bunkers for bait.

Q. So that you could see what they were catching?—A. Yes, sir; I could see they had a good deal in their nets.

Q. What kind of fish did they have?—A. Mossbunkers, sharks, weakfish, and such things; all kinds of fish that would go in a school.

Q. They catch all the fish that run in a school that they surround?—A. Yes, sir.

Q. How far out from shore do they fish?—A. I have seen them out 3 or 4 miles.

Q. And how near to the shore?—A. I have seen them right here on the rocks, right alongside of our fishing-nets, so that the nets get right fast into the rocks.

Q. Inside the breakers, you mean?—A. No, sir; not inside the breakers, but inside of about 50 yards from the beach, just as close as they could come.

Q. They go wherever they can see the menhaden, I suppose?—A. Yes, sir; they have a man at the masthead to look out for them.

Q. Do they surround small schools and larger ones, too?—A. They will not surround small ones, because it don't pay and because it is some work to get out their nets and haul them in again, and there must be some quantity to make it pay.

Q. Do you know how many they catch at a haul?—A. I have no idea how much they get, but I have seen them go out in the morning and come back at night with a full load.

By Mr. CALL:

Q. How many tons would one of these steamboats carry?—A. I suppose 50 or 60 tons.

Q. Not more than that, one of these steamboats?—A. They have built larger ones now.

Q. Did you see these boats pass by here this morning?—A. Yes, sir; they were loaded down.

Q. How many tons would they carry?—A. I could not tell exactly. I never inquired into the case. It all depends upon what size engines they have in them. If they did not have an engine they would carry, I should think, at least a hundred and fifty tons.

Q. There is a menhaden boat now [pointing at it]; what is the tonnage of that boat; would she carry a hundred tons without her engines?—A. Without her engines, I think she would. Without her engines she would carry a hundred tons easy.

Q. You think it is the general opinion of the people here that this menhaden fishing with the purse-nets is destroying the food-fish?—A. I have heard that from very old fishermen, around Seabright especially, because there are so many fishing for bluefish there.

Q. The bluefish are getting scarcer than all other fish, are they not?—A. Yes, sir.

Q. And they attribute that to menhaden fishing with purse-nets?—A. Yes, sir.

Q. The general opinion is that there ought to be some legislation to stop that?—A. Yes, sir; that is the opinion.

BRIGHTON BEACH, CONEY ISLAND, N. Y.,
July 20, 1883.

DUDLEY HALEY sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. I reside in Brooklyn.

Q. How long have you been a resident of Brooklyn?—A. About twenty years; Brooklyn and New York forty-five years.

Q. What is your occupation?—A. Dealer in fish.

Q. How long have you been in that business?—A. Forty-five years.

Q. What experience, if any, have you had as a practical fisherman?—A. Very little as a fisherman.

Q. Your knowledge is mainly confined, then, to what you have learned in the course of your dealings?—A. Yes, sir; pretty much so.

Q. Have you ever known a period when the menhaden, as they are termed, or the mossbunkers, were used for food?—A. Oh, I have known of small quantities of them to be used for food.

Q. Did you ever know of their being corned for winter use?—A. I have known of people buying them who said they were to be corned.

Q. Pack them for family use?—A. Yes, sir.

Q. How is the supply of menhaden now compared with a prior period of ten or fifteen years ago?—A. Well, there never have been a great many in the markets for sale; there would not but a small quantity sell if they were plenty.

Q. Are they still sold at all in any quantity?—A. Oh, yes.

Q. Some are yet sold?—A. Some are yet sold; yes, sir.

Q. For anything but bait?—A. I think they are; yes, sir.

Q. How is the supply of bluefish now compared with former years?—A. The supply is larger than it was in former years, but there are so many more catching them that I do not know as the fish are any plentier; do not think they are; do not know that they are as plenty.

Q. Is the demand for fish for food an increasing demand?—A. Yes, sir.

Q. Rapidly or slightly?—A. Pretty rapidly.

Q. How is it with the striped bass?—A. The striped bass are scarce, much scarcer than they used to be.

Q. You deal in weakfish?—A. Yes, sir.

Q. How is the supply of weakfish?—A. The supply has been pretty good this year, so far.

Q. How is the quality?—A. Good.

Q. Do you know anything personally of this menhaden fishing, or its effect?—A. I know something about it, not a great deal.

Q. State what your knowledge is.—A. I know that it has been an increasing business for the last twenty-five or thirty years. It has all been started in that time pretty much.

Q. How long is it since you first knew of their using steamers?—A. I could not say exactly; I should think about ten years.

Q. Have you any opinion as to whether the catch they make of menhaden has any effect upon the supply of the other varieties of fish, or food-fish as they are termed?—A. I should think it had some effect.

Q. Have you ever been on one of their boats when they were catching?—A. No, sir; I never have.

Q. You do not know what they catch, then?—A. No, sir.

Q. Take the present season; do you know where the menhaden fishermen are operating mainly?—A. I do not; but there are many of them

in this neighborhood. There has been one up to market, one load of weakfish that they caught.

Q. What quantity?—A. If I heard I have forgotten. I should think some 20,000 pounds; something like that, I think, is the quantity.

Q. Have you sufficient knowledge to know what is the food of the bluefish?—A. I could not say; there is a kind of a small fish that they eat.

Q. What kind of fish?—A. I have seen herring in them, and so on; these menhaden—I have opened them with a piece of them in them.

Q. You have found menhaden in them?—A. Yes, sir; part of a menhaden. Bluefish, you know, are a very ravenous fish, and bite a fish right in two.

Q. What is the condition of the bluefish when it first appears in the spring?—A. Thin.

Q. And do they gradually increase in value until they leave in the fall?—A. Yes, sir; gradually increase.

Q. About what time do they disappear?—A. About the 10th of October, I should say. It depends a little upon the state of the season.

Q. They leave as soon as it is cold weather, I suppose?—A. Yes, sir; as soon as cold weather sets in they leave.

Q. Do you know whether the striped bass feed on menhaden?—A. I think they do, small ones.

Q. How large have you ever seen a striped bass?—A. Seventy-five pounds. I think I have seen them 90, but I know I have 75.

Q. How large have you seen any this year?—A. Fifty, perhaps; I don't know; 50 certain. I have had them over 50; I think 55.

Q. Are they more valuable than bluefish?—A. Yes, sir.

Q. More valuable than Spanish mackerel?—A. I think they are. What I mean by that is, the same quantity of them would sell for more money.

Q. Next to the salmon, are they not?—A. Yes, sir.

Q. Do you know whether the Spanish mackerel feed on the menhaden?—A. I do not think they do.

Q. What do they feed on?—A. That I could not say; we seldom dress any fish; we are wholesale dealers; those who dress them can tell all about it.

Q. Now, in your judgment, will the destruction or material decrease of the supply of menhaden necessarily have any effect upon the quantity of the varieties of food-fish which you get here?—A. I should think it would.

Q. That is your judgment about it?—A. Yes, sir.

Q. No matter from what cause they are diminished?—A. I think it would have some effect; I do not know to what extent; there are other fish to feed on menhaden—the herring and codfish.

Q. Codfish do not come until menhaden leave, do they?—A. Yes, they do sometimes.

Q. They do not come into market before October, do they?—A. Yes, sir; they come all seasons of the year. There is hardly a day in the year but what we have codfish. I have sold 8,000 or 10,000 pounds of them to-day.

Q. And you think they feed on the menhaden?—A. I know they do, some.

Q. Where are they caught principally?—A. You can catch them off Block Island now; that is about as near as they catch them here and plenty off Nantucket Shoals; that is a great place for them.

Q. They are mostly caught north of here?—A. Yes, sir.

Q. Are there any caught on the New Jersey coast?—A. Not at this time of the year; they come there about the first of November, and leave about the first of May.

Q. They stay all winter, then?—A. Yes, sir.

By Mr. McDONALD :

Q. How is the quantity of bluefish now in the market compared with what it has been in past years?—A. Say ten or twelve years back, or many years back?

Q. Take ten or twelve years back, first.—A. I think it has not varied a great deal.

Q. It has not varied?—A. No, sir; some years they are plentier.

Q. Do you ever remember a year when they were scarcer than they are this year?—A. I do not think I can.

Q. Your memory, then, does not go back to the time when the bluefish was not taken on this coast at all?—A. Yes. I remember some years they were not taken at all here, but I think they were somewhere on the coast.

Q. How were the menhaden that year; were they always abundant?—A. I could not say; these vessels were not in this business at all. If they were caught they were brought to market to sell, or used for manure where they were.

Q. You would not attribute, then, the scarcity of menhaden to fishing for them in any way; that was before any fishing for menhaden began, was it not?—A. Yes, sir; there is something about fish I could not tell about.

Q. They come and go?—A. Yes, sir; next year, perhaps, there will be plenty of little ones. I have seen them not longer than your finger.

Q. You say that the supply of food-fish now is more than it has been in past years?—A. Yes, sir; there are more ways of catching them; more artfulness.

Q. Take any locality, say the New Jersey coast, do you draw as large a supply from a given reach of coast now as you used to?—A. I think we do, bluefish.

Q. How is it in regard to the striped bass?—A. Nothing to what it used to be.

Q. Where does your supply of them come from now?—A. There is hardly any supply of them; they are now a fish that fetch about the same price as the salmon.

Q. Is the larger part of the catch of striped bass now small fish or large fish?—A. I should think the larger part was small, very small.

Q. That is, small pan fish?—A. Yes, sir.

Q. Do they come principally from the southern coast?—A. Well, yes, sir.

Q. You get them from North Carolina and the Chesapeake principally?—A. Yes, sir.

By Mr. CALL :

Q. Do you think the supply of fish is adequate to the demand?—A. Sometimes it is.

Q. On an average, though?—A. On an average they are rather scant.

Q. Is not the demand necessarily increasing very largely with the population?—A. I do not think the fish increase as fast as the demand for them. The demand increases with the population, as you say, yes, but I do not think the fish increase as fast.

Q. Have you any opinion on the subject of the effect of this menhaden steam-fishery upon the supply of food-fish?—A. Of course they have some effect; to what extent I could not say.

Q. I mean upon the permanent supply, do you think there is any probability of destroying it?—A. I do not think there is any probability of their destroying it entirely. I think they have some little effect.

Q. You think they have a little effect?—A. Yes, sir.

Q. Not a very great one?—A. Well, not very great as yet.

Q. There is nothing in your opinion, then, to indicate that in the near future the supply of food-fish will be materially diminished because of the menhaden fishery?—A. I should not think it would unless they increase their business very much; they might run that enough to damage it considerably, but I believe they are not making it as profitable this year as they have some years past.

Q. You think they are not?—A. No, sir.

Q. Have you any reason for that, known to you?—A. No, sir; I merely heard one of the men say they were not doing as well as usual.

Q. Have you any particular familiarity or knowledge of the menhaden fishing with the purse-nets?—A. No, sir.

Q. You are a dealer in the fish, I suppose?—A. Yes, sir; I have been forty-five years.

Q. In the New York market?—A. Yes, sir.

Q. Then up to this present time, I understand you to say, the supply of food-fish in the New York market continues to be reasonably abundant?—A. Reasonably fair; a very great supply to-day; the market was well stocked.

Q. They have varied the mode of catching them very much?—A. Yes, sir; that is it.

By the CHAIRMAN:

Q. State, generally, from what localities you obtain fish.—A. They come from almost every State in the Union, you might say.

Q. To your market?—A. Yes, sir; Michigan, a great many of them.

Q. I am speaking now of the summer fish.—A. The summer fish come from all the coast, away along clear down in the British Provinces.

Q. How far south?—A. Norfolk is about the farthest south this time of the year.

Q. From the British coast, then, as far south as Norfolk?—A. Yes, sir.

Q. You get more or less fish from all those localities?—A. Yes, sir.

Q. You spoke of more people being engaged in catching fish than formerly?—A. Oh, yes.

Q. What is the proportion of persons engaged in it?—A. To what there was when I first knew, ten to one.

Q. That are now fishing for the varieties of food-fish?—A. Yes, sir; perhaps more than that.

Q. That grows out of the demand for them for food, I suppose?—A. Yes, sir; that is it.

Q. To what localities do you send fish?—A. We send them all over; to Philadelphia, Baltimore, Albany; anywhere most.

Q. Any further west than Albany?—A. We do not much, but there are fish sent to Chicago, I think.

Q. But you send to the various cities in the interior?—A. Yes, sir; anywhere where they are ordered.

Q. It is not the fish consumed in New York alone, then, that you deal

in?—A. Oh, not by any means; sometimes we ship away twice as much as we sell in New York.

Q. For home consumption?—A. Yes, sir; when fish are plenty and cheap, we have a market for them somewhere. We telegraph the prices, &c.

Q. When is the demand for them the greatest, in the winter or summer?—A. In the spring and fall is the greatest demand. In the very hottest weather the demand is not so large; in very hot weather and very cold weather.

Q. That is owing to the difficulty of transporting, more expensive?—A. Yes, sir; people are afraid they will not keep, and it costs more to send them.

By Mr. McDONALD :

Q. Can you institute any comparison between the total amount of fish brought to New York and Brooklyn now and what was brought ten years ago; how does the bulk of the trade compare now with what it was ten years ago?—A. I should think it would be probably double in ten years.

Q. Not more than double?—A. No, sir.

Q. But you think there are ten times as many men engaged in fishing?—A. Not ten times as many in ten years; but since I have been in the business, that is, forty-five years, there are ten times as many as there was then.

Q. Going back forty-five years, how does the total trade of the city compare now with what it was then?—A. I should think the amount of fish is, well, perhaps eight times as much.

Q. So the amount seems to have increased very nearly as fast as the number of people engaged in the business?—A. Yes, sir; very nearly.

By Mr. CALL :

Q. Do not you get fish from Florida?—A. Yes, sir.

Q. Considerable quantities?—A. Well, not very large quantities.

ALBERT VOORHEES sworn and examined.

By the CHAIRMAN :

Question. Where do you reside?—Answer. Gravesend.

Q. How long have you lived there?—A. All my life.

Q. Give the number of years.—A. About forty-five.

Q. What is your occupation?—A. Fisherman.

Q. What kinds of fish have you caught during your life?—A. Most all kinds; weakfish is our principal fish.

Q. Caught in what way?—A. Nets.

Q. Pound-nets or gill-nets?—A. Some seasons of the year we have one kind, and other seasons another kind.

Q. What other varieties, except weakfish?—A. Sometimes we catch bluefish, butterfish, herring, menhaden, and some other different kinds.

Q. For what purpose have you ever caught menhaden?—A. We sell them for bait for smacks to go bluefishing with, and some we take to New York to sell for food.

Q. How long have you been accustomed to sell them for food?—A. Ever since I have been in the business.

Q. Are they eaten fresh or corned?—A. They are eaten fresh; some eat them salted; I often salt them myself.

Q. Keep them for winter use?—A. Sometimes, yes, sir; when they are fat.

Q. How large have you ever seen menhaden?—A. I don't know as I can answer that exactly; I think I have seen them weigh as much as 3½ pounds.

Q. You speak of when they are fat; when do they get fat; what time of the year?—A. There are some menhaden that are fat in the fall of the year; late in the fall.

Q. How large have you seen any menhaden this year?—A. I have seen them weighing 3 pounds this year, I think; I don't know, I am only speaking—

Q. Caught where?—A. Gravesend Bay.

Q. In what description of net?—A. In pounds.

Q. What is their condition?—A. Poor; that is, not fat.

Q. Are they salable for food at this season of the year?—A. Yes; some little of them, a few of them, not to any great extent.

Q. They are a cheaper fish than the other varieties, are they not?—A. Yes, sir.

Q. Cheaper food for the people?—A. Generally, yes, sir.

Q. In what quantity have you ever caught them for food in any year?—A. I don't know. I have sold as high as 10,000 of them in a morning at Fulton market.

Q. For the purpose of eating?—A. Yes, sir.

Q. When was that?—A. Not this season; last season; I think I did it last season.

Q. You mean 10,000 in the season?—A. No, sir, in one morning, I think it has been 10,000. I may not have sold them all myself, but with others—that is, with other fishermen like myself—there has been 10,000 sold there. I have sold myself 10,000 of a morning, but I do not think I have done it this last season.

Q. When did the menhaden steamers first fish with a net?—A. I can not say exactly how long ago it is. I should judge they have been now about nearly ten years.

Q. With steam vessels?—A. Yes, sir.

Q. Before that, with what were menhaden caught?—A. Sloop vessels.

Q. Do the steamers fish in this bay now?—A. They do sometimes.

Q. Have they this season?—A. They have around, just outside, at any rate; what they would call Gravesend Bay.

Q. Where, generally, do they go now?—A. They go further south.

Q. Do the sailing vessels fish for them yet?—A. Not many of them; there are one or two rigs.

Q. Have you ever seen them catch fish on those boats?—A. Yes, sir.

Q. Often?—A. Not often.

Q. Did you ever work on them?—A. Not to make a business of it. I have helped on them.

Q. When?—A. It must be four or five years ago.

Q. Where did you fish?—A. Right off Rockaway.

Q. What kind of fish did you catch?—A. Menhaden.

Q. Nothing else?—A. Not at that time.

Q. Well, at any time?—A. Not any time that I have been with them.

Q. You mean they took schools with nothing but menhaden, no other fish at all?—A. They did not any time that I have been with them; they do catch other fish, but no time when I was with them. I could not say positively, although I know they catch them.

Q. Do you think it is possible to run one of these long seines out and bag it and not catch anything but menhaden?—A. O, yes.

Q. You think that is so?—A. Yes, sir; it is possible.

Q. Well, probable, I mean?—A. Yes; well, no, I hardly think it altogether probable, but it is possible.

Q. Yes, all things are possible, perhaps. What quantity have you seen them catch at a haul?—A. About 8,000; eight or ten thousand at a haul. I have never been with them when they were making very big hauls.

Q. Do you know what is the largest catch they made?—A. I have heard them say they catch 100,000 at a haul.

Q. In one purse-net?—A. In one purse-net; yes, sir.

Q. How many will their vessels hold?—A. Some of them will hold 200,000.

Q. They load them down when they can find fish to do it, I suppose?—A. I suppose so; yes, sir.

Q. What do bluefish feed on?—A. They feed on menhaden principally.

Q. Is not that the main food of bluefish; do not they come with the menhaden in the spring and go away in the fall about the same time?—A. I think it is a general food for bluefish, although bluefish will eat anything.

Q. Of course, eat anything that is eatable?—A. Yes, sir.

Q. How many menhaden factories are there in this section that you know of?—A. I don't know; there are four or five or six on the bay.

Q. Where are they located?—A. On Barren Island.

Q. All on Barren Island?—A. Yes, sir.

Q. Do not you know of any others?—A. No, sir; there are no others in our neighborhood.

Q. Did they go south for menhaden when they first began to fish here?—A. There was plenty of them right here.

Q. They had no occasion to go south, you think; they could catch all they wanted here?—A. Yes, sir; there were not so many steamers at that time.

Q. Can they catch all they want here now?—A. No, sir; they have got to go south of here.

Q. The quantity of menhaden has diminished, then, since they began to fish?—A. I don't know how that is; there are not as many here as there were; whether they have diminished, or whether they have driven them further south or off in other quarters, I don't know.

Q. Do you think the fish are operated upon by what we would term fear; that they leave their haunts because of fear?—A. Yes, sir; there is no doubt of it.

Q. You have not any doubt of it?—A. No, sir; none at all.

Q. Do bluefish do the same?—A. Bluefish are not hardly the nature of menhaden.

Q. Menhaden are a shy fish, are they?—A. More of a shy fish; yes, sir.

Q. The men engaged in the menhaden business whom we have examined told us that they first began to take the fish on the coast of Maine, but for the past six years there have been no menhaden there; they have abandoned that coast entirely, and the factories have been given up. We heard that they had returned there this year; do you know anything about that?—A. I heard that they were plentier than they have been in some three or four years.

Q. Do you know whether they are fishing for them there now?—A. They have been fishing for them there.

Q. The same steamers that are now running south?—A. Well, some of them.

Q. Some of them have been fishing there, have they?—A. I am not certain about that.

Q. Have they left there and gone south?—A. That I don't know, but the steamer that we call the eastern steamer came and went south to-day; whether she has been fishing there for them or not I do not know, but it seems to me it would be likely that she has been fishing up there and left it and gone fishing south, because they would not fish here and take them away up to the factories if there was plenty there.

Q. You infer from that that they are not in quantities north of here?—A. Yes, sir.

Q. By the eastern steamer, what steamer do you mean?—A. I think her name was the Vesta.

Q. Do you know who owns it?—A. No, sir; she came from Milford, Conn.

Q. Do you know who is the owner?—A. No, sir.

Q. Or to what factory it is attached?—A. No, sir; I do not.

Q. There are factories on the coast of Long Island above Barren Island, are there not?—A. I don't know; there may be; there used to be factories down on this coast as far as Patchogue, but I think they are done away with.

Q. At Barren Island they work up animals as well as fish, do they not?—A. Yes, sir.

Q. Anything else?—A. They have some kind of stuff they call slug acid.

Q. What is that?—A. Some of the refuse of kerosene. After they manufacture the kerosene there is some refuse; I think that is where they get it from.

Q. Where they purify it, you mean?—A. Yes, sir; and they manufacture that up into some kind of a fertilizer.

Q. Well, they work it in?—A. Yes, sir.

Q. Do not work it separately?—A. No, sir; I think not.

Q. Is there any complaint of their factories on the part of the people?—A. There have been complaints; yes, sir.

Q. Have they ceased?—A. No, sir.

Q. Do they affect the waters around them to any extent?—A. They do when they let this acid run in the water.

Q. Well, where else do they dispose of it except in the water?—A. They are making use of it now in the fertilizer; whether they use all of it or not I do not know.

Q. Does that affect the fish?—A. When it runs over in the water it does.

Q. Kill them?—A. Certainly it kills.

Q. It kills them?—A. Yes, sir.

Q. You have seen that kill them, have you?—A. Yes, sir; I have seen fish floating on top of the water.

Q. What kind of fish?—A. I have seen fish floating on the water; all bottom-fish; see it in the clams; it kills them where it falls on them.

Q. Does it kill oysters?—A. Yes, sir; anything.

Q. Anything it reaches?—A. Anything it reaches; yes, sir.

Q. How long have they been accustomed to do that?—A. I think about three or four years; five years, maybe.

Q. Are you a dealer in fish except as you sell your own catch?—A. Not altogether, no, sir; I do not sell them.

Q. You do not buy and sell, I mean?—A. No, sir.

Q. You do not know about the supply of oysters and clams, then?—
A. No, sir.

Q. What effect have the menhaden boats had upon the quantity of menhaden in this region, so far as your observation goes?—A. I do not know as I could say that it has had any material effect, more than what they catch; what they catch of course I cannot catch, or they cannot be caught again.

Q. They catch a hundred times as many as individuals?—A. Oh, yes.

Q. A thousand times as many?—A. Yes, sir; you see we are nothing at all.

Q. I know you are not much more than a single bucket?—A. No, sir; no account at all.

Q. What are caught by individuals does not amount really to anything?—A. No, sir; it does not amount to anything, not in comparison.

Q. Where do you catch bluefish?—A. In Gravesend Bay.

Q. In pound nets?—A. Yes, sir.

Q. How many years have you been accustomed to fish for them?—
A. About twenty years.

Q. How is the supply now compared with twenty years ago?—A. The supply of bluefish is nothing at all compared with what it was twenty years ago.

By Mr. McDONALD:

Q. You mean in that locality, of course?—A. Yes, sir.

By Mr. CALL:

Q. Do you attribute that to the menhaden fishing?—A. No, sir; not altogether.

By the CHAIRMAN:

Q. Do you catch striped bass?—A. Yes, sir; in the fall of the year we catch a few.

Q. How is the supply of striped bass?—A. Not like it used to be.

Q. How much has that diminished?—A. You may say that is not half so much.

Q. Not half as many as there used to be?—A. No, sir.

By Mr. EUGENE G. BLACKFORD:

Q. Do you think there are half as many?—A. No, sir; I do not think there is half.

Q. Do you think there are quarter as many as you used to catch?—
A. No, I do not.

By the CHAIRMAN:

Q. Do you catch sheepshead?—A. Yes, sir; we catch once in a while a single one.

Q. You do not catch them in quantities?—A. No, sir.

By Mr. McDONALD:

Q. Will they run into a pound at all?—A. Oh, yes.

By the CHAIRMAN:

Q. How is the supply of weakfish, compared with your early experience?—A. Not near as many.

Q. What proportion have they diminished?—A. There are not quarter as many as there was.

Q. Not quarter as many as there were twenty years ago?—A. No, sir; in our bay I am speaking of.

Q. How far are you from Barren Island?—A. Seven or eight miles.

Q. You are on the ground where menhaden boats used to fish?—A. Yes, sir.

Q. Do they fish there yet?—A. Well, once in a while they fish there.

Q. Not much?—A. No, sir.

Q. Have they fished there any this year?—A. I have seen them there, I think, once.

Q. Once this year?—A. Yes, sir.

Q. How many boats?—A. Two boats; whether they fished or not I do not know; they looked for fish.

Q. You cannot say they caught any there?—A. No, I cannot say they caught any there.

Q. Now, as to the quality of the weakfish, are they as large as they used to be?—A. Yes, sir.

Q. As good quality in every respect?—A. Yes, sir; I think they are.

Q. How is it with the bluefish?—A. I think they are just as good.

Q. And the striped bass?—A. Yes, sir.

Q. There never has been any disease among the fish here that has diminished the quality has there?—A. No, sir.

Q. The fish has always been healthy, except as affected close to the factory?—A. Yes, sir; I think it was a year or so ago they got into the habit of throwing this acid overboard right in our bay and made bad work.

Q. With all kinds of fish?—A. Yes, sir; all kinds of fish; they made the water very foul; fish would not stay in it. I think that is the cause we do not have more fish there now; more than it is the menhaden fishermen.

By Mr CALL :

Q. The menhaden factories made the water foul, you say?—A. No, oh, no; it is the acid from the kerosene oil works I think has more to do with it.

Q. You think that affects the fish in the whole bay?—A. I think so; yes, sir.

Q. Where are those works?—A. There are some in what we call Gowanus Cove; there is a factory in there, and perhaps an oil works. They used to come right down here—I have not seen it lately—and dump their refuse right in the bay.

Q. You think that affects the fish in the whole bay, do you?—A. Yes, sir; no doubt of it at all.

Q. Is that the general opinion of fishermen?—A. Yes, sir.

By Mr. McDONALD :

Q. Have you any oysters in the bay now?—A. Not of any account.

Q. Did you ever have?—A. Yes, sir.

Q. Many?—A. We have had some quite nice oysters in there; yes, sir.

Q. Natural beds?—A. Yes, sir.

Q. But you have nothing of the kind now?—A. No, sir; not of any account.

Q. Then, you attribute the destruction of them to the factory?—A. Yes, sir; and foul water. I would not say it was altogether owing to the factories, but then the city dumps all its refuse in the water and it comes right down the bay and makes the water foul. Fish will not stay here like they used to. Fish used to come in our bay in the spring and would be in it all the season through. Now there may come a little

run of weakfish into our bay, and in a few days they are all gone again. I think that this foul water kills their feed; something of that kind.

By the CHAIRMAN :

Q. Does the water become offensive?—A. Yes, sir.

Q. There is an offensive smell?—A. Yes, sir; sometimes you can see this oil in streaks on top of the water. It will even stick to our boats; the boats will get all colored up with it, and nets.

Q. It will color your nets more than your boats, I suppose?—A. It cuts our nets all to pieces; it takes the tar off of them. This acid is as thick as tar.

By Mr. McDONALD :

Q. You attribute, then, the falling off in your fisheries to local influences, and not to the menhaden fisheries?—A. Not altogether. I suppose the menhaden fishermen are some cause of it, but not altogether, I don't think.

Q. Suppose the menhaden were all taken out of these waters, do you think you would have any bluefish here?—A. Not so many bluefish.

Q. Or weakfish?—A. I hardly think it would make any difference with weakfish.

Q. Do not they feed on menhaden?—A. Not so much as the bluefish.

By Mr. BLACKFORD :

Q. How close to where you fish is the nearest factory from which this offensive matter comes?—A. It does not come from the factory. It comes from the boats going to the factory; the boats coming down and dumping it.

Q. I mean this slug acid you speak of.—A. Murray's Cove is the nearest.

Q. How many miles is that from where you fish?—A. About 6, 7, or 8 miles, I think.

Q. How many years have you fished right in Gravesend Bay?—A. About twenty years.

Q. About what proportion has the catch of fish diminished in that time to when you first commenced fishing; do you think you catch 10 per cent., or one-tenth, of what you caught twenty years ago?—A. No; I know I did not last season.

Q. You did not last year; did you the year before?—A. Well, I I don't know how that is. I know we are catching more this season than we did last.

Q. It is better this year?—A. Yes, sir.

Q. Have not in your time certain kinds of fish that you used to catch entirely disappeared; you do not catch any more?—A. Not any kind we used to catch for any market.

Q. How about the Spanish mackerel?—A. There was a good many Spanish mackerel last year; not as many as we caught years ago.

Q. Within ten years have not you caught as high as a thousand pounds of Spanish mackerel in a day?—A. I think so.

Q. Have you within the last three or four years caught as high as 100 pounds of Spanish mackerel in a day?—A. No; I think not.

Q. So that, as to that fish, you are not getting 10 per cent. of what you used to get?—A. No, sir.

Q. You say that you have seen menhaden to weigh $3\frac{1}{2}$ pounds?—A. I calculate that; I never weighed them.

Q. Have you any time in your life weighed menhaden to know what they weighed apiece?—A. No, sir.

Q. What will the average weight of a shad be?—A. Four pounds; four and a half.

Q. Do you think you have seen any menhaden that have been as large as a shad?—A. No.

Q. Anything like as large?—A. No.

MR. BLACKFORD. I think Mr. Voorhees is mistaken in speaking of the weight of the menhaden.

THE WITNESS. I do not speak as if I weighed them; I only gave my idea of them; guesswork, that is all.

By the CHAIRMAN:

Q. Is that weight of fish exceptional, or do you mean that they are generally that weight?—A. No, sir; they are exceptions, certain.

Q. Not frequent?—A. No, sir.

By Mr. BLACKFORD:

Q. What do you think the menhaden you are catching at the present time would average in weight?—A. I don't know; the catch of menhaden is irregular. I had two kinds to-day. I had very big ones and very small ones; I don't know what they will average.

Q. Do you think they would average 1 pound each?—A. No, sir.

Q. Less than a pound?—A. Yes, sir.

By the CHAIRMAN:

Q. What was the the relative number of large and small?—A. We had about 1,200.

Q. But of which kind did you have the greatest number, the large or small?—A. The small.

Q. What proportion?—A. In 1,500 there was not over, probably, 100 large.

Q. The balance were fish weighing less than a pound?—A. Yes, sir; small.

By Mr. BLACKFORD:

Q. Have you any idea where the menhaden spawn?—A. No, sir; I do not know where they spawn, but I think they spawn all times of the year, pretty near, although I never saw any roe in menhaden unless it was in October.

Q. Have you ever seen any very small menhaden, 1 or 2 inches long?—A. Yes, sir.

Q. At what season of the year?—A. I have seen them early in the spring and quite late in the fall.

Q. When you say early in the spring, what month do you mean?—A. I have seen them along in May.

By the CHAIRMAN:

Q. What bait do you use in fishing, or do not you use any?—A. Do not use any.

Q. You do not fish with bait at all?—A. No, sir.

Q. Did not you ever fish with bait for bluefish?—A. Yes; I have.

Q. What bait did you use?—A. Menhaden.

Q. Did you catch your own supply or get it from the menhaden boats?—A. Got it from the menhaden boats at that time.

Q. You used to get your bait from the menhaden boats?—A. Yes, sir.

Q. When you saw them catch menhaden, about what was the average

size of those you saw caught; you were on board when they made a haul?—A. No, sir; I have seen them catch menhaden a good many times, and one time I was in the boat helping haul.

Q. That was the time I was speaking of. About what was the average size of the fish at that time?—A. About two pounds and a half; they were large fish.

Q. How long ago was that?—A. It was about five years ago, I think.

Q. What season of the year?—A. It must have been in July, I think.

Q. They continue to grow fat until they leave in the fall, do they not?—A. I think so; we always catch fat fish late in the fall.

Q. And the same with bluefish, I suppose?—A. Yes, sir.

Q. They grow fleshy during the summer?—A. Yes, sir.

Q. You speak of the menhaden spawning at all seasons of the year; where do you think they spawn; where are their spawning beds?—A. O, I think they spawn in different places.

Q. In this region?—A. I don't know; that is only my opinion; no, sir, I don't think they spawn in this region at all.

Q. Where do you think they spawn, in which direction?—A. In the Atlantic Ocean. I don't think they come up the river and spawn, or anything of that kind.

Q. You think they do not?—A. No, sir.

Q. You speak of seeing roe in them in the fall?—A. Yes, sir.

Q. Full grown?—A. Yes, sir.

Q. Ready to spawn?—A. I should say so; yes, sir.

Q. Did you ever see them in that condition in the spring?—A. No, sir; not that I know of.

Q. When they come back in the spring they are poor, are they not?—A. Yes, sir; generally poor.

Q. Would not that indicate that they had come from spawning beds?

—A. It would, but I think there are some spawning all the time; I think they do not come here to spawn at all.

Q. You do not mean to say they do not get as good living south as they get here?—A. I don't know about that.

Q. What do they live on?—A. That I do not know.

Q. They do not bite?—A. No, sir.

Q. Will not bite a bait or hook?—A. No, sir; not that I know of.

Q. Do not they go with their mouths open?—A. Yes, sir.

Q. Do not they come to the surface and swim with open mouths?—A. Yes, sir.

Q. Have you any opinion as to whether they take their food in that way?—A. I suppose so; I do not know.

Q. You suppose they do?—A. Yes, sir.

Q. There are substances in the ocean on the water?—A. Oh, yes.

By Mr. McDONALD:

Q. You spoke of seeing full roe menhaden in the fall; what was the color of the roe?—A. The roe was something similar to shad roe.

Q. What color was it?—A. Red; pretty red.

Q. Reddish?—A. Yes; not a dark red.

By the CHAIRMAN:

Q. Do you know what substance forms the barnacles on vessels; what is it?—A. There are three or four different kinds; there is a kind we have here, a kind of a hard shell and a good deal of meat inside of it; that is about all there is of it.

Q. Do they attach themselves to the hulls of boats?—A. Yes, sir;

but they come very small; they come in the water, set fast to the plank, and grow.

Q. It is something that has life in it?—A. Yes, sir.

Q. Attaches itself to the vessel and then grows?—A. Yes, sir; the same as an oyster.

Q. Now the vessels must pick that up on the surface of the water?—A. Yes, sir.

Q. It is there floating?—A. Yes, sir; it lodges against them and grows.

Q. Have you ever seen the hull of a vessel scraped?—A. Yes, sir.

Q. How thick do they come on the hull of a vessel?—A. They only lay one against the other.

Q. About how deep?—A. A barnacle is only just about so thick (indicating), and it will only be that depth; they will not lay on top of one another like oysters.

Q. Why do they impede the sailing qualities of the vessels, then, if they are only as large as that?—A. Well, because they are rough.

Q. It makes it more difficult to propel the vessel through the water?—A. Yes, sir.

Q. Like a gravelly surface?—A. Yes, sir; exactly.

SAMUEL POTTER sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. In the town of Gravesend.

Q. What is your occupation?—A. Fishing; marketing and fishing, principally.

Q. How long have you followed it?—A. About twenty years now, I think, I have been here; I followed fishing before that time.

Q. In the same place?—A. No, sir; smack fishing.

Q. Where did you fish before that?—A. I have been smack fishing in smacks all along the coast from off Fire Island to Cape May.

Q. Along the New Jersey coast?—A. Yes, sir.

Q. How long since you fished there?—A. Oh, it is twenty years ago.

Q. For twenty years you have been fishing at Gravesend?—A. Been fishing at Gravesend and different places.

Q. What is the supply of fish now there compared with what it was twenty years ago—all kinds of fish?—A. It is nothing, you might say; it has pretty much diminished altogether; all kinds. Where we used to catch plenty of fish and make money, now we cannot make a living at it; hard to make a living.

Q. That applies to your business generally?—A. Yes, sir.

Q. What varieties of fish did you use to catch?—A. Do you mean in this bay here?

Q. Yes.—A. Our principal fish was weakfish; then we caught all kinds. We caught shad the first thing in the spring of the year; then next would come weakfish and herring, sheepshead; we used to catch any number of them where we do not catch any now; we have not caught any this summer; sometimes we would have fifteen or twenty in a day; now we do not catch any.

Q. What other varieties?—A. Herring, and then along about next month, in September, we used to catch the Spanish mackerel.

Q. Did not you catch bluefish?—A. Oh, yes, we caught some. Those we caught in the bay used to be most generally small until fall; then sometimes we had a run of big ones. I have caught them weighing 10 or 12 pounds. We have not caught any of them for four or five years

now. No; year before last we did have about one hundred of them. We do not catch them any more; they do not seem to come up here.

Q. So that the catch of bluefish has nearly ceased?—A. Yes, sir.

Q. How about Spanish mackerel?—A. Last summer we did catch a few.

Q. Generally, I mean.—A. Oh, there is nothing like as many; half or quarter, you might say.

Q. Sheepshead you do not catch any more?—A. Have not caught one this summer, and did not catch any last summer.

Q. How is it with weakfish?—A. We do not catch one now where we used to catch a thousand. I have turned out thousands of them; could not sell them in market.

Q. That is, you caught more than you could sell?—A. Yes, sir; would take out what we wanted and let the rest go.

Q. Still, there has been an increasing demand for fish for food during all this time, has there not?—A. Yes, sir.

Q. The market increases?—A. Of course, they sell more, they are very high and there seems to be more in the business.

Q. And the number of fishermen has increased largely?—A. Oh, yes, not so much in our bay; there has been a decrease in our bay.

Q. There are not so many?—A. There are not so many.

Q. You have less competition now than formerly?—A. But on the Jersey coast I suppose there are ten to one to what there was twenty years ago. I know there are, because I used to fish there myself.

Q. Well, that whole coast is a watering place, really.—A. It is a watering place all along the coast, and fishing place too. It is a fishing ground from one end to the other, and so on down to Cape Henlopen.

Q. But you have not fished there for twenty years, as I understand you?—A. No, not on the Jersey coast, except the menhaden fishing. I have fished for menhaden on the coast.

Q. On the Jersey coast?—A. Yes, sir.

Q. When?—A. Last fall a year ago I was fishing there.

Q. For what purpose?—A. For the factory, for oil.

Q. You were a menhaden man, were you; how many seasons have you been with them?—A. I have been four seasons, I think. The first season I went in a sailing gear before any steamers were here.

Q. How long since the steamers came?—A. I think it is six years ago.

Q. You went in a sail-boat the year before that?—A. I went one year before that, and the next year there came steamers; after that two steamers came here to Jones's factory from Rhode Island.

Q. Mr. Church's?—A. No, sir; they were Gallup and Morgan's, and the next season there came two more; the same two came here and I was hired as a pilot on one; the captain that was on one of the boats was not acquainted with the coast going in to Barren Island, and I was hired to go as a pilot on her that season; this was in the fall when I went; I did not go the whole season.

Q. How often did they generally find schools of menhaden; take your experience of the steamer?—A. They would find schools most every good day.

Q. The steamers have this advantage, have they not, that while a sail-vessel cannot run to menhaden unless the wind is in the right direction, a steamer can run wherever it sees them?—A. When there were no steamers we did not have to go so far. I was in a sailing gear the first fall, and we never went to the southward of the Highlands and never to the east of Fire Island. We found fish right along; but nowadays you

have got to go from Montauk to Barnegat or Cape Henlopen to find the fish. They do not go quite so far, but pretty much all the spring they have gone down to Barnegat; there has been all the catch this year. They head the fish off before they get here.

Q. They meet them as they come?—A. Yes, sir; that is the way it is and they get to working in them and they scatter them all away.

Q. Break up the schools?—A. Break them up; scatter everything.

Q. Was that the effect when you worked on the vessel?—A. Oh, yes. I have seen two or three different nets hauled at one school of fish and not catch them at all; they frightened them and could not catch them.

Q. They disappear?—A. Yes, sir.

Q. Are they a shrewd fish in the water?—A. If they find out they are penned they are; they are very quick to find out.

Q. Can they outswim the bluefish?—A. Oh, no; I have seen bluefish catch them.

Q. Have you ever seen bluefish drive them ashore?—A. Yes, sir; on the Jersey coast. I saw them drive weakfish ashore, too.

By Mr. CALL:

Q. Bluefish are a savage set of fell ows?—A. Oh, yes.

By the CHAIRMAN:

Q. Are the menhaden here in any such quantity as they were twenty years ago?—A. No, sir; nothing like the quantity; there is not one out of a thousand, I should say.

Q. Of menhaden?—A. No, sir; neither are they the same kind of fish.

Q. How do they differ in that respect?—A. They are small; they are not more than half-grown now.

Q. You do not get the large ones?—A. They do not seem to get them any more; I am not in the business. Of course I went a little while when I had nothing else to do. In the fall when our fish get down here I jump aboard the steamer and go for a month.

Q. When the menhaden vessels began they caught large, good fish?—A. Indeed, they did.

Q. Now they do not catch such fish?—A. Now, I will tell you the difference in the menhaden and what we call fallfish. We caught then what we call fallfish that would make 14 gallons of oil to a thousand. Now they will not make but 2 gallons; a gallon and a half; they have been making a gallon.

Q. They only make about one seventh part, then?—A. That is just what they make; when they first come they make five gallons sometimes; that is what the man at the factory told me; they run off five gallons to a thousand, but now they do not run off more than a gallon and a half to two gallons.

Q. What other cause, if any, can you assign for the diminution of menhaden except the catching by the boats?—A. I have the same opinion the fishermen have; that is what they told me. They catch them up. When they used to fish in Maine and Rhode Island they used to catch these large fish, and now there has been none there for quite a while. There have been fish along Block Island in the fore part of the season, but the steamers are all fishing here now.

Q. From Rhode Island?—A. Yes, sir.

Q. Have been all this season?—A. They say along in the fore part of June there were a few here from Greenport; took them into the factories.

Q. Have you learned whether they first began on the coast of Maine?—A. Yes, sir; on the coast of Maine.

Q. Have you learned whether they are catching any there this sea-

son?—A. Not as far down as that; we have not heard of any steamers fishing down as far as that. They have been fishing down to Rhode Island and the east end of this Island.

Q. They used to be very plenty in Narragansett Bay, did they not?—A. Yes, sir.

Q. Do you know whether there has been any there this year?—A. I do not.

Q. Well, the Churchs' vessels would not come here if the fish were there?—A. No, sir; there are five steamers here now, I think.

Q. How far is it from Tiverton here?—A. I do not know what the distance is; about 125 miles, I think, from New York to Hawkins's factory; but Church's factory I have never been down to.

By Mr. McDONALD:

Q. You are not now engaged in menhaden fishing?—A. No, sir.

Q. Have you ever been engaged in the menhaden fishing?—A. Yes, sir.

Q. How long ago?—A. Last fall a year ago I was in one of their boats. I was hired to go there.

Q. Are you engaged in fishing at all now?—A. Yes, sir; Gravesend Bay.

Q. You stated that the menhaden now are smaller than they used to be, not near as large numbers, and not near as good condition?—A. Oh, no. Well, they never are in good condition until November.

Q. The question I wanted to understand distinctly was what you suppose affected their condition so far as the amount of oil furnished is concerned?—A. They are not as large; do not grow as big. They have got small nets now, and catch little ones as well as large ones.

By the CHAIRMAN:

Q. That is, they have diminished the mesh of the net?—A. Oh, yes; they catch small ones.

Q. Weighing how much, quarter of a pound?—A. They will not weigh quarter of a pound.

By Mr. McDONALD:

Q. Did you ever see the small menhaden fat at any season of the year?—A. No; never saw any but large ones fat. I have never seen any fat ones until late in the fall of the year. They used to come along in the latter part of September and first of October years ago, when they used to fish for them on the Jersey beach, for nothing only to salt for the winter. I can remember when my father used to have nets there to gill them, and they used to fetch them ashore there, and there used to be wagons—the same as wagons now take fish—buy up loads and peddle them out through the country, through New Jersey, and clean to Pennsylvania. That is twenty years ago, when I was a boy; they never knew anything about making oil of them then.

By the CHAIRMAN:

Q. We have got that from witnesses in New Jersey.—A. That is the place. I used to live there. My father always used to salt a barrel of them. The first season I was in a steamer, about five years ago, I got a few of them and salted them.

Q. You put up a barrel?—A. Yes, sir; but there has not been any large ones since then.

By Mr. McDONALD:

Q. You have eaten the corned menhaden?—A. Oh, yes.

Q. How does it compare with what you call the alewife; what we call the herring in the Chesapeake Bay.

Mr. BLACKFORD. What we call the spring herring.

The WITNESS. Oh, they are a great deal better than them. You take what we call a bunker, a good fat one, and he is very nice eating; a good deal of meat on them, too, when they are fat.

By the CHAIRMAN:

Q. Well, they are decidedly a cheap food for the people?—A. They used to be.

Q. What do they sell at?—A. We used to sell them there; I have seen them sell for \$1 and \$1.50 a hundred; I have sold a good many of them.

Q. What would they weigh on the average; those you sold at that price?—A. I do not think they would weigh a pound; not over a pound.

Q. About a pound?—A. I have never seen them weigh over a pound.

Q. Did you ever see one weighing 3 pounds?—A. No sir.

Q. You do not agree with the last witness about that.—A. Oh, no; he is mistaken; I think we caught one once and we measured him. I think he measured 14 inches from the head to the end of his tail.

Q. What would he weigh?—A. He would not weigh over a pound and a half, I don't think. I heard some of the fishermen there who had caught millions of them allowed that was the largest one they ever saw, and that is the largest one I ever saw.

Q. While you were on these menhaden boats you saw them haul in fish a great many times, I suppose?—A. Of course; I have worked on the net—helped.

Q. What kind of fish have you known them to take?—A. Take all kinds of fish, even to a whale; we have had him in.

Q. They take all the net surrounds?—A. Yes, sir; even to a whale

By Mr. CALL:

Q. He must have been a very small whale.—A. A small one.

Q. How large was the whale?—A. We went around one one day that was 30 feet; they were after bunkers.

Q. You did not catch that one, did you?—A. No, sir; could not hold him.

Q. Do they catch bluefish?—A. Yes, sir.

Q. Weakfish?—A. Yes, sir.

Q. Sheepshead?—A. Yes, sir; all kinds of fish on the coast, even to striped bass, once in a while one, but weakfish and bluefish we used to catch any number then; we would salt them down.

By Mr. McDONALD:

Q. Does the net go to the bottom?—A. According to how deep the water is.

By Mr. CALL:

Q. Is it necessary that the nets should go to the bottom in order to catch the fish?—A. We used to rather have it go to the bottom.

By the CHAIRMAN:

Q. You can purse it, then, without its going to the bottom?—A. Yes, sir; purse it in 30 fathoms of water.

Q. How far out from shore have you ever seen them purse a net?—A. We have been off 3 or 4 miles.

Q. One or two witnesses said last fall they had taken them 50 miles

from shore.—A. Well, that they might. I have seen them in the fall when we have been cod-fishing off shore.

By Mr. CALL:

Q. Would it be practicable to conduct the business profitably 2 miles from shore?—A. Oh, they are not as far offshore as that.

Q. Not usually?—A. No; right along shore. Sometimes they will be 4 or 5 miles offshore.

By the CHAIRMAN:

Q. Suppose these menhaden boats were stopped by law from fishing within 3 miles of the shore, do you think the menhaden would return to the New Jersey coast?—A. I cannot tell about that.

Q. Have not you any opinion about it?—A. Of course they would be plenty if they stopped fishing.

Q. Do you know of any reason why they should not come back as they were formerly?—A. Now we catch menhaden here in our bay; we bait smacks generally. Sometimes fish will get up there, will be around in the bay may be for a week; may be some of these steamers will come along from the east and see a few schools and get to work in them and drive everything right out; we will not catch bunkers nor anything else. After the steamers have been in them away they go; but before the steamers got fishing here the bay was full of them. I do not know as that is the cause of the fish being so scarce.

Q. Where was this large menhaden you speak of caught?—A. Down at Sandy Hook. We used to catch those large ones up in the bay here just inside the Hook.

Q. Do they use sailing-vessels here for catching menhaden?—A. Very few. I believe there are a couple of factories over on the Jersey shore, and they fish with smacks. They cannot make a living at it any more, and have given it up. I know some gears that were at it last year have given it up this year.

Q. The steamers have dispensed with them?—A. Oh, yes; the steamers have done away with the sailing-gears altogether. They used to be all on shares, and now they cannot get anyone to go; they have to hire the men now on steamers. The fish are decreasing.

Q. That is the men used to go into it and divide the value of the cargo caught among themselves?—A. Yes, sir; the factory used to furnish boats and nets and they took half; paid so much for the fish and then one-half went to the factory and the other half to the crew.

Q. Did the factory buy the half of the men?—A. Yes, sir; they took all the fish.

Q. How much did they pay?—A. Along in the summer months until the 10th of October they paid 10 shillings a thousand; after that they paid 20 shillings a thousand.

Q. For a thousand fish?—A. Yes, sir; and then they took half of them.

By Mr. McDONALD:

Q. Do you mean a New York shilling?—A. Yes, sir; a dollar and a quarter. They paid that until the 10th of October; then they raised it generally. That is in the sailing-vessels. Then generally when the fall fishing came they got the fat fish, making twelve and fourteen gallons to a thousand.

By Mr. BLACKFORD:

Q. How small menhaden have you ever seen in schools?—A. We

used to see them about may be 5 inches long. I have seen acres of them.

Q. Have you seen any as small as 1 inch or an inch and a half?—A. No, I never noticed them.

Q. Do you know anything about when menhaden spawn?—A. Well, you always see the roe in the fall.

Q. The roe is the largest in the fall?—A. Yes, sir.

Q. Did you ever see any menhaden where the roe was running out, ripe?—A. No; I never noticed that.

Q. You say in the fall they are fattest; do you mean October?—A. Yes; along in the fall. We generally fish here for them until the 20th of November, and then probably we give it up.

Q. Do you think they spawn in the ocean or run up into shallow water?—A. They must spawn south, because all these big fish with the roe in them are going south; I do not think they spawn here at all.

By Mr. McDONALD:

Q. Are they running down close to the shore when they go south?—A. They always stick to the shore the first part, and then the latter part will be away offshore.

Q. Have you ever noticed them farther south than Cape Henlopen?—A. Oh, yes; clean down the Chesapeake.

Q. Were they close inshore down there?—A. I do not know about that, only they do not go close in there. Sometimes they will be close in; sometimes they are off 2 or 3 miles. It is all according to the weather. Sometimes, if there is a northeaster, they go offshore, and if the wind is to the westward, they will always draw to the shore. Where the wind draws off the shore they naturally draw to the shore.

Q. Do you ever find a bug in the mouth of the menhaden that you catch here?—A. No; we find a worm, though.

Q. Do you find them here, in this locality?—A. Oh, yes; we do here, but you never find a worm in a fat one in the fall. It will be in the back; it will curl around like a hair, but you never see it in a fat bunker.

By Mr. CALL:

Q. What do you think will be the effect of this steam fishery upon the menhaden; do you think it will destroy them?—A. I think, if they keep on fishing, they will not be able to fish much longer.

Q. You think, then, the system will be destructive of the supply, even for fertilizing purposes?—A. Yes, sir; I think it will. They say the factories are making nothing this year, simply because the fish are so poor; there is no oil in them, and all they get is the scrap.

Q. Have you any idea what legislation would be necessary to protect them, what it needs, whether fishing within a certain distance from the coast would be effective?—A. Well, if they stop fishing within 3 miles of the coast they cannot fish.

Q. That would stop the business?—A. Yes, sir.

Q. How about not fishing certain periods of the year, when the fish are spawning or small?—A. I think in the fall of the year would be the time for them to fish.

Q. You think a law, then, limiting the time of fishing would be beneficial, confining it to the fall of the year?—A. Yes, sir; then the fish are in good order and are larger.

Q. You think the menhaden would be an important supply of food-fish, do you?—A. Well, most all fish follow menhaden.

Q. I mean they might be an important food-fish for the people. I understood you to say that they had been taken formerly in large quantities and salted?—A. Yes, sir; that is, in the fall of the year; they never salt them this time of the year.

Q. Well, when they are fat you think they might contribute to the subsistence of the population?—A. Oh, yes; when they are fat they are very good fish, and I have had those Jerseymen come off the coast when we have been catching the fish and fairly beg for them, but we would not sell them; had orders from the factory.

By the CHAIRMAN:

Q. You had that occur when you were fishing in the menhaden boats?—A. Yes, sir.

Q. But still the men came who wanted them?—A. Yes, sir; they wanted them, and we refused them. Sometimes we gave them some, but they came and wanted them to salt for food.

By Mr. CALL:

Q. It seems to be your idea that if there was some adequate legislation upon the subject they would be an important article of subsistence for the people?—A. Well, they used to be.

Q. Well, is the demand for fish increasing very largely; is it in ratio with the increase of population?—A. The demand increases with the more people.

Q. Greater demand?—A. Yes, sir.

Q. And the supply has not increased, as I understand?—A. Oh, no. There did not use to be any smacks for fishing for bluefish and menhaden, this time of the year, not over seven or eight years ago; they did not use to fish this way for them.

By the CHAIRMAN:

Q. Take the case of the men who come to the New Jersey coast, for instance; they come for summer pastime, for sport, if you term it so; among other things they want to fish?—A. Yes, sir.

Q. Can they fish now as they could before the menhaden boats began to run there?—A. Oh, yes.

Q. Can they have the same luck, I mean?—A. They used to fish for sea bass and porgies, likely.

Q. Yes, but I'm speaking of bluefish. Did you ever see a bluefish caught from the shore?—A. Yes, sir; I have done it myself many a time.

Q. In quantities?—A. No, not any great quantity. I have caught about seven or eight with a troll—just throwing out.

Q. Just throwing a line from the shore?—A. Yes, sir; I can remember when bluefish would not be eaten by the people.

Q. And they wanted menhaden to corn and would not eat bluefish?—A. Yes, sir; I can remember when they would not make any question of bluefish at all; called them horse-mackerel, and you could go out and catch as many with a troll as you wished and fetch them ashore and people would not buy them.

Q. Is there any fish that will furnish as cheap food for the masses of the people as the menhaden?—A. No; I do not know of any.

Q. You say they do eat them and desire to have them?—A. They do so in the fall of the year; the people do.

Q. That is what I mean.—A. I often sell them in New York. Most every Thursday I will take a lot up there, and if fish are scarce in the market may be sell four or five hundred, a thousand, two thousand.

Q. And they are used for food?—A. Wagon boys take them around through the streets and sell them. I do not know what they call them.

Q. They are sold for food?—A. Yes, sir.

By Mr. CALL:

Q. They will keep anybody from starving, will they not?—A. Well, there are plenty of bones in them, and their taste is nothing like what it is in the fall with a fat fish.

Q. Well, a fat menhaden is very good food, I understand you to say?—A. Yes, sir. A Jerseyman used to think he lived good when he had a barrel of them for winter.

By the CHAIRMAN:

Q. How is the bluefish for corning?—A. They are very good.

Q. They are highly prized for that purpose now, are they?—A. Well, yes; I cannot say that I fancy them so much.

Q. Not so good as mackerel?—A. Not for my use.

Q. Better than menhaden?—A. Oh, yes; there is more meat to them, of course, but the taste I don't know; everyone; has not got a taste alike.

By Mr. CALL:

Q. Suppose the entire supply of food-fish on the coast was destroyed, would anybody suffer?—A. Well, I do not know about that. There are a great many people who live partly on fish, of course, who would have to live upon other things.

By the CHAIRMAN:

Q. Have you any idea what proportion of the food people use consists of fish?—A. No, sir; I have not.

By Mr. CALL:

Q. You are a fisherman yourself, I understand?—A. Yes, sir.

Q. Have been all your life?—A. Pretty much; yes, sir; fishing and boating.

Q. You find sale for your fish always, I suppose?—A. Yes, sir; Fulton market is our main place.

By Mr. McDONALD:

Q. How small menhaden are taken in these purse-nets?—A. They are not half grown.

Q. Six inches long?—A. Not over that; not as long as that.

Q. Will three of them weigh a pound?—A. No, sir; ten will not weigh a pound that they have got nets to catch. The Churches have got the smallest nets.

Q. What is the size of the mesh?—A. I do not think it is over an inch mesh.

Q. You mean on the bar?—A. A little over half an inch from knot to knot; about an inch that will make; a half-inch square.

By the CHAIRMAN:

Q. How long since they began to use those nets?—A. I do not know exactly how long.

Q. What size mesh did they use when you first began to fish with them?—A. Two and a half.

Q. Two and a half inches?—A. Yes, sir.

Q. They have reduced that more than half?—A. They have reduced it to about an inch. Some of them are using the larger mesh now, but

they had to do away with it; the fish gilled in the nets so that they had to get other nets.

Q. Had to get smaller meshes?—A. Of course, there are so many small fish caught.

Q. If they gill they cannot get them into the boat?—A. No, sir.

EUGENE G. BLACKFORD recalled.

By the CHAIRMAN:

Question. As you are familiar with the subjects of this inquiry, we desire you to make your statements in your own way. You are still a member of the fish commission of the State of New York, I suppose?—Answer. Yes, sir; I am one of the commissioners of fish and fisheries of the State of New York.

Q. You have substantially the principal charge of that subject?—A. Of what are called sea fishes; yes, sir.

Q. And you are still in business at Fulton market, as you were last year?—A. Yes, sir.

By Mr. CALL:

Q. What proportion of the food of the people of the city of New York, in your best judgment, consists of fish, the various varieties of salt-water fish?—A. In my own judgment, I should think it would be 15 to 20 per cent. of the entire subsistence of the city of New York.

Q. About what quantity of ocean fish is annually sold at Fulton market, if you are able to state?—A. From the best of my recollection, about 8,000,000 pounds per annum.

Q. You have statistics that show it?—A. We have exact statistics; yes, sir.

Q. But you haven't them here?—A. No, sir.

Q. We would be very glad if you would furnish to the committee whatever you have upon the subject; we would like to include it in the report.—A. I would state that my information in that respect was derived as agent for the United States Fish Commission in compiling the statistics of New York City for the census, so that you have that much more accurately detailed in the census reports.

Q. Those you believe to be accurate?—A. Those I believe to be as nearly accurate as possible to obtain them.

Q. You remember that was two years ago?—A. Yes, that was two years ago.

Q. What is the present supply?—A. I do not think there is any very material change; some fishes are scarcer and others are more plentiful.

Q. Now you may make any statement you desire to.—A. I merely wish to add to my testimony of last year (page 47) that at that time I realized the importance of accurate knowledge with regard to the food and spawning seasons of the various sea fishes that come under this inquiry, and I determined at that time to organize an investigation which would give us some reliable data, and about the first of December we commenced these investigations. I say we; I employed Prof. H. J. Rice, who had had some experience in ichthyology, to make the necessary dissections and to give it his particular attention, and he has done so under my direction, so that the facts that we have obtained have been through our joint labors, and up to the present time we have examined every day from two to six specimens of each variety of fish that came into the New York market. We would first take the weight of the individual specimen, then the measurement, and then, removing the entire

viscera of the fish, examine the ova or milk, the ova of the female and milk of the male fish, and then the contents of the stomach, and I have prepared here just a brief note as to the general results of a few of the fishes that come particularly under this inquiry.

By the CHAIRMAN :

Q. Up to the present time?—A. Up to this time. It would, in my opinion, be necessary to extend this investigation over at least one year. I proposed to do it two years in order to obtain reliably accurate information on which to base our tables.

Q. Are you doing this as one of the members of the fish commission of the State?—A. No, sir; I am doing it as an individual, at my own expense and for my own knowledge.

Q. Is the professor whom you employ in Government employment, State or national?—A. No, sir.

Q. Go on now.—A. The striped bass has received our particular attention. We first commenced to examine the striped bass from the coast of North Carolina, I believe caught in the Roanoke Sound, and we found in the stomachs of the striped bass alewives, menhaden, flounders, and a fish that we style as white bait, but is really a variety of anchovy, and sometimes we found crabs and shrimps and small crustaceans, and the spawn or ova of the fish. We first commenced to find what we call ripe fish in April, and through April, May, and June we found what are called spawning fish. After that time we find what are called spent fish, showing that after the month of June the spawning season had closed. In the striped bass caught in this vicinity, on the New Jersey coast, and on Long Island, we find up to the present time, since the spawning season has closed, very little food, mostly small crustaceans.

Q. Does the spawning season vary from North Carolina to here?—A. Yes, sir; a little later we find the spawning season here; along in June.

Q. The habit of the striped bass, then, in regard to spawning, is very much like black bass in fresh waters?—A. Yes, sir.

Q. Occurring very nearly the same period?—A. Occurring very nearly the same time. In bluefish we commenced with North Carolina, and we found in the stomachs of the bluefish—even in one fish—as many as seven different varieties of fish. On one day's investigation I took from twenty small bluefish from North Carolina, in the month of May, seven species of fish. I do not recall exactly the varieties, but we found the spring herring, small kingfish, and small striped bass; but the larger proportion of the fish that we find in the stomachs of the bluefish are menhaden. The roe of the fish up to within a week was very immature, and within three days we found a change from what we call hard roe in the fish to ripe roe.

Q. The last three days?—A. No, sir; about a week ago we found our first ripe roe fish. We then found some bluefish with the spawn running from the female, and the milk running from the male fish, weighing upon an average about 4 pounds apiece, caught on the south side of Long Island. Of course we cannot say very much about that, as they have just commenced; we can only say that the spawning season commenced in this vicinity in July. In fresh mackerel, caught first off Cape Henry, the food was found to consist mostly of small crustaceans, with now and then a small fish, and occasionally a crab. Ripe or spawning fish found first in the latter part of May, and continuing through June and the first part of July. Those fresh mackerel that we find now seem to be what are called spent fish. Spanish mackerel from the Chesapeake Bay, we find the food is similar to that of fresh mackerel

and the first ripe fish we found in the latter part of June, and we are now finding ripe fish every day. The Spanish mackerel have now made their appearance on this immediate coast, the coast of Long Island; some two or three specimens have been taken. As to sheepshead which were taken, some in the Chesapeake Bay, some North Carolina, and within the last fortnight taken mostly on the New Jersey coast, and within a couple of days a large quantity taken in the vicinity of Bay Shore, Long Island, we find the food to consist of crabs, mussels, and small animal life that is found clinging to the grass or seaweeds in the vicinity of spots where the sheepshead are caught. The first ripe fish we found was in the latter part of June, and we are now finding what we call spawning fish every day from the New Jersey coast. In menhaden nearly all the specimens, with the exception of those examined this morning, were from Gravesend Bay, and we have found no indications of ripeness or spawning fish up to the present time. The roe is very small, so small as to be difficult to find in the fish, and the same with the milk of the male, just a small, fine thread, and very hard. This morning we examined some fish that were taken in Little Neck Bay, which is on the north side of the island, up beyond what is known as Hell Gate. We found fish that were approaching ripeness.

Q. Menhaden?—A. Yes, sir. And in the stomachs of the menhaden we find a fine black moss, which Professor Rice defines as small crustacea of various kinds. That is, in brief, what I had to submit to you this afternoon.

By Mr. CALL:

Q. Do you think the menhaden would be an important food-fish if it was preserved until it had grown to a good size?—A. In the event of great scarcity of fish in the market the menhaden can be sold in large quantities to the poorer classes.

Q. You think it is a valuable food-fish, then, in that respect and under those conditions?—A. Well, I am not of the opinion that it is a valuable food-fish. I think that it would be only under exceptional circumstances that any large quantity could be marketed.

Q. Its value, then, you think, consists in its value as a food for other fishes?—A. Yes, sir.

Q. Well, in that respect do you think it is necessary to be preserved in order to continue the supply of other food-fishes?—A. Yes, sir.

Q. You think some of the other food-fishes are dependent almost entirely on the menhaden?—A. I do.

Q. What kind?—A. Principally the bluefish. I will state here that the bluefish is probably one of the most, if not the most, important food-fish for the people at this time of the year.

Q. The largest in quantity?—A. The largest in quantity, and the greatest demand is for bluefish. To give you an example, a hotel of this kind will use 1,000 pounds of bluefish to 10 pounds of salmon.

By the CHAIRMAN:

Q. How is it with sea bass?—A. About the same.

Q. The same as salmon?—A. Yes, sir. We will take all the kinds of fish in the aggregate, and we sell ten times as many bluefish to the hotels of Coney Island as we do of all other kinds put together.

By Mr. CALL:

Q. What is your opinion, in view of the rapidly increasing population of the United States, of the necessity of legislating for the preservation

of the food-fishes?—A. I believe that there is a necessity for legislation for the protection of food-fishes.

Q. Do you think that the supply of food for the people will depend in any important respect upon the food-fish of the sea?—A. Yes, sir, I do.

Q. In other words, would there be a scarcity of food if this supply of fish from the sea were cut off?—A. Oh, I do not think we would starve.

By the CHAIRMAN:

Q. We should lose a luxury as well as a partial subsistence?—A. Yes, sir.

By Mr. CALL:

Q. You are of the opinion, then, that legislation is advisable for the protection of the fish?—A. I am so.

Q. Is that the general opinion amongst men engaged in the business?—A. It is not general, but they give no good reasons. They are a sort of improvident people, who want to get all they can at the present without any regard for the future. One of the most marked features of decrease in an article that comes to our market is in the lobsters. If there is not proper legislation for the protection of lobsters they will eventually become a luxury. Instead of being sold as they formerly were, at 6 cents a pound, they will sell for \$1 a pound.

Q. Such prices remove them beyond the reach of a majority of the people?—A. Yes, sir; the demand increases every year and the supply decreases.

By the CHAIRMAN:

Q. What do you attribute that to?—A. Overfishing; that is, we are consuming them faster than they are produced.

By Mr. CALL:

Q. Is not that true of all the other sea fishes?—A. No, sir; I do not think it is true with regard to fresh mackerel, for instance. I think the fresh mackerel are found now in fully as large quantities as in former years.

Q. No diminution of the supply?—A. No apparent diminution; no, sir.

Q. How about the codfish?—A. There has been within a couple of years an apparent diminution, scarcity of codfish, especially in this immediate vicinity.

Q. Is that attributed to the same cause, improvident over-fishing?—A. I am not prepared to answer that. I think there are other questions which govern, which are not fully known to us, questions of temperature, &c.

Q. What is your opinion upon the subject of the effect of this steam fishery with purse nets for menhaden upon the supply of menhaden for factory purposes; do you think that they will be destroyed or diminished in such quantities as to render it unprofitable?—A. Of course I base my knowledge principally upon the statements of others in that respect. I have no personal experience in either the handling or catching of menhaden, but I look upon it as entirely probable that the effect of this vast fleet of steam vessels pursuing the menhaden at every point where they make their appearance, breaks up the schools and scatters them, and we have the best illustration of the result in our Bay here from the evidence of these two previous witnesses. There are other causes which may have contributed to the decrease in menhaden

in our bay, such as the pollution of the waters, but as Mr. Potter has explained, when those vessels come into the bay and sweep their nets, it drives off all the fish, and they have not any fish.

By the CHAIRMAN:

Q. They cannot catch their bait?—A. They cannot catch their bait.

By Mr. CALL:

Q. Is it not apparent that fishing with nets so small as they are, they catch the young fish?—A. Yes, sir.

Q. From that point of view, then, it would seem to be advisable that there should be some action upon it?—A. There should be some action by which the meshes of their nets should be larger.

By the CHAIRMAN:

Q. From what extent of ocean fishing do you obtain fish?—A. During the year?

Q. Yes, in your own business, I mean.—A. We draw supplies from Mobile and Pensacola, on the Gulf, as far south as Key West on the Florida Peninsula and then from all points between Key West and Labrador on the north, and as far west as San Francisco.

Q. And to what localities do you sell fish; what territory is covered by your operations?—A. The largest portion of my business is in the supplying of large consumers like the Coney Island houses, the Saratoga hotels, Long Branch hotels. We ship fish as far west as Saint Louis; supply two hotels at Saint Louis with fish.

Q. But it is only within a few years that could be done?—A. Only within a few years; yes, sir.

By Mr. CALL:

Q. I suppose the increased facilities for preserving fish with ice, ice-cars, and steam transportation enable you to supply almost the entire country?—A. Yes, sir.

Q. Wherever there is a demand for it you can furnish it?—A. Wherever there is a demand and railroad we can furnish it. Great loads of shad are sent during the shad season to Chicago in refrigerator-cars.

Q. What fish do you get from Florida?—A. From Key West we get what you call the king-fish; they are a fish similar to the Spanish mackerel, only not so large; we get sheepshead; we get what you call spotted trout, which is a variety of our weakfish, the red snapper, and, of course, the Saint John's River gives us our first shad.

Q. Do you get them in considerable quantities?—A. It has diminished within a few years. We generally receive our first shad from Florida about Christmas time, but the quantity of shad from Florida has decreased year by year, until this last winter it was very small indeed.

By the CHAIRMAN:

Q. Do you attribute that to the large number of people who go there to stay through the winter?—A. No, sir; I think unless shad are properly protected and the supply kept up by artificial propagation, it can be exterminated from the river, but the past season from Florida to the Connecticut River has been a poor season; a light catch.

Q. Does not that grow partly—and I may say, substantially—from the fact that they are caught in the spawning season and before they are fully grown?—A. Yes, sir.

Q. The season for catching them here is when they are full of spawn, is it not?—A. Yes, sir; for the very reason that that is the only time

of the year we can catch them; they come within our reach for the purpose of being caught.

By Mr. CALL :

Q. What legislation could you have, then?—A. We can only have legislation which will give one day in the week in which there shall be no fishing allowed; make the fishermen take the nets out of the river from Saturday night until Monday morning. That would allow a sufficient number to get up to the spawning-beds to keep up the supply; that, with the artificial propagation, will keep the river well stocked. There is no river in the United States that has been so thoroughly fished for shad as the Hudson River. It is fished from Sandy Hook to Albany, and the only wonder to me is that there is a shad left in it.

Q. How soon do they return to salt water after spawning?—A. We begin to find back shad in July. What we call back shad are fish that have spawned and are on the way out.

Q. They are not fit to eat then, are they?—A. No, sir.

Q. They are fattest when they are caught, I suppose?—A. They are in the best condition probably a week or ten days previous to the spawning; then the roe is hard.

Q. What means have you adopted to preserve them in the Hudson River?—A. The only thing we have done is to keep up a constant supply by artificial propagation. I have advocated this one-day-in-the-week-closed season, but up to the present time have not succeeded in having it.

Q. It is attributable, then, so far, to the artificial process?—A. Yes, sir.

By Mr. McDONALD :

Q. Of course we know that the shore fishing is an important interest; we know at the same time that there is a great deal of money and capital invested in the menhaden interest, and we know that the agricultural pursuits of the country depend very largely upon the fertilizer furnished by the menhaden interest to keep up their supply of crops. Now, can you suggest legislation in regard to the menhaden fishing that will not be prohibitory, and at the same time give a fair chance to the fishermen?—A. I think I substantially answered that question at the previous session, and I am of the same opinion now as then: that after obtaining accurate information as to the spawning time of the menhaden there should be a closed season, in which all persons should be prohibited from catching them. I think there is no other legislation that you can have which would be just to all parties. It has been stated by those who know that if we have the three-mile enactment—that they shall not fish within 3 miles of the shore—that means extermination of the fishery.

Q. But, as a matter of fact, are they now caught in the spawning season, so far as your information goes?—A. I will be better prepared to answer that in December.

Q. One other question; what would be the effect of prohibiting the menhaden fishing upon the pound-net fishing; would not that grow very rapidly and give the same trouble to the hook-and-line fishing that the purse-net fishing now gives to both hook-and-line and pound?—A. No, sir; I think not, for the reason that a pound cannot chase a school of fish; they have a chance to get around it and get away, but if you have a fleet of steamers patrolling the coast from one end to the other, and every time a school of fish is in sight they sail into it with their purse-net, I think such a course continued a few years longer must necessarily exterminate the fish.

Q. Well, and would not the multiplication of pound-net fishing in all their bays do more damage to your food-fish than menhaden, unless there is legislation in regard to them too?—A. I do not understand your question.

Q. Would not the multiplication of pound-nets in all your bays and harbors and coves have a more injurious effect upon your food-fish supply than the menhaden fishing has had upon it?—A. I think not, so far as concerns what you might call sea-fishes.

Q. The pound-net fishing has been very destructive in the Chesapeake, as destructive as the purse-net fishing seems to be here?—A. I can very readily see that it would affect certain localities very injuriously; but you take, for example, the New Jersey coast. I do not think that the pound-net men there could damage the supply of fish, even if they should line the coast with pound-nets.

By the CHAIRMAN:

Q. They do not get very far from shore?—A. They cannot go very far from shore; the fish have a chance to get around them, and when the water is very transparent the fish see the net; will not run into it.

By Mr. McDONALD:

Q. You think, then, no kind of legislation in regard to the pound-nets would be necessary, if there were legislation in regard to the menhaden fishery?—A. I do not think you could provide any legislation which would be of any practical importance so far as the pound-nets are concerned.

By the CHAIRMAN:

Q. Why would not you follow the analogy of our State legislation in that respect and prohibit the catching of these fish during the spawning season, preserve them from being caught in any way during the period of procreation; what objection is there to it?—A. None, except that you would not get any to sell.

Q. That would mean, of course, that the people would not get them to eat; but we protect, of course, as far as we can, the waters of our State from fishing during the spawning season?—A. That is our theory, yes; but with an inland lake or pond or stream, as you can readily see, we can do it, while with the vast Atlantic you cannot get it big enough to take them all in.

Mr. McDONALD. It is true, too, that there is a spawning season in any season of the year; fishes spawn in the summer and as late as December. There are spawning fish all the time, and to prohibit the catching of spawning fish would be to prohibit fishing entirely.

By Mr. CALL:

Q. Is there any fishing by foreign vessels within the waters of the United States around this locality?—A. Very little, if any. I really do not recall but a single instance.

By the CHAIRMAN:

Q. You do not think legislation on these questions would affect our treaty obligations at all?—A. No, sir.

By Mr. CALL:

Q. I suppose above here, further east, off the coast of Massachusetts and Maine, we find foreign vessels?—A. I think it is very likely you find some of our provincial neighbors there.

By the CHAIRMAN:

Q. Do not you think there is greater necessity for legislative protection by the General Government on the coast of New Jersey than any other equal portion of the Atlantic coast; take all the interests of society into consideration, the amount of summer resorts, and all together, if you were going to localize legislation would not you begin with New Jersey?—A. I think that our own State is entitled to, and needs it as much, because in speaking of the seaside, the New Jersey coast becoming a great resort from one end to the other, the same applies to this coast here. You commence at this point here, Coney Island point, and Long Island is dotted with summer resorts to Montauk, and increasing all the time, and the varieties and quality of our fish on Long Island are superior to any other portion of the coast of the United States. A Long Island Spanish mackerel, a Long Island bluefish, a Long Island kingfish, a Long Island striped bass, is a better flavored fish than the same kind of fish of any other State.

Mr. CALL. Except Florida.

The WITNESS. I will not except Florida, with all respect to the Senator from Florida. It is impossible for the fish of Florida to be as good as ours, because of the temperature of the waters. There are only two fish in the State of Florida that will compare with our northern fish; those are the pompino and red snapper.

BOSTON, MASS., *July 23, 1883.*

BARNA S. SNOW sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. In Boston.

Q. How long have you lived here?—A. About thirty years.

Q. What is your occupation?—A. I am a fish dealer.

Q. Have been for that length of time?—A. Yes, sir.

Q. Are you familiar with the fisheries upon this coast?—A. Yes, sir; to a greater or less extent.

Q. Our inquiry relates mainly to the question of the destruction of menhaden or mossbunkers, which are regarded as the food for the other varieties of food-fish; can you give us any information on that question?—A. I am not a practical fisherman, but a dealer in fish, and for thirty years have observed the action of the menhaden as it has come upon the coast. Some years they have been as far north as the coast of Maine, in very large quantities, and then again do not seem to come north of Cape Cod at all, but are abundant in Buzzard's Bay, Narragansett Bay, and off Long Island. My own individual opinion is that they follow their own food; that they come north on the coast of Maine when the smaller fish, the food, is there, which they want, and that the taking of them by seines does not materially interfere with the quantity of the fish; that they are affected more by this question of food for themselves than they are by the quantities that are taken by seines. I think the same idea holds with reference to mackerel. Mackerel come on the coast in very much the same way, in schools. It is very difficult to tell one from the other when they are in the water, except by experienced fishermen; and, while very large quantities of them are taken by seines now, as the water seems to be full of them when the necessary condi-

tions are here to bring them here, I think the seining of them makes very little difference as to the quantity.

Q. At this point?—A. At this point; anywhere along on this northern coast. I think, however, that there are times when the seining of them is more injurious than at others. For instance, some of our vessels go south and get them very early, follow them along as they are coming on this coast for spawning; and it seems to me, for various reasons, that if the Senate should decide that they have jurisdiction, if some legislation could be had with regard to the season in which our fishermen may be permitted to take mackerel, as well as menhaden, on the coast, it would materially affect the quality of the supply which we have to give to the people of the country. When the fish first come on here in the spring for spawning they are in very poor condition; they are thin and almost tasteless, and taking them that early it throws an inferior quality of fish upon the market, which is distributed over the country for food, and at a time when, usually, the stock of the fall has not been wholly consumed, so that it comes in direct competition with it, and of course, the fish taken at that early season of the year, it must destroy a great number of the spawn which they contain; but if they went out after the fish come on here and spawn, then there seems to be a little time when they are recovering their nervous activity again, and at once they begin to fatten up. After the 15th day of July we begin to observe the fish improve very rapidly in quality, and from that time on the fish that are taken are superior in quality for consumption. They are better for dealers to handle, and in every way a more desirable article of food. While in the matter of pogies, of course that question does not come into the same consideration, because they are not used for food—by pogie I mean menhaden; we sometimes call it pogie and sometimes menhaden—yet by deferring the catching of them they are very much more valuable taken at a later season, and it would be very much more profitable for the fishermen; and, then, after the spawning time is over, of course year by year the quantity of fish in the waters must increase, and very rapidly.

Q. Have you ever sold the menhaden for family use?—A. They are not used in this country at all. They are used to some extent in South America, where there is a limited call for them. A thousand or two barrels when they used to be plenty, perhaps, would be exported during the year.

Q. We have proof that they are used largely on the coast of New Jersey.—A. Yes; they are not used very much here.

Q. You have got better fish?—A. Yes, sir; the mackerel is considered so much superior that it is not sought for. We deal in them principally as a bait for mackerel.

Q. You deal in them, then, for bait?—A. Yes, sir.

Q. From whom do you get them?—A. We get them from the fishermen; and it used to be the case a great deal more than it is now that they would go out especially fitted to take them.

Q. Do you get them from the menhaden boats?—A. Yes, sir; but the last few years it has not been followed very much for the reason that they have been taking mackerel so extensively with seines that bait has not been used extensively.

Q. Have you any opinion or impression that the cessation of the use of purse-nets in the catch of menhaden will materially advance the interests of the people in the food-fishes of the coast here?—A. I do not think it would have very much effect. I think if any regulat on

could be had with regard to the time of taking the fish that that would have more effect than anything else.

Q. Have you any suggestion to make as to the time?—A. I think if it could be controlled until the 15th of July it would be sufficient.

Q. Have you any opinion as to where the menhaden spawn?—A. I think they spawn on the shallow places of our shore, anywhere along from the coast of New Jersey north.

Q. After they come on in the spring?—A. Yes, sir.

Q. Have you ever examined them at that season of the year to see what the condition of the roe was in them?—A. I never have examined the roe, but I have examined the fish after they were taken. They are in that condition in which every fish is immediately after spawning—very poor—in May and June when you first catch them, and after the 15th of July they fatten very rapidly, so that they are almost clear oil, as you may say; they are very fat fish after the 15th of July.

Q. Are they not used at all for food here?—A. I do not suppose there are fifty barrels sold in Massachusetts for food.

Q. The mackerel is better food?—A. Yes, sir; decidedly. It is not so bony a fish and is esteemed so much more highly that menhaden is not used at all.

Q. Then, if we were to prohibit the catch of the menhaden until after the spawning season, until the middle or last of July, you think it would accomplish the object we have in view?—A. I do, sir.

By Mr. CALL:

Q. I understand you to say that formerly there were about a thousand barrels shipped to South America?—A. I should think from one to two thousand barrels.

By the CHAIRMAN:

Q. Of what?—A. Of menhaden.

By Mr. CALL:

Q. Shipped from this port?—A. Yes, sir.

Q. You do not understand, then, that the supply of menhaden is in any way connected with the mackerel fisheries?—A. It seems to be entirely distinct.

Q. Mackerel do not feed upon them?—A. No, sir.

Q. What is the food of the mackerel?—A. The mackerel feed very largely upon an article which the fishermen call cayenne. It is almost like a plant in the water.

Q. A vegetable?—A. It seems to be a vegetable, but I believe the authorities pronounce it a species of animal. I suppose it is a very delicate animal, but resembling almost a vegetable substance. Where the water is filled with that the mackerel follow and are very fat; when they are taken they will be full of it.

Q. Have you any suggestions to make in regard to any measures that are necessary or would be advisable for the protection of the other food-fishes, the mackerel on your coast?—A. The same suggestion that I made with regard to menhaden applies to mackerel very strongly, and, especially, as they are a more valuable food-fish than the menhaden.

Q. The mackerel industry constitutes a very large industry here?—A. O, yes; a very large industry.

Q. Both for domestic use and export?—A. Yes, sir; at this port they are shipped largely all over the country.

Q. Can you give us any idea as to the extent of the industry resting upon the mackerel fishery at the present time?—A. Yes, sir; I have got

some statistics here that give a little idea of it. Last year the catch of mackerel was 380,000 barrels for the New England coast, of which there came here to this port about one-half, something like 165,000 or 170,000 barrels. I think I am correct.

Q. What size barrels are they?—A. Two hundred pounds to a barrel.

By the CHAIRMAN:

Q. Does that include Gloucester?—A. Yes, sir; that includes the New England coast. I suppose the average value of those fish last year was about \$ 10 a barrel the season through.

By Mr. CALL:

Q. I suppose mackerel are almost the exclusive food-fish that are caught here; are they not?—A. Well, codfish are taken very largely on our coast and on the banks, and the relative value of codfish and mackerel for use as food is about the same.

Q. What is the extent of your codfish yield here for the last year?—A. I have the figures only as to the fish that came to the city here. If our secretary was here with one of our reports, I could give you all those figures exactly; and I will see that you have one of them.

Mr. CALL. I will be glad to get it.

The WITNESS. There came to this port last year 140,000 quintals of codfish; 40,000 quintals of hake; 4,000 quintals of haddock; 3,000 quintals of pollock; 17,000 quintals of cusk. Those are salt fish. I deal in nothing but salt fish. We have a report of our Bureau here which gives the entire catch for the season, the vessels engaged in it, the number of men engaged in it, and the entire fishing industry, and will furnish you with it.

By the CHAIRMAN:

Q. You do not deal in fresh fish at all?—A. No, sir; I only deal in salted fish.

By Mr. CALL:

Q. Do you intend these remarks of yours in regard to the time of fishing to apply to all these various industries?—A. Yes, sir.

Q. You think it would be advisable for all?—A. I do not think it applies so strongly to codfish, because they are caught off the shore; they are caught in the open seas.

Q. How far off?—A. They are caught the season through; they are not migratory as the mackerel are; they seem to be more stationary upon their feeding grounds; they are there all seasons of the year, and I judge no legislation would apply to the ground fish, as they call them.

Q. If that could be so would it be advantageous to the supply?—A. Yes, sir; if their spawning seasons could be ascertained, as I suppose it could be.

Q. So large an interest evidently requires whatever protection it can have?—A. Yes, sir.

Q. What distance from shore are these fish—the mackerel and codfish—caught?—A. Mackerel are taken all the way from a half mile to 40 and 50 miles out, just as they can catch them. Vessels are constantly sailing upon the lookout for them, and sometimes they are close in to the land, and then again off 40 or 50 miles.

Q. Codfish the same?—A. Codfish are taken in a different way. They go upon the George's Banks about 60 miles from Cape Cod. There is a range of banks running along through the sea, extending away down to Newfoundland, all along the coast, and upon those banks the cod-

fish are to be found; it is their feeding ground. The vessels go there and anchor, send out their boats with trawls and hand lines, and the fish are taken in those small dories and taken on board the vessels and cured.

Q. Caught with lines?—A. Yes; and with trawls. A trawl is simply a long line with a great number of hooks. Instead of the men fishing with a single line, the vessel sails from 1 to 3 miles, as the case may be, and brings them in. The mackerel, however, are taken in an entirely different way. They are constantly on the move, skipping about on the surface of the water in schools, and when seen the fishermen start out with their seine-boat and seine, shoot around them, and purse them up and take them in that way.

By the CHAIRMAN :

Q. Are the mackerel taken in purse-nets?—A. Yes, sir.

By Mr. CALL :

Q. What proportion of these fish are caught immediately off our coast here, and what proportion upon the British fisheries?—A. The last five to eight years very much the larger proportion, probably two-thirds have been taken—more than two-thirds in the last year or two—on our immediate coast here. Ten years ago it was the fact that our vessels went in and caught them in the British waters very largely, beyond Nova Scotia and Prince Edward Island, but the last few years the fishing has been poor there. Our vessels have had no occasion to go there; and that very largely accounts for the feeling among the fishermen that they see no good in this treaty that we paid so much for. I told them last winter, when the thing was being agitated, the time may come again when they will be very glad of the privilege, and the time may come when it will be of very great importance to us.

The CHAIRMAN. We have given notice to terminate the treaty.

The WITNESS. Yes; that pleases the fishermen very much, but I do not think it pleases the merchants so very much.

By Mr. CALL :

Q. What distance do you say these fisheries are off the coast?—A. The mackerel run all the way to 100 miles, and the codfish from 60 to 150 miles.

Q. None within 60 miles?—A. No, sir; not to any great extent; there are what we call shore vessels, generally smaller vessels, engaged in taking some of the ground fish, like hake, haddock, pollock, and those things, but the cod fishing is carried on very largely on the banks far out.

Q. Is there any large proportion of fishing done here in our waters by foreign vessels?—A. I have known of but one or two vessels on our coast fishing since the treaty went into effect.

Q. It is your opinion, then, that a modification of the treaty would not affect us unfavorably?—A. I do not see why it should.

Q. You do not think we derive any particular harm from foreign fishing here?—A. No, sir.

Q. And you think it possible we might need the provisions of the treaty to fish on the British coast again?—A. It is not at all unlikely.

Q. Is that the general opinion amongst intelligent men who are acquainted with the fishing interest here?—A. We are all influenced somewhat by our individual interests. Now, those of us who are dealers in fish, while of course we want our own fishermen to have every facility we still do receive a large quantity of fish from the Provinces that come

in free of duty. They are a very large item for the consumption of our own people, and the dealers are, as a rule here, inclined to feel that the privileges which our fishermen secure of going on to their coast to fish fully compensate for the disadvantage they claim it is to them to have the British fish come in free of duty.

Q. You mean to say that large quantities of fish that are caught by British fishermen in their own waters are sent here?—A. Yes, sir.

Q. And that is what the fishermen object to.—A. Yes, sir; a good deal.

Q. They do not object themselves to being allowed to go there?—A. No, sir; they do not object to go there, and if the fishing is better they do go there.

Q. But they do object to the English-caught mackerel coming in free of duty. In other words they want a monopoly to supply the people?—A. That is what it amounts to.

Q. And they feel that their perilous business should have some protection also?—A. I have no doubt that you will find the feeling on the coast of Maine and at other fishing ports here is very strongly in favor of the abolition of the treaty.

Q. The fishermen?—A. Yes, sir.

Q. But you think that is confined to them and not to the dealers or consumers?—A. I think so; yes, sir.

Q. Well, the dealers and consumers are much the larger proportion, are they not?—A. Yes, sir. I do not think the dealers wish to do anything that shall seriously interfere with the interests of our fishermen; I think that our view is rather this: that the privilege our fishermen have of going north and taking fish on their coast gives them the opportunity of employing the capital invested in a way they could not if they had not that privilege, and through both sources we have more fish to handle, more to eat.

Q. The supply is greater?—A. Yes, sir.

By Mr. McDONALD:

Q. How long have you been familiar with the mackerel fishery?—A. From my boyhood; I have been in the business for thirty years; I was born on Cape Cod, and my boyhood was passed among the fishermen.

Q. How were mackerel taken when you first knew of the fishery?—A. They were taken entirely by jig, as the fishermen term it; hook and hand line.

Q. Do you know when they first introduced the gill-nets?—A. Gill-nets were never used to any extent; it is the purse-seine.

Q. When was the purse-seine first introduced?—A. It is fifteen to twenty years since it began to be used, but it has grown in favor constantly, until now the fishermen use the hook and line very little.

Q. Do you find the product of the mackerel-fishery pretty constant every year?—A. It has run down as low as 150,000 barrels, but that would be a very small catch. It varies from 250,000 to 300,000 barrels.

Q. You have had these fluctuations since the purse-net was introduced?—A. Yes, sir.

Q. Did you have similar fluctuations before the purse-nets were introduced?—A. Yes, sir.

Q. Precisely analogous in character?—A. Yes, sir; I think the average catch of mackerel is larger since the seine was introduced.

Q. How is the catch this year compared with previous years?—A. Up to this time we are nearly 100,000 barrels short of what we were last year at this time.

Q. Last year you had a very large catch?—A. Yes, sir; it was an unusual catch. Last week there was a shortage of 26,000 barrels compared with the corresponding week of last year.

Q. When does your season end?—A. Practically, the last of October; sometimes it extends into November, the middle or last of November.

Q. They fish for them as long as they are on the coast?—A. Yes, sir; I have known fishermen to go as late as the middle of December, but that is rare.

Q. Then the time in which they are on the coast in the season varies a good deal, does it?—A. Yes, sir.

Q. Some seasons they are on the coast much later than others?—A. Yes, sir; it depends a good deal whether we have storms and cold, blustering weather. They leave the grounds earlier—at any rate the fishermen leave the grounds earlier—when we have that kind of weather. The mackerel seem to be running south for warmer water.

By Mr. CALL :

Q. How far south do they go?—A. That is a question that has not been decided. The fishermen meet them as far south as Cape Hatteras—not often further south than that; and there are different theories; some think they run off into the Gulf Stream and winter there, and then come on in the spring for spawning. They can calculate pretty nearly what time to meet them.

Q. Is there any certainty what time they spawn?—A. Yes, sir; they spawn all along the coast apparently. When they are first taken they are full of spawn, and then they seem to sink for awhile.

Q. What time do they begin to take them?—A. About the 1st of March. There is very little menhaden fishing—

By the CHAIRMAN :

Q. You are speaking of menhaden?—A. Mackerel. There is very little menhaden fishing now except by steamers that follow them up for the purpose of oil.

By Mr. CALL :

Q. I understood you to say that the menhaden were still found in considerable quantities off this coast.—A. Not on this coast. For several years they have not been here.

By the CHAIRMAN :

Q. Were they ever here?—A. Yes, sir; and on the coast of Maine there were very large outlays of capital for the production of oil.

Q. And they have been abandoned?—A. Yes, sir; practically so.

Q. Do you know any cause for that?—A. No, sir; I know no cause except what I stated at the opening, that they follow their own food, and that when their food comes on this coast, which may be some years in larger quantities than others, they come here for it.

By Mr. McDONALD :

Q. Were they always on the coast of Maine in large quantities until their recent disappearance?—A. No, sir; I think there have been seasons when they were not there, just as now.

Q. That was before any purse-net fishing was followed at all?—A. Yes, sir:

By the CHAIRMAN :

Q. Do you know what these steamers catch in the purse-nets; have

you ever been with them?—A. No, sir; only as I have seen them operating at a distance. I have never been with them. I think they scoop up any kind of fish that they surround.

Q. Food-fish or other fish?—A. Yes, sir.

By Mr. CALL:

Q. Do you think that species of fishing has any permanent destructive influence upon the food-fish, or upon the fish that the food-fish feed upon?—A. I do not, sir.

Q. You do not think it is objectionable?—A. I do not. My observation—it may be entirely incorrect, but that is simply what I have observed—is that there are such immense quantities of these fish in the waters that the few that are dipped out by the seines really are but as drops in the ocean.

Q. What is your opinion in regard to the food that the menhaden feed upon?—A. I think it is very much the same food the mackerel feed upon.

Q. It is a sort of animalculæ?—A. Yes, sir.

Q. That is floating in the water?—A. Yes, sir; floating in the water.

Q. Kind of an infusoria, I suppose, found floating everywhere in the water?—A. Yes, sir.

By the CHAIRMAN:

Q. Do not the mackerel feed upon the menhaden?—A. I think not to any extent.

Q. That is your impression?—A. Yes, sir; the menhaden is about as large as the mackerel, and it would be rather impossible that the mackerel should feed upon them.

Q. How large are menhaden?—A. Menhaden are a fish about ten to twelve inches long.

Q. What weight?—A. I should think they would weigh from half to three-quarters of a pound when taken.

Q. And the mackerel?—A. About the same. We have run from eight to fourteen inches in mackerel. It is a very large mackerel that will go twenty inches in length, and the weight is from a quarter to two pounds.

Q. You are not speaking of the Spanish mackerel?—A. No, sir; the Spanish mackerel is larger.

Q. You speak of the same mackerel that is caught in Canadian waters?—A. Yes, sir; the same fish.

Q. Has there been any deficiency in the supply of food-fish for public demand within ten years past?—A. No, sir; it comes nearer to it to-day than I ever saw it for thirty years.

Q. Deficiency in what kind of fish?—A. In mackerel.

Q. You do not have the bluefish here at all?—A. Yes, sir; we have them on our coast here, but they are not salted very much. They are in large supply, abundant supply, as fresh fish, now.

Q. How high do they rate in the market?—A. Some esteem them more highly than they do a mackerel, but they are not in such general consumption, and they are not cured for preservation to be sent over the country as mackerel are.

Q. How do they rank with salmon?—A. Much below it.

Q. How is it with striped bass?—A. Not very abundant on this coast.

Q. They used to be, did they not?—A. Yes, sir; very abundant.

Q. Striped bass have diminished from some cause?—A. Yes, sir.

Q. They are next to salmon, are they not?—A. Yes, sir; they are esteemed very highly for food-fish.

Q. Do you know what they feed on?—A. I do not.

Q. What season are they caught?—A. Any time after June.

Q. Through the summer season?—A. Yes, sir.

Q. They are a fish for summer use?—A. Yes, sir.

Q. And the next in value to the salmon?—A. Yes, sir.

Q. When did they begin to diminish, disappear?—A. I think within twenty-five years they have been gradually growing less. I think the last two or three years they have been a little more plenty.

Q. How long since you knew the first menhaden boat on here?—A. These steamers?

Q. Yes, or sail boats either.—A. Well, the sailors have always been taking them to use as bait for mackerel.

Q. Yes; but I mean for the purpose of manufacture?—A. I should think it has been twelve or fifteen years.

Q. Are there any factories in this vicinity?—A. Not in this immediate vicinity.

Q. North or south of here?—A. East of here, on the coast of Maine. There was a large factory south of here, on Rhode Island. Messrs. Church & Co. do a very large business with them in Rhode Island.

Q. They are still in operation, but the main factory has stopped, has it not?—A. Yes, sir; I think so.

Q. Ceased to operate?—A. Yes, sir.

Q. Have you heard anything as to whether the menhaden have returned there this year?—A. I have no definite information. My impression is that they are not in any large quantity.

Q. Not back on the coast of Maine?—A. No, sir.

Q. They were numerous there when the menhaden boats began to operate?—A. Yes, sir.

Q. Have you any opinion as to the cause of their disappearing from the coast of Maine?—A. I do not think the seining of them has had much to do with it.

Q. Have you any opinion as to what the cause was?—A. Only as I stated; my judgment is that the food was not here to attract them on the coast, and consequently they did not come.

Q. You think catching them by millions did not affect them?—A. I do not think it affected them very much.

Q. It may have done so?—A. It may; yes, sir.

Q. Are fish subject to fright?—A. Yes, sir; I think that may be said.

Q. And that constant fishing upon a coast where they are liable to be taken may drive them away from their haunts, break up their schools, and disorganize them?—A. I think in some classes of fish it disorganizes them more than in others.

Q. Do you know anything as to the habits of the menhaden in that respect, whether they are a shy fish or not?—A. I think they are a shy fish; they are very much like the mackerel.

Q. And it may be that fishing for them in quantities has had that effect?—A. It may be; I cannot say it has not.

The statistics referred to by Mr. Snow are as follows:

MACKEREL.—The total catch by the New England fleet amounted to 378,863 inspected barrels; of this 258,716 barrels are credited to Massachusetts. This amount has been exceeded but eight times during the past fifty years. The early fleet sailed from home ports in March, more vessels going south than for many years. The schooner Nellie N. Rowe took the first fare on March 31; the fish were of mixed sizes. First catch in 1881 was March 22. The first mackerel taken in the weirs at Cape Cod, April 20; previous year on May 4. The first fare of salt mackerel direct from the

fishing grounds arrived at Boston on May 4; in 1881, May 9. The fish were found quite plenty, and worked north slowly; the vessels that made an early start were more successful than for a number of years.

The season's catch is noticeable as having been of larger size and poorer quality than the previous year. As the season advanced, the fish did not improve as usual, the fall catch being inferior to that of midsummer. The schooner *Yankee Lass*, of Boston, was the only vessel from the United States that fished in Provincial waters; she returned with 275 barrels.

The catch by the Provincial fishermen was the smallest for years, and accounts for the large decrease in the amount imported at this port. Prices have held firm, with an upward tendency, from the first of the season, and much higher than the previous year, selling uninspected in June at \$4; July, \$6 to \$7; August, \$8 to \$9; inspected, selling in August, \$7, \$9, \$12; September, \$7, \$10, \$13, and in October and later, at \$8, \$11, \$14 for No. 1, 2, and 3's. During September the catch rapidly fell off, with few fish caught in October, and the fleet early gave it up. Although the total catch was extra large, a steady demand prevented any large accumulation; only a small amount remained on hand at the close of the year.

NEW ENGLAND MACKEREL CATCH.

Amount of inspected barrels packed at home ports, and Southern catch, as reported to the Boston Fish Bureau.

Localities.	New England shore fleet.	Southern fleet.	Total number of sail.	Total number of crews.	New England shore catch.	Southern catch.	Total New England catch.
MASSACHUSETTS.							
* Boston	24	5	29	435	<i>Insp. bls.</i> 73,400	<i>Barrels.</i> 9,775	<i>Barrels.</i> 83,175
† Cohasset	2	5	7	105	1,489	1,082	2,571
† Chatham	1	1	1	14	150	.....	150
South Chatham .....	.....	5	5	80	6,961	1,477	8,438
† Dennisport	1	1	1	58	944	.....	944
Fair Haven	1	1	1	15	300	.....	300
† Gloucester	96	55	151	2,325	107,222	20,000	127,222
† Harwich .....	.....	5	5	75	2,075	350	2,425
§ Newburyport	2	2	4	51	.....	.....	.....
§ Rockport	7	.....	7	80	160	.....	160
Provincetown	5	.....	5	78	4,821	.....	4,821
§ Plymouth	1	1	2	32	.....	.....	.....
Wellfleet	28	.....	28	475	28,510	.....	28,510
Total	167	79	246	3,823	226,032	32,684	258,716
NEW HAMPSHIRE.							
§ Portsmouth	4	4	8	104	300	.....	300
MAINE.							
† Booth Bay	7	10	17	224	12,577	2,541	15,118
§ Camden	3	.....	3	39	.....	.....	.....
§ Deer Isle	1	1	2	28	.....	.....	.....
* North Haven	8	3	11	132	600	200	800
* Portland	24	22	46	600	86,627	13,764	100,391
† Southport	8	.....	8	118	3,538	.....	3,538
§ Sedgwick	1	.....	1	15	.....	.....	.....
Total	52	36	88	1,156	103,342	16,505	119,847
TOTAL CATCH OF NEW ENGLAND FLEET,							
Total, 1882	223	119	342	5,083	329,674	49,189	378,863
Total, 1881	205	93	298	4,258	364,253	27,404	391,657
Total, 1880	235	92	327	4,778	340,255	9,419	349,674

The Southern fleet united with the Shore fleet after the early catch, making the total Shore fleet 842 sail.

* Many vessels packed from other ports included.

† Many vessels packed away from home ports.

‡ Weir catch, 769 barrels cured, 2,065 barrels fresh; 43 men.

§ All vessels packed away from home port.

NOAH MAYO sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. In Boston.

Q. How long have you lived here?—A. Thirty years.

Q. What is your occupation?—A. I am a wholesale fish dealer.

Q. Have you ever been a practical fisherman?—A. Yes, sir.

Q. For how long a time?—A. For six years.

Q. Do you know anything upon the question of the fish called the mossbunker or menhaden?—A. Yes, sir.

Q. What about them; what is your experience with reference to them?—A. Well, my experience is that some twenty years ago menhaden appeared upon the coast of Maine in large quantities, and they remained there until about 1879, and from 1879 to date there have been but very few menhaden caught on the Maine coast.

Q. Now, when did the menhaden boats commence operations?—A. About, I should think, 1870; came into general use about 1870; that is my judgment.

Q. Steamers or sailing vessels?—A. Steamers and sailing vessels; steamers largely.

Q. Have you any opinion as to whether they had any effect upon the quantity of menhaden?—A. Well, I think menhaden is more of an intellectual fish than any fish that swims. I think they are shy, easier to take fright.

Q. That does not quite meet my question. Do you think the use of the menhaden boats has had any effect upon the quantity or supply of menhaden along that coast?—A. I think it has.

Q. To diminish it or increase it?—A. To diminish it.

Q. Materially or slightly?—A. Well, considerably, materially, on the coast of Maine during these five or ten years; the steamers, you know, can go just when they please and where they please, and are constantly on the move.

Q. Despite wind or weather?—A. Yes, sir; and they throw very large seines; I suppose some of their seines are 300 fathoms long.

The CHAIRMAN. Yes; that is all in proof, and 12 fathoms deep.

The WITNESS. Yes; 24 fathoms deep, and they have been continually slashing, going for every school they could find on the coast, and, as I said before, menhaden fish, in my opinion, is considerable of an intellectual fish; they are very shy, and I think they have got the scent that there is somebody after them and have left the coast of Maine.

Q. Left from depletion and fright?—A. Yes, sir; as much as anything, because other fish go there and get the same food that menhaden do year by year.

Q. What kind of fish upon this coast feed upon menhaden?—A. Large fish, such as bluefish and all sorts, the shark, swordfish, and whale, and everything of that description.

Q. They all feed on the menhaden?—A. Menhaden and mackerel.

Q. Do you have weakfish at all on this shore?—A. No, sir.

Q. Do the mackerel feed upon menhaden at all?—A. No, sir.

Q. What is the most valuable fish in your market?—A. Mackerel.

Q. More so than salmon?—A. We have but very few salmon on our market.

Q. Yes, but which is the most valuable of all fish?—A. Salmon is the most valuable per pound.

Q. Is the mackerel more valuable than bluefish?—A. Yes, sir.

Q. More than striped bass?—A. No, sir.

Q. Striped bass is next to salmon?—A. Yes, sir.

Q. How is the supply of striped bass?—A. Very few caught now.

Q. Do you know upon what they feed?—A. Small fish by the shore.

Q. Do not they feed on menhaden?—A. They may feed upon what menhaden live on; I think they do. When I was a boy we used to go in-shore and about the bay and seine around menhaden and draw them ashore, and they live right close in.

Q. The menhaden is a shore fish, is it not?—A. Yes, sir.

Q. I mean when they come north they go to warm water, go into the bays, do they not?—A. Yes, sir.

Q. Do you know where they spawn?—A. Years ago they used to come in off the coast of Connecticut and Rhode Island to spawn. That is where they first made their appearance, I think. Twenty years ago menhaden were hardly ever seen outside of Cape Cod. Our fishermen used to go and catch them for bait and bring them around.

Q. Why did they go there for bait?—A. Because that is the only place they could get them.

Q. Why did they get that particular bait?—A. Because they were good for nothing else.

Q. It is the best bait used for catching the varieties of food-fish?—A. Yes, sir; used for mackerel entirely.

Q. And bluefish?—A. No. The way they use menhaden for bait for mackerel they catch them in large quantities and salt them; each vessel uses three or four hundred barrels, and generally used to grind them perfectly fine and throw them on the side of the vessel overboard, and that would attract the mackerel. Then throw the jig out with a little bait, and catch them; but they do not do that now.

By Mr. CALL:

Q. They catch them with the purse-net?—A. Yes, sir.

By the CHAIRMAN:

Q. When did they cease to do that?—A. About fifteen years ago.

By Mr. CALL:

Q. They caught the mackerel then with a hook and line?—A. Yes, sir.

By the CHAIRMAN:

Q. Suppose we should stop, by a law of Congress, the fishing for menhaden within 3 miles of the shore at all seasons, what is your judgment as to the effect which would be produced by that?—A. I think it would stop a large proportion of the catch.

Q. Of what?—A. Of menhaden.

Q. But what would be the effect upon the food-fish; fish that are used by the people?—A. Not any to speak of.

Q. It would not affect them, you think?—A. No, sir.

Q. Then the catching of menhaden, in your judgment, does not interfere with the supply of food which the people have from the ocean?—A. No, sir. To be utilized it has got to be used as a bait; we do not use it.

Q. Why so?—A. Because we catch mackerel in a different way.

Q. And mackerel are what you are after?—A. We used to catch menhaden to grind for bait for mackerel, but now we do not catch mackerel by bait; we catch them by seines.

Q. Do you know what mackerel feed on?—A. Yes, sir; they feed—

Q. If the cutting up of menhaden attracted mackerel is it not fair to

assume that they feed on menhaden?—A. Menhaden is too smart a fish for mackerel to catch.

Q. Assuming it was not, would not mackerel catch them if they could?—A. They are too large. All along our coast in the summer there is a little small fish called shrimp, about as long as your finger; that is what our fish feed on mostly, except the cayenne that Mr. Snow spoke about.

Q. Then you have no disposition to enter complaint against the menhaden fisheries for any cause?—A. Not any.

Q. Did you ever know menhaden to be used for food?—A. Yes, sir. Menhaden are not used for food-fish to any extent. They are sliced, a slice taken off one side and the backbone taken out; they make two slices about the size of your hand; they are not used to any extent.

Q. Have you ever known them to be corned for winter use?—A. I have, and think they are good eating.

Q. Where do you know that to be done?—A. I have eaten them myself.

Q. They make good corned fish?—A. Very good indeed, but it is not used.

Q. As good as mackerel?—A. No, sir; not as good as mackerel.

Q. As good as bluefish?—A. As good as bluefish after it is corned.

Q. As good as any fish except mackerel?—A. Yes, sir.

Q. Salmon and mackerel?—A. Yes, sir. Salmon is not very good after it is salted.

By Mr. CALL:

Q. What do you think is the effect upon the fisheries of our existing treaty regulations; is there any respect in which they require modification, according to the opinion of the people here—those engaged in the fishing business?—A. I think the law you passed abrogating the treaty is just right.

Q. You are in favor of terminating the treaty?—A. Yes, sir; by all means.

Q. Do you think that will limit or increase the supply of fish?—A. I do not think it will affect it in any way.

Q. Do you think it will increase or diminish the price of fish?—A. I think it will remain about the same. If our fish on our coast bring a good price there will more go after them. There are plenty of men in our own country to catch our own fish if they bring price enough, but the way fish go for the last three or four years most all foreigners get into it and our countrymen are left out. If foreign fish are brought in free of duty it will not be ten years before the British Provinces have a monopoly.

Q. You think the supply of fish is too great for the demand?—A. No, sir; I think people will go in the fishing trade and keep in it just as long as they can make a good living; when they cannot they will go out of it, especially so in the United States.

Q. Well, if the demand for food fish is sufficient the price will correspond with the demand, will it not?—A. Some years it is more and some years less. I think there are men enough in our own United States to catch all the fish the people will eat, at a fair price. You know fish is cheaper than anything else, and I do not think it should be.

By Mr. McDONALD:

Q. You said that twenty years ago there were no menhaden north of Cape Cod?—A. But very few.

Q. What explanation have you of that; had they been there in num-

bers previous to that and caught up?—A. No, sir; they did not fish for menhaden for anything but for bait until about twenty years ago.

Q. Then they were absent from that coast and made their appearance on that coast all of a sudden?—A. Yes, sir.

Q. But there is no way of accounting for their previous absence by a previous catch?—A. No, sir. Bluefish never came on this coast until a few years ago. Bluefish hardly ever came around Cape Cod until a few years ago. If you were going to legislate on anything, I should think it would be better to legislate on these weirs, pounds, they put down. They are destructive to fish.

Q. Pound-nets?—A. Yes, sir; they are killing them by thousands of barrels.

By Mr. CALL:

Q. That is the shore-net fishery?—A. That is the weirs that make off from the shore; what they call pounds down East.

The CHAIRMAN. One menhaden boat would catch more in a day than all the pound-nets on the coast of New England.

The WITNESS. Oh, no; they took 800 barrels night before last down at Provincetown.

By Mr. CALL:

Q. What kind of fish?—A. Small mackerel.

Q. Were they too small for use?—A. Too small.

By the CHAIRMAN:

Q. They put them in the market, did they not?—A. No, sir; they threw them back; from 6 to 7 or 8 inches. They cannot do anything with them.

Q. Did they put them back in the ocean?—A. Yes, sir.

Q. So they did not destroy them?—A. They died.

By Mr. CALL:

Q. How would you propose to remedy that?—A. Not have any traps. Twenty-five years ago there was not one school of mackerel seen where there are fifty to-day. Before they used purse-seines there were very few mackerel seen, which is a sure indication that seining does not hurt them, does not frighten them. This year is one of the years when mackerel do not show on top of the water, and I think the reason is because there is no live bait.

Q. Do I understand you to say that the supply of fish is entirely adequate to the demand for them?—A. It has been; yes, sir.

Q. As a general rule it has been?—A. Yes, sir.

Q. Is not the demand for fish increasing with the population of the country largely, and with the new means of transporting and preserving fish?—A. The consumption of salt fish does not increase with the population. I do not think there is any more salt fish used now with a population of 50,000,000 than when there was a population of 25,000,000, but there is more fresh fish used.

Q. Do not you use the fresh mackerel?—A. Very largely.

Q. That is a very important industry, is it not?—A. Yes, sir.

Q. They are shipped by rail all over the country, I suppose?—A. Yes, sir.

Q. I suppose you regard that as an interest that ought to have protection, to be preserved and increased as far as possible?—A. Yes, sir.

Q. That is an important interest here, I understand?—A. Very important.

Q. Can you give us any idea of the extent of the catch and shipment

of the fresh mackerel?—A. I cannot, but the fish bureau, of which Mr. Snow is president, has the details in full for ten years past.

Q. That is a business, I understand you, that is rapidly increasing?—A. Yes, sir; I think there are 75 sail of vessels that come to this market with fresh fish.

Q. How does that compare with former years?—A. More increase every year—and this canning goods. Now they can fresh mackerel; they can them extensively all up and down Massachusetts and the Maine coast, and where there used to be a surplus of fish they can them, so there is no surplus of fresh fish.

Q. Is it not reasonable to suppose that with the increasing population of this country the demand for mackerel will be entirely adequate, if not greater, than the supply?—A. It may be; yes, sir. In 1852 there were about 800 sailing vessels engaged in the mackerel fishing.

Q. That is for salt mackerel?—A. For salt mackerel, but now there are not over four, but the four catch as many with purse-seines as the 800 did with hook and line.

Q. The diminution is probably attributable, is it, to the increased facility of catching?—A. Yes, sir. One-fourth certainly of the men that fish now are British fishermen, in our American vessels.

Q. They are American vessels, but the fishermen — A. Come from the British Provinces, come here and go to fishing.

Q. What do you attribute that to?—A. Because our fishermen want to go into other business.

Q. Find better employment?—A. It pays them better. The fishing business for this last ten years has not paid the mackerel fishermen 75 cents a day.

Q. You do not propose legislation to prohibit your vessels from employing men the cheapest they can get them, do you?—A. I do not suppose you could do that, but before this treaty when our vessels went into the bay to fish they were taxed 50 cents a ton, then \$1, then \$2, until our fishermen did not consider it worth \$2 a ton and abandoned it. That treaty is the most one-sided thing I ever saw. It was all against the fishermen, ruinous.

Q. The treaty allowing British fish to be imported here free of duty?—A. Yes, sir. I am glad that treaty is to be abrogated.

Q. Are there any British vessels now fishing here as such?—A. No, sir, none at all, and there have been but very few; there have not been more than a dozen of our vessels down there, and when they want the right they can buy it.

Q. Your idea is that it would be well to exclude the fish caught in the British waters?—A. There are more fish go off our coast yearly than are caught, and these fish that do go to the British Provinces breed in our waters; they all spawn here.

Q. Do not you think it is important to the consumers, the men who eat the fish, that they should get them as cheap as possible.—A. Yes, but I do not think it makes any difference.

Q. You think the cost of the fish would be the same?—A. Yes, sir.

By the CHAIRMAN:

Q. At what season do they corn menhaden, as far as you know?—A. All seasons; in the spring, when they commence catching them.

Q. Do not they grow better?—A. Yes, sir.

Q. They grow fatter as the season progresses?—A. Yes, sir.

Q. Until they disappear in the fall?—A. Yes, sir.

Q. They are best in the fall then?—A. Best in the fall, same as mackerel.

PORTLAND, ME., *July 25, 1883.*

EMORY CUSHING sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Portland.

Q. How long have you lived here?—A. I have lived here since I was born.

Q. Give the number of years.—A. It will be seventy-two years in November.

Q. What is your occupation?—A. I am a cooper by trade, and fish inspector.

Q. How long have you been acting in that capacity?—A. About fifty years I have been inspector.

Q. Have you ever had any experience as a practical fisherman?—A. Never went fishing; no, sir.

Q. Never went fishing at all?—A. No, sir.

Q. You cannot speak, then, of the habits of the fish in the waters?—A. No, sir.

Q. Can you remember a time when the fish known as menhaden, or mossbunkers, were in these waters?—A. Yes, sir.

Q. They used to be plenty here?—A. Very plenty; yes, sir.

Q. You called them pogies, did you not?—A. Yes, sir.

Q. Was any use ever made of them here to your knowledge?—A. The most they have been used for has been for bait to catch other fish.

Q. What kinds of fish?—A. Well, before they commenced using seines they used to catch their fish with hooks, and they used these menhaden to grind up and throw in the water.

Q. What description of fish were caught in that way?—A. Mackerel.

Q. Only mackerel?—A. Only mackerel.

Q. How are the codfish taken?—A. They are taken with hand-lines and trawls to the bottom; they are what are called bottom fish, ground fish.

Q. What bait is used in taking those?—A. When they go trawling they ice up menhaden and mackerel and other fish that come cheaper, cut them up, and use them for bait to catch fish.

Q. Were the menhaden ever used for food?—A. Yes, sir. I have packed them thirty-five or forty years ago. There were several years I packed for people and shipped to Florida; shipped to Florida all that I put up.

Q. Corned and sent away as salt fish?—A. Yes, sir.

Q. What would they average at that time?—A. I think about \$4.50 or \$5 a barrel then.

Q. A barrel holding how much?—A. Two hundred pounds.

Q. What do they sell for fresh?—A. That depends on how bad a man wants them to catch other fish with. If they are scarce they pay more, and if they are plenty not so much.

Q. What is the usual range of the market for them as a fresh fish?—A. I think they used to measure them up in our vessels and get about \$2 and \$2.50 a barrel for them, round.

Q. They are never used by the people here, then, as food?—A. Not to my knowledge.

Q. They are cheaper than almost any other fish, are they not?—A. Yes, sir.

Q. What size did they use to grow?—A. They would average, I should think, nearly a pound, or about a pound.

Q. In what season of the year did they first make their appearance here?—A. I think about the 1st of June.

Q. What time did they leave here?—A. They leave pretty late in the season.

Q. As soon as the cold weather comes?—A. Yes, sir.

Q. They are a migratory fish?—A. Yes, sir.

Q. They go away in the fall and reappear in the early summer?—A. Yes, sir.

Q. What is their condition when they first come back?—A. When they get down as far as our coast they are decently fat; when they get here they begin to show some fat.

Q. Do they grow better until fall?—A. Yes, sir.

Q. What season of the year were those you corned caught?—A. In August and September.

Q. They weigh more then than when they first appear, do they not?—A. Yes, sir.

Q. Has there been any change here in the supply of those fish?—A. About, I think, four years ago they disappeared. They made a law here in this State prohibiting catching them in the bay, and that very year there was none arrived.

Q. Your State legislature passed a law?—A. Yes, sir.

Q. That law has been repealed, has it not?—A. Not that I know of. I guess it is in force now.

Q. Is it not more than four years since they disappeared?—A. Four or five years; about five years ago. I think that they did not do well. In Casco Bay here they caught everything there was in the bay—shad, seal, and everything.

Q. Do you remember the menhaden boats coming here and fishing?—A. Oh, yes.

Q. How long is it since they first began fishing here?—A. I should think it is twenty-five years ago.

Q. They had factories here, had they not?—A. Yes, sir.

Q. Where, at what points?—A. They did have them here on Chebeague Island and Peak's Island, but they abolished them here, fish got so scarce, and they fished further east.

Q. Are any of these factories running here now?—A. None running here now; no, sir.

Q. When did they stop running; how long ago?—A. I should think, in the vicinity of the County Cumberland, twenty years.

Q. How long is it since they stopped their factories in this vicinity?—A. I should think it is twenty years or more; I may be wrong.

Q. You think it is twenty years since there have been any menhaden factories here?—A. I should think so; I may be mistaken.

Q. Do you know whether they have been running those factories down East since the menhaden disappeared from this shore?—A. Yes, sir; they did catch some about Cape Cod and carried them down to their factories, but I guess it is two years or more, three years, since they have been in business down at this factory at Easton.

Q. So that, virtually, the industry has ceased along this coast?—A. Yes, sir; ceased for the want of material.

Q. Undoubtedly because they could not catch the fish here?—A. Yes, sir.

Q. You do not know whether they are a fish to bite a hook, do you?—A. They do not bite a hook; very seldom I have heard of their catching from bait.

Q. They are surface fish?—A. Yes, sir.

Q. Have you ever seen them on the water?—A. Oh, yes.

Q. In quantities?—A. In quantities. I have seen this harbor full, solid full, away above the bridges.

Q. The surface of this harbor?—A. Yes, sir.

Q. How long is it since they came in here in quantities like that?—A. I should think twenty-five years ago, along there, that they were seen here. I think it was in 1858 that I gave permission for people to seine a load of pogies in this harbor. I got \$5 for it. I was a member at that time of the city council, and I was delegated to look after that.

Q. Did the menhaden boats come for them then?—A. Yes, sir.

Q. What kind of boats, sailing vessels or steamers?—A. No steamers; sailing vessels.

Q. Have you ever seen any steamers here?—A. Yes, sir; I have seen fifteen or twenty in this bay at one time.

Q. How long since?—A. Six years ago, perhaps.

Q. Since that they have ceased coming here?—A. Yes, sir.

Q. And the reason, you suppose, is the disappearance of the menhaden?—A. Yes, sir.

Q. Now do you know whether the fish have reappeared since they stopped fishing for them?—A. Yes, they have come this spring quite plenty in this bay; so that they caught quite a lot in their set-nets.

Q. For bait?—A. For bait.

Q. How do they compare with the fish formerly caught; are they as large or smaller?—A. They are about the same size.

Q. How long since they made their appearance here?—A. I guess here in this bay about three weeks now.

Q. Are they here in quantities so that they run in schools on the surface as they used to?—A. I have not learned that fact, but I suppose they do; they are a fish that generally school a good deal on top of the water.

Q. You do not suppose them to be here in large quantities as they were formerly?—A. Oh, no, sir.

Q. Have you any idea of where they go to spawn?—A. I suppose they deposit their spawn all along on the sand as they come along.

Q. Do they have spawn in the spring when they come here?—A. I suppose they do. I never dressed any myself to know.

Q. You do not know how the fact is, whether they have spawn when they come here early in the season; when they first make their appearance here?—A. I think they have about shot their spawns out by the time they get down here.

Q. Then they continue to grow fleshy until they leave in the fall?—A. Yes, sir.

Q. Do you know whether they have any roe in the fall when they go away?—A. I do not.

Q. What are the principal kinds of food-fish that are caught in these waters around Portland; fish that are eaten by the people?—A. The mackerel, shad, lobsters, and codfish; I suppose all the bottom fish come under the term of codfish, but they come under different names, pollock and haddock, &c.

Q. Have you any sheepshead here?—A. Not that I know of.

Q. Bluefish?—A. No; there have not been any bluefish caught for several years.

Q. Have there been any bluefish here since the menhaden left?—A. I don't think there have.

Q. They were here before that?—A. Yes, sir.

Q. What use was made of the bluefish?—A. They were packed in barrels and shipped away for food.

Q. What we call salted fish?—A. Yes, sir.

Q. Were they used as fresh fish here at all?—A. Yes, sir; when they could be had in the market.

Q. You think they disappeared when the menhaden did?—A. About that time.

Q. Have any returned this year; do you know of any being caught this season here?—A. I guess there have been some caught in the vicinity of Cape Cod and around there; I have not heard of any this way.

Q. None so far east as here?—A. No, sir.

Q. Is the bluefish regarded as a good fresh fish here?—A. Yes, sir.

Q. It was not so formerly, was it?—A. When they first used to catch them here the people did not fancy them; did not like the color of them; kind of a blueish cast.

Q. But they have come to be regarded as a more valuable fish than formerly?—A. Yes, sir.

Q. How do they rank with mackerel or salt fish?—A. They are not so good a fish as mackerel.

Q. What do they sell for as salt fish?—A. I think at the time that I put them up they fetched somewhere about \$7 or \$8 a barrel.

Q. How long ago is that?—A. It has been fifteen years since I packed them.

Q. Were you accustomed to pack them every year more or less?—A. More or less.

Q. From your early recollection?—A. They have caught them more or less in our weirs.

Q. What size bluefish are usually caught here, or were when they were here?—A. I think they would average from $1\frac{1}{2}$ to 2 pounds; perhaps more, some of them.

Q. You never saw them as high as $4\frac{1}{2}$ and 5 pounds?—A. I do not recollect, really, what the weight was as a general thing.

Q. Have you any opinion as to why the bluefish disappeared from here?—A. Well, I suppose that with so many seining they were generally caught up the same as other fish were, and thinned them out, so that they became scarcer.

Q. You do not know whether the menhaden had any effect upon their leaving?—A. I would not think they had.

Q. Do you know whether they feed on menhaden?—A. Yes; they are a fish that feed on any live fish they can get hold of.

Q. And whether the menhaden is one of the fish they seek for food?—A. Menhaden and mackerel and herring, I guess, suit them best.

Q. Where do the mackerel spawn?—A. I do not know where, but I suppose their spawning grounds are generally sandy bottom, such as George's Bank.

Q. They remain here during the winter, do they not?—A. No, sir.

Q. They disappear?—A. Yes, sir.

Q. At what time?—A. I have known them up about until the last of December.

Q. They do not go away as early as the menhaden did?—A. No, sir.

Q. Or so early as the bluefish did?—A. I have known in Cape Cod years ago where there were tons and tons of them chilled and went ashore on the beaches there. They are a fish that cannot stand the cold weather like a mackerel.

Q. What is the largest quantity of menhaden you ever knew caught here in any one year?—A. I do not know as I really know now.

Q. Well, a large or small quantity?—A. We used to use a good many thousands of barrels of them. When the mackerel catchers used to draw without any seines, I have paid as high as \$850 for one vessel full of menhaden in one season for what we threw away to take other fish with; paid as high as \$8 a barrel for them at that time.

Q. Just for bait for other fish?—A. Yes, sir; to grind up.

Q. What have you used as a substitute for that since the menhaden left?—A. The fishermen refuse to go now and catch with hook and line; rather catch them with a seine.

Q. They have stopped fishing with hook and line?—A. Yes, sir.

Q. So that most of the food-fish here now are caught with a seine?—A. Yes, sir; the mackerel and herring, and like of that.

Q. What time do they commence catching codfish here?—A. They catch them all winter; they do not leave the coast at all.

Q. All the year round, then?—A. Yes, sir; they swag off into deeper water, of 80, 90, or 100 fathoms.

Q. Do you know what time they feed?—A. There is a different kind of fish; there is a fish we call the shrimp fish; they feed on shrimp. Then there is what we call the clam worm fish. I have heard people say that they have seen what we call this clam worm fish sit right on end in the water and go down like lightning in the flats and haul these clams out to eat.

Q. Have you any opinion as to the reason of the menhaden disappearing from here?—A. My reason is that there are so many of those pogie steamers they have swept them all up—caught them all up.

Q. Either swept them up or driven them away?—A. Yes, sir; two seasons they went right into the bay as far as they could find one, and, I think, caught them all up.

Q. How many steamers have you ever seen at work here at once?—A. I have counted here in the harbor at the wharves and down in the bay, I don't know how many—several; but I have heard people say that they have counted thirty in a day sailing up and down the bay.

Q. Since the menhaden disappeared they have disappeared, have they not?—A. Yes, sir.

Q. They do not come here to fish any more?—A. No, sir.

Q. They did not come here this year?—A. I have seen one or two boats here; I think they are after mackerel, though. I do not think the menhaden is of sufficient amount.

The CHAIRMAN. We have evidence that some of the boats have converted their seines into mackerel seines and are pursuing that class of fishing.

By Mr. CALL:

Q. Is there any legislation that you gentlemen here desire for the protection of the food-fish on the coast, the fish you deal in? If there is anything of the kind, we would be glad to have any opinion you may have on the subject.—A. My opinion is that they should not be allowed to catch mackerel until about the 15th of June, about the time they get rid of their spawn. Picking up so many spawn fish on the southern coast tends to lessen the amount of spawns deposited, and, therefore, is making the fish more scarce every year.

Q. That is the only suggestion you would like to make, is it, on the subject? There is nothing else except limiting the time for fishing?—A. That is all, except the duties. I should think the duties ought to be put on.

Q. That is, by the treaty?—A. Yes; it was a bad trade allowing the Englishmen to have the advantage they have had.

The CHAIRMAN. You know we have given notice to abrogate that treaty?

The WITNESS. Yes, sir.

By Mr. CALL:

Q. Your idea is, not to allow any other fish brought in, except those caught by American vessels and Americans?—A. I do not know what law they could make. I suppose if they would not allow vessels licenses for catching mackerel or pogies until the 15th of June, and make the fine very heavy if they attempted it, it would tend to stop their catching them so early in the season. I do not know whether we should have the power to say that they should not bring in English fish unless they should show satisfactorily to the Government that they were caught after the 15th of June. I suppose they could make a law of that kind.

Q. You think that would be a protection do you, to the supply of fish, and prevent their being decreased?—A. I do think so myself.

By the CHAIRMAN:

Q. What season of the year are the mackerel in the best condition?—A. I think from the 1st of August until about the 7th of September. They begin to grow a little thinner late in the fall.

Q. Suppose they were prohibited from taking them until the 1st of August, then?—A. Well, I don't know as there would be any necessity of preventing them catching them any later than people would be satisfied that they had got rid of their spawn. I think the 15th or 20th of June would be as early as they ought to be allowed to catch them.

Q. The legislation, then, you think desirable is for the protection of mackerel principally?—A. Yes, sir.

Q. Cod does not need any protection; they are not caught with these purse-nets at all?—A. There are no seines for them; they are caught with trawls.

Q. You mean the menhaden purse-nets would not catch them?—A. No, sir.

Q. They catch everything they surround, I suppose, when they put their nets around a school of fish?—A. Yes, sir.

Q. Do you know what they catch here in this bay besides menhaden?—A. They catch shad and herring.

Q. Mackerel?—A. Yes, mackerel.

Q. Sharks; are there any sharks here?—A. There is once in a while a shark that will get into the bay, follow the fish in; not very plenty, though.

Q. One of the witnesses said they caught a whale on one occasion; I suppose they never caught one of those in this bay?—A. No, sir; I have seen whales, though, in Casco Bay when I was a young man.

Q. You have not seen any late years?—A. No, sir.

Q. How near the coast here do they appear now?—A. I do not know, really.

By Mr. McDONALD:

Q. You said that one year shad were taken in large numbers here; what year was that?—A. They always would catch shad, more or less, in this bay, on this side of Small Point. This bay has been a great shad ground until they swept them all up with pogies and the like of that.

Q. Have any been caught this year?—A. I should think, probably,

when they got them all to market that have been caught this side of Small Point, a thousand or twelve hundred barrels.

Q. How many shad to a barrel?—A. What we call sea shad, I should think it would take 150 to 160.

Q. How much will they weigh apiece?—A. They will weigh from three-quarters of a pound to a pound and a quarter or pound and a half. I counted some last spring, the very first they caught in the spring, and it took almost 106 to make a barrel; that is almost two pounds apiece after they are dressed.

Q. That fishery has been falling off here every year?—A. They could get plenty again this year. Last year I handled about 250 barrels, and this year—we counted up this morning—I have handled within six barrels of 500, and I probably have not handled half of them.

Q. They have come back, then, with the menhaden?—A. Yes, sir; probably if they continued seining in the bay we should not have got any; they would all have been gobbled up with the seines.

Q. Did the poggy-fishing fall off at once; you stated that about five years ago there was very large poggy-fishing here?—A. Yes, sir; and next year it did not amount to anything.

Q. None at all?—A. That last year I do not believe they fished here at all; there was but one caught in the bay, and never saw one in the water. This year they have come back.

Q. It looks, then, as if they had changed their ground, rather than been caught up?—A. Yes; there was not any caught off Gloucester last year, where there is not generally any at all, and I saw an account in the paper that this year they find they come around the cape quite abundantly, and have caught a good many there.

Q. Where do the bluefish come from that are brought to your market?—A. Off the Maine coast, all around Cape Cod; they are caught here in this bay, Harpswell Bay.

Q. They are a small fish, are they?—A. No, they are not very small.

Q. How much do they weigh?—A. What I have handled would weigh from a pound and a quarter to two pounds and three pounds.

Q. That is small for a bluefish?—A. That is, after they are split and dressed; of course they dress away some.

By the CHAIRMAN:

Q. How are the bluefish caught?—A. What I have handled here have generally been caught in the weirs and pounds.

Q. Do not they fish them with hook and line here at all?—A. Never knew them to here. I believe they do around Cape Cod.

C. D. THOMES sworn and affirmed.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Portland.

Q. How long have you lived here?—A. I have lived here since 1843.

Q. What is your occupation?—A. Cooper, and inspector of fish.

Q. Have you ever had any experience as a practical fisherman?—A. Yes, sir.

Q. For how many years?—A. I have been in the business since 1843; that is I have worked in the business since 1843; I have carried it on since 1849.

Q. Have you ever had any apparatus of your own for carrying on the business of fishing?—A. Yes, sir; we had vessels and seines of our own.

Q. What kind of fish have you been accustomed to take?—A. Mack-

erel principally; mackerel, shad, bluefish, menhaden; we handled some pogies, as we called them.

Q. Have you ever known a time when bluefish were plenty here?—

A. Not very plenty. I remember about fifteen or sixteen years ago packing about 100 or 200 barrels in one season. I guess that is the most we ever packed in one season.

Q. For food?—A. Yes, sir.

Q. What time of the year?—A. I think we packed them in July.

Q. They grow better until they leave in the fall, do they not?—A. I am not so much acquainted with bluefish, because I never handled much, nor the menhaden.

Q. What do you know about the habits of the menhaden or pogies; what time of the year do they make their first appearance?—A. About the 15th of May, I think.

Q. What is their condition when they first come?—A. They are poor.

Q. When do they leave here?—A. They leave here, I think, in the last of September or sometime in October; I have almost forgotten.

Q. When cold weather comes?—A. When the water chills they leave.

Q. Do they get in good condition here?—A. They do; yes, sir.

Q. What use have you ever made of menhaden?—A. Principally for bait.

Q. For catching what kind of fish?—A. Mackerel, codfish, and had-dock; such things as those. We used to, years ago, have them put up on purpose for winter bait; used to use a good many of them; used to use them principally, and finally they went off and left; so we had to adopt some other plan.

Q. How long is it since they left?—A. I think four or five years.

Q. Disappeared entirely?—A. About all, I guess. The last two or three years there have not been any. This year we have a few again.

Q. How long is it since the menhaden boats began to fish for them here?—A. That I could not tell.

Q. About how long?—A. I could not give any idea; I should think as much as fifteen or sixteen years ago, though; I do not know.

Q. They used sailing vessels first, did they not?—A. Yes, sir.

Q. How long is it since the first steamers came here?—A. I do not know; I could not give any idea about it. When they first began to catch them up and press them, they used sailing vessels, and pressed them aboard the vessels; then they adopted the use of what they called caraway boats and used to seine them in and lug them in in that way; then they commenced using steamers; I should think about twelve years ago; I do not know but what more.

Q. How many of these steamers have you ever seen here at once?—A. I think probably six or eight at a time.

Q. In this harbor?—A. In this harbor, lying around here, but not to work; laying at the wharves and watching for a chance.

Q. Are any of the factories in operation along this coast now?—A. I don't think there is one of them unless they have started very recently. They ceased when the menhaden disappeared, or about that time.

Q. Yes, but I heard that some of them were talking about starting again this year?—A. I do not know whether they have made up their minds to or not, down about Booth Bay.

Q. Have you any opinion as to the cause of the menhaden disappearing from here?—A. Oh, yes; my opinion is that they were caught up, drove off.

Q. By these purse-nets?—A. Yes, sir; and being chased away would not come on the coast.

Q. They are a fish easily frightened, are they not?—A. I do not know as they are; I do not know about that, but continual dropping wears away a stone, and I think——

Q. Your opinion is that the use of those purse-nets is what caused them to disappear from here?—A. Yes, sir.

Q. And you learn that the nets are coming back since the fish are coming back?—A. I do not know anything about that, except what I have heard.

Q. Was there any other use made of the menhaden except for bait before they commenced manufacturing them into oil and fertilizers?—A. I never knew that there was.

Q. You never packed any for food?—A. No, sir; I never packed any.

Q. Did you ever eat any?—A. No, sir.

Q. You can always get better fish?—A. We can always get better fish; yes, sir.

A. The subject of legislation has been talked of among the people of Maine, I suppose; some kind of legislation to protect you here.—A. That is what we have been wishing, that there could be something done in that respect.

Q. What is it you want done?—A. My idea, I suppose, is like all the rest of them, that there should not be a seine thrown in the water until after the middle of June.

Q. Even by private individuals?—A. Yes, sir; and I guess nine-tenths of the fishermen agree to the same thing.

Q. What does your State law provide in that respect now?—A. Our State law does not stop us from seining any time of the year we want to.

Q. There is no restraint?—A. No, sir.

Q. Do you think that protection is needed on the shores of the ocean as well as in the bays?—A. Yes, I think it ought to be done from Cape Hatteras as far as we go on east; that is my opinion about it.

By Mr. CALL:

Q. You have no objection to the purse-net method of fishing; you think that is not material?—A. My objection is to everything; that is to everything that catches mackerel; I do not want them caught before they spawn.

Q. Yes, but you would not think it advisable to prohibit that method of fishing?—A. Yes, I think it would be advisable.

Q. You mean you think it would be advisable up to the middle of June; but how about after the middle of June?—A. I do not think it is after the mackerel spawn; I calculate the mackerel spawn before the 15th of June, or by that time.

Mr. CALL. Some persons on the coast have been in favor of prohibiting the use of the purse-net altogether within a certain distance of the shore.

By Mr. McDONALD:

Q. What year was it the menhaden left the Maine coast?—A. I think about 1877 or 1878 was the last year.

Q. Was not that the same year the mackerel left the Canadian waters?—A. I do not know, I am sure.

Q. They have not been in Canadian waters within the last three or four years?—A. No, we have not seen anything there the last three or four years.

Q. Would not your fishermen have gone there if the mackerel were there to catch; the fish left the Canadian waters for a number of years, did

they not?—A. When there are not many mackerel on this shore there are plenty of them there, and we go for them there.

Q. That is just the point I wanted to bring out, that the mackerel seem to shift their ground from one year to another.—A. I think they do; sometimes the mackerel travel inshore and then again they will not. Now last year mackerel were broad off, most of the season.

Q. Do you attribute that to the mackerel being worried on particular grounds by fishing; their changing their ground from year to year?—A. Oh, yes; it is my opinion that they do change their ground.

Q. Well, because they are fished for?—A. I suppose it must be because they are driven away, they are fished for so much.

By the CHAIRMAN:

Q. Do the Canadian fishermen come into these waters to fish?—A. Yes, sir; I suppose they do; I don't know; sometimes they come here with fish, but not very often. They send their fish here after they are caught there.

Q. Yes; but do they come here and take fish in your waters?—A. I do not think they do; no, sir.

Q. They have not since the treaty of Washington?—A. I do not think they do.

Q. But you do go to the Canadian shores?—A. Oh, yes; we go to their shores after fish.

Q. How many vessels have you ever had at a time engaged in fishing?—A. Years ago when we used hook and line we had as much as forty.

Q. Sailing vessels?—A. Yes, sir; now our fleets are smaller, but we employ about as many men as we did then.

Q. Did you ever use a purse-net?—A. No, sir; we use a seine, but not a purse-net.

Q. Do you know how the menhaden-nets are used?—A. They are used pursed up the same as our nets; are the same things exactly. I suppose it is a purse-net; I do not know what else. We call it a seine. A seine and a menhaden-net is the same thing.

Q. They are in boats and surround the fish and purse them at the bottom?—A. That is the way we do.

Q. The same way?—A. Yes, sir.

Q. You use that seine?—A. Yes, sir; that is the way we catch all mackerel; no other way now.

Q. You used to catch them with hooks?—A. Yes, sir.

Q. It requires less men to catch them now than it did?—A. Oh, yes; more skill.

Q. The mackerel-fishing here is one of the most important industries, is it not?—A. The most important industry we have here.

Q. The greatest?—A. Yes, sir.

Q. Greater than the codfishing?—A. Yes, sir; codfishing is large, but it don't come up with the mackerel.

CHARLES A. DYER sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. At Portland.

Q. How long have you lived here?—A. Forty-two years.

Q. What is your occupation?—A. Inspector of fish.

Q. Have you ever had any experience as a practical fisherman?—A. No, sir.

Q. What you know about the subject, then, is from observation?—A. Yes, sir.

Q. Do you remember how it was with the menhaden or pogies, as they are called here, when you first knew of them?—A. In 1866 they started the business. Mr. Church came here with a little schooner and seine and a boat, and they run one year down here on Peak's Island. I guess they had a capital of perhaps \$2,000 or \$3,000; they staid here two years, and finally went down to Round Point; went into business there; they had sail-vessels then, and finally they went into steamers, and I guess they have got now, or have had for the last four or five years, some seven steamers. Those steamers along in 1876 or 1877 caught, well, the highest 23,000 barrels; from that down to 14,000 barrels. I guess the lowest was 14,000 barrels of pogies up to 1878, when the pogies disappeared; they have not been here since.

Q. Are their factories stopped?—A. Their factories have stopped; they have got a factory down at what they call Muskingee, that cost them, I think, \$115,000.

Q. Where is that?—A. Near Portland.

Q. East of here?—A. Yes, sir.

Q. Is that running?—A. No, sir; all of those factories down there are lying still.

Q. Valuable factories?—A. Yes, sir; that one cost \$150,000, machinery and everything.

Q. Do you know why they stopped?—A. They stopped because the pogies stopped coming here.

Q. Disappeared from here?—A. Yes, sir.

Q. Have they returned here in any quantity since?—A. No, sir; a month ago I saw on the Old Orchard Beach quite a number of schools, but then there does not seem to be any body. I counted there one Sunday I was over there about ten of these small schools; we have a trap over there and we catch a few barrels at a time, perhaps 30 or 40. I do not believe they are in any such body as they used to be.

Q. Have you any opinion as to the cause of their leaving this coast?—A. I think that the body were caught up, and I think that what run from the factory, the refuse water, &c., keeps them off the coast. I do not think they will go where the water is unhealthy.

Q. Poisons the water?—A. Yes, sir; I think that has a good deal to do with it, and their catching them in such large quantities. There were somewhere about 90 steamers at one time employed in catching menhaden.

Q. Does that refuse that goes into the water affect the food-fish any?—A. Yes, sir; I think it does. I know I was down there about eight years ago, and went off in a boat and caught a few mackerel, and they looked then as poor in the middle of August as could be; looked as if they were sick.

Q. How near the factory was it?—A. It was right off the factory where they were then at work.

Q. So that you think they affect the water as well as catch the fish?—A. I think they do.

Q. They used to be very plenty here?—A. Yes, sir; very plenty.

Q. How far is it from here to Tiverton where the Church's factories now are?—A. That is Tiverton, Rhode Island?

Q. Yes.—A. It is just this side of Newport; it is a station this side of Newport.

Q. Yes, but what is the distance from here there?—A. I should think it is 150 miles.

Q. Do you know how far east they have come for menhaden since they

established their factories here?—A. I do not think they have come—well, perhaps to the back side of Cape Cod in the fall of the year.

Q. How far is it from here to Cape Cod?—A. It is about 115 to 120 miles.

Q. By the ocean?—A. Yes, sir.

Q. Do you know any other cause for the disappearance of the menhaden except the use of those nets and the effect upon the water?—A. That is all I know of. I think the mackerel have been plentier on this coast since the pogies left. Since 1875 every year except this year there has been a very large catch of mackerel since the pogies left.

Q. Do you know whether they ever caught any mackerel in their catch?—A. No, sir; none of any account that I know of.

Q. Any bluefish?—A. Bluefish; there has not been any of any account this year. We caught in our weir once seven.

Q. Have they ever been penty here?—A. Not since I have been in the business. I don't think they are a fish that inhabit this water a great deal. They are a southern fish; do not come so far north in any quantities.

Q. Are they used for food here?—A. To a very small extent. I think east of here they do not use them, but here in Portland they do some.

Q. The mackerel are preferred?—A. Yes, sir.

Q. Which come first, the bluefish or the mackerel?—A. The mackerel. The menhaden come first as a general thing; used to when they did come.

Q. Before the mackerel?—A. Yes, sir; and I always supposed they ate the bait up that the mackerel feed on, because after they left mackerel were very plenty on the coast.

Q. What do the menhaden feed on?—A. I do not know; I suppose this red seed in the water; it looks more like cayenne pepper than anything else.

Q. Mackerel feed on it?—A. Yes, sir.

Q. And the disappearance of the menhaden you think brought the mackerel here in force?—A. Yes, sir; it looks like it, because the menhaden struck here this year and there is no mackerel to amount to anything.

Q. Have you any opinion as to what legislation is needed?—A. I think they ought to prohibit fishing before the 15th day of June, and I think all the fishermen would go in for that, too.

Q. Would you have that apply to anything but your bays and inlets; would you have it apply to the ocean?—A. Yes, sir. They issue what they call the mackerel license and the codfish license to fishermen. I should prohibit the issue of the mackerel license until the 15th day of June. It would be a good idea to stop these traps, if they could be stopped, too.

Q. Do you know whether the Canadian fishermen come here under the treaty?—A. Not of any account. I believe there was one here last year.

Q. They do not come so as to interfere with your industry here?—A. No, sir. They sent quite a lot of Cape mackerel here in the spring; caught them in traps; they are early—about the first of May.

JOHN A. EMORY.

Mr. CALL. If you have any suggestion to make on this subject we should be glad to hear it.

Mr. EMORY. I think this Southern mackerel-fishing ought to be stopped; they go down South very early and they spoil a good many fish.

Question. You think they injure the permanent supply of mackerel, do you?—Answer. Yes, sir; very much, indeed.

Q. Is it your opinion that a law prohibiting fishing within particular times would be effectual?—A. I do not think they should be allowed to use purse-seines before the 15th of June. I think it would eventually drive them out, and our population is increasing so fast that by and by the supply will not be adequate for the consumption.

N. O. CRAM. If there is any way of reaching it I think it is very desirable to stop all purse-fishing until about the middle of June; they are destroying more than they catch and they break them all up. My impression is that one cause of their absence on the coast for the last month or six weeks—almost an entire failure of the usual catch—is to be attributed in a great measure to their having been chased and harrassed from Hatteras to Cape Cod.

By Mr. CALL:

Q. It is an entire failure in the fishing, is it?—A. Almost an entire failure, and I think the great scarcity now is attributable in a great measure—perhaps one cause may be the disturbed condition of the rivers, roiling the surface and keeping the feed down below; that may be the cause in some measure. Fish don't like that, and they may have sunk, but I think the fish have been disturbed and interrupted very much by the purse-seine.

By the CHAIRMAN:

Q. Do you know anything on the subject of the menhaden?—A. I have no practical knowledge only in general as I have observed them around here in years past. I think they have been disturbed because of the summer fishing along the coast.

Q. The use of the menhaden boats you mean?—A. Yes, sir. This morning they appeared off Wood Island and this afternoon they will be up to Falmouth Bay. To-morrow morning they will be up on these rocks somewhere, and all the time catching, dragging, seining among the mackerel as well as the menhaden, and loading vessels with them and carrying them off.

Q. The steamers are much more destructive than the sailing vessels?—A. Oh, yes; those steamers, whether they catch the menhaden or the mackerel are floating around all the time disturbing the waters.

Q. They can run to them wherever they find them?—A. Yes, sir. Then again they come cruising along the shore; the older fishermen and their families, the boys, would catch and sliver these menhaden for bait and send them up here; they had quite a revenue from it. It breaks up that business, comparatively speaking.

Q. Do you mean by that cut off the sides?—A. Cut off the sides; use them for bait. I suppose that business is almost stopped. That was quite an income to the coast people.

Q. Were the bluefish ever caught here to any extent?—A. I think not; occasionally we see the tautaug, but it is very rarely.

Q. Have you any other suggestion to make?—A. Only that if there is any possible way of stopping the taking of mackerel by seines until the 15th of June, it ought to be done.

Q. Would you think that necessary on the shores of the ocean as well as in the bays and harbors?—A. Yes, sir; outside.

Q. How far out?—A. Anywhere outside of the ledges.

Q. Three miles out?—A. Yes, sir; anywheres that it would stop the sailing of the vessel.

By Mr. CALL :

Q. The mackerel is an important industry here, is it not?—A. Yes, sir; quite a large interest. We packed here last year about 100,000 barrels.

Q. Increasing, is it not?—A. Yes, sir.

Q. I suppose the demand increases as the population of the country increases?—A. Yes, sir; and it will have to be cared for or it will fail entirely; the population has increased faster than the catch has.

By the CHAIRMAN :

Q. The advantage of the mackerel is you can use them as a fresh fish and corned fish for winter?—A. Yes, sir; and they are a very favorite fish, too.

Q. Do you think the menhaden boats interfered with the mackerel fishing?—A. I have no doubt of it.

Q. Has it been better since they left?—A. Oh, yes; the receipts of packing of fish along in our vicinity and Booth Bay, now, will show that.

Q. And you attribute the absence of these boats here as one of the causes?—A. One favoring the increase of mackerel; they are resting quietly in the bay or down the bay.

Q. One gentlemen stated that the menhaden take the same food the mackerel take, a substance floating in the water.—A. I do not know where or what they do feed on. The waters are filled at certain seasons with feed adapted to the fish that tolls them in.

Q. Is it not a fact that the mackerel feed on menhaden to some extent?—A. Really, I do not know that.

A. M. SMITH. I would like to make the statement here that any legislation that might be enacted that would prohibit our people from catching fish certain seasons of the year should not be had unless it also prohibited the catching them in weirs, and some legislation could be enacted that would prohibit the provincials from taking advantage of the situation. I can see, it seems to me, where the provincials might step in and rather monopolize the business if we were debarred by legislation.

The CHAIRMAN. Oh, no; our legislation would apply to them.

Mr. SMITH. It will not apply to them, but it will give them the privilege of stepping in and taking from us a business.

The CHAIRMAN. By sending their fish here you mean.

Mr. SMITH. Yes, sir.

The CHAIRMAN. That we cannot stop.

Mr. SMITH. That is why I say I should deprecate any legislation that would throw the business into their hands and out of ours. We can prevent them from catching fish here within the 3-mile limit, but all the fish that are caught here from the middle of March up to the 1st of July are caught beyond the 3-mile limit, and there is no legislation would reach that.

By Mr. CALL :

Q. Outside of one marine league?—A. Yes, sir; fish are caught away beyond that.

The CHAIRMAN. You would have the same right to fish that they would.

Mr. SMITH. But, as I understand this matter of legislation, they would deprive our vessels of the privilege of fishing without the 3 miles.

The CHAIRMAN. Oh, no.

Mr. SMITH. That was the drift of the testimony, wasn't it?

The CHAIRMAN. Oh, no; the bill that brings us here prohibits the use of the purse-nets within 3 miles of the shore, which means the ocean at low-water mark.

Mr. SMITH. I know; but it was suggested that the Treasury Department might refuse to issue mackerel licenses to vessels.

The CHAIRMAN. Oh, no; nothing of that kind is attempted.

Mr. SMITH. Some of that testimony is on record; that is why I made the remark. I should not want to see any regulation that would give a monopoly.

The CHAIRMAN. You need have no apprehension of that kind.

GEORGE TREFETHEN. Gentlemen, I think, as far as the legislation for a 3-mile limit concerns mackerel, it does not amount to anything; there are no mackerel of any account taken within 3 miles of our shore; there has not been for twenty-five years. The seines are too deep; they use a deep seine and have got to have deep water. The seines that they are using will not admit of their coming in near the shore.

By the CHAIRMAN :

Q. How deep are they?—A. All the way from 20 to 30 fathoms.

Q. Do they use steamers or sailing vessels?—A. Sailing vessels for mackerel altogether; there is not a steamer in the business; no other steam-vessel except the menhaden that use the purse-nets. There are no mackerel caught before the first of July within 3 miles of the shore; that is, there is no quantity; there may be a few. I would like to say something about the pogy-fishing, because I feel a little interest in that, and I think I know as much about it as most anybody that was reared on the shore. My native place was on an island down here about 3 miles from the city, and I lived there until I was about twenty-two years old. I saw any quantity of pogies; we could catch pogies any time of the day or night by taking a little net 20 yards long and going out to the rocks and swinging it around; secure a boat-load in it. There were any quantity of pogies until these steamers commenced operations. Before the steamers we had sailing vessels that seined and carried to these factories, and they destroyed a great many fish, but they did not seem to have the effect that the steam did. When these steamers came on the ground they covered so much ground. Now, the extent of ground that the pogies occupied in this State was very limited; scarcely a pogy was ever caught, I was going to say, to my knowledge, east of Mount Desert.

Q. How far is that east of here?—A. About 110 miles. They were not very plenty as far east as that, but that was the limit, and you take those steamers running 50 or 60 or 100 miles a day, and you see they were covering the ground all over, and if a pogy made his appearance here some of them were after him. A dozen steamers would come into our bay here and there would be thousands of pogies here, and in twenty-four hours you could not see one flip; they would clean them right out. I think the seining by these steamers is what cleaned out the pogies. I have not a doubt of it in my own mind. I think the pogies will come back of their own accord if they are let alone.

Q. They are coming back, are they not?—A. They are, yes, sir; they have got turned on to the coast here again; got started, I think. There will be no trouble if the steamers let them alone. This pogy interest is vitally interesting to the shore fishermen. A great many men in this State get their living by fishing in open boats, and they depend on

pogies for their bait; they catch codfish, haddock, and hake, and it is their business principally; has been for years; they get their living in that way and support large families, and when you take the pogies away from them, you take away their bread and butter. They do not know hardly where to turn.

Q. Were they ever used for food?—A. Very little.

Q. Only used to catch food?—A. Only used to catch food. There were a great many of them slivered and used to toll for mackerel when they used to bait a hook, and then there has a great many been used to catch haddock in the winter. Men made good livings by catching pogies and slivering them up, and salting them for winter bait.

JOHN E. ROBBINS sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Deer Isle.

Q. How far is that from here?—A. It is about 100 miles.

Q. How long have you lived there?—A. I have lived there ever since I was born; thirty-eight years.

Q. What is your occupation?—A. Fishing.

Q. Fishing for what?—A. Mackerel fishing.

Q. Principally mackerel?—A. Mostly mackerel; yes, sir.

Q. Did you ever catch bluefish?—A. I never did.

Q. What do you know about the menhaden, or pogies as they are called?—A. I never fished but a very little for those.

Q. For what purpose did you catch them, if at all?—A. Bait.

Q. Do you remember when they were plenty here?—A. Yes, sir; I do. I can remember when they were very plenty right around in our harbors; right down around home there.

Q. Have they disappeared?—A. Yes, sir; they have. I have not seen any pogies down east for the last four or five years; four years, I think it is.

Q. What do you think caused them to leave here?—A. I think it was the seining them.

Q. With what?—A. With seines.

Q. With steamers?—A. Yes, sir; I think that is what drove them off. They made a practice of catching them in those small nets they used to use by hand; they used them ever since I remember until they got the steamers to going, and I do not think it drove them off. They were just as plenty up to the time the steamers went to work.

Q. How many steamers have you ever seen here at once?—A. I saw 40 sail I should think at a time, and I don't know but more.

Q. How many years ago?—A. About five years ago, I guess.

Q. Have they been here any since the menhaden left?—A. No, sir; I guess it has not been more than four years though.

Q. Have you seen any this year?—A. We have not seen any this year, not one?

Q. Have you seen any of those steamers here this year?—A. Two or three, mackerel-seining.

Q. Catching mackerel?—A. Yes, sir; I have not seen a school of pogies on this coast for the last three years to my knowledge.

Q. Are they not here this year?—A. I have not seen any; we have been cruising from Cape Cod to Cape Sable, in shore and off, all the spring, and we have not seen one school, not one.

Q. Where they used to be common?—A. Yes, sir.

Q. And in large schools?—A. There used to be large schools; yes sir.

Q. Have you ever seen the menhaden steamers catch them?—A. Yes, sir; I have seen them catch them right in our harbor down home; right up close to where I live.

Q. How many would they take in a haul?—A. Sometimes they got four or five hundred barrels more or less.

Q. Do they catch any other fish?—A. Sometimes; not a great many. Pogies generally go in schools by themselves.

Q. Do you know any other reason for the pogies going away except the fishing with steamers?—A. I do not.

Q. You think that is the cause?—A. I think it is.

Q. Have the factories here stopped?—A. The factories have all stopped, I believe, down around Booth Bay.

Q. How many factories were there years ago?—A. I could not tell you how many, but there were quite a number.

Q. And they have all stopped operations since the pogies went away?—A. They have all stopped operations and gone to the southward.

By Mr. CALL:

Q. Do you think the mackerel industry is increasing?—A. No, sir; I do not.

Q. You think there are fewer mackerel here then ever before?—A. Yes, sir; I do.

Q. How was it last year?—A. There were considerable many mackerel last year, but wide off shore most of the time.

Q. I suppose that is a very important industry here, is it not?—A. Yes, sir.

Q. A great many people make their living out of it?—A. Yes, sir; there are lots of people who depend on mackerel-fishing.

Q. Do you think it advisable that there should be some legislation; is that the opinion of the fishermen?—A. Yes, sir; I think it is. I have talked with a number of captains and men who are interested in the business and they seemed to think it would be a good thing; that it would be a benefit. Mackerel would strike on to this coast nearer in shore; give them a chance to go on to their spawning grounds and spawn and stop there.

Q. What kind of a law do you and other gentlemen interested in fishing think ought to be passed to protect that kind of fish?—A. I think there ought to be something passed. I don't think they ought to issue license up to, well, say, the 15th or 20th of June. I think that is as soon as a man ought to start for mackerel-fishing.

Q. Ought not to be allowed to fish for mackerel with purse-seines, I suppose?—A. Not allowed to fish for them in any way whatever.

Q. Until the 15th of June?—A. No, I don't think they had.

Q. Either with hand-lines or seines?—A. No, sir; or weirs either.

By the CHAIRMAN:

Q. Would you object to a man's catching enough with a hook for breakfast?—A. No, I don't think so; but if you are going to stop it, stop it right still; don't leave any holes open.

By Mr. CALL:

Q. You think he would not be apt to stop with catching enough for his own breakfast?—A. No. If a man thought he might catch a mess when he was outside, probably he might throw a line over.

F. F. JOHNSON sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Deer Isle, Maine.

Q. How far is that from here?—A. About 80 miles.

Q. What is your occupation?—A. Fishing, mostly, for thirty-five years.

Q. Fishing in what waters?—A. In American and English waters; south of the St. Lawrence and Banks on this coast.

Q. What do you know about menhaden or pogies?—A. I never was in that business, but I have lived right where they have done that work.

Q. Tell us what you know about it.—A. The oldest people where I have lived that have been in the business say they never knew pogies to fail coming on this coast as long as they could remember back before these last three years; that is, while they fished with nets and seines and the steamers have been coming they have been diminishing every year until they have been driven off. I do not know of any other cause.

Q. Did you ever see the steamers catch them?—A. Oh, yes; plenty of them.

Q. Do they catch any other kinds of fish?—A. Once in a while they will make a mistake and get a school of mackerel, but they fish for menhaden.

Q. When they catch mackerel, I suppose they put them on the market?—A. Sometimes, and sometimes they used to let them go.

Q. Go into the factories or into the water?—A. Trip the seine and let them out, because they were not prepared to take care of them; they could not dress them; have no barrels and salt, and so they had to let them go. Probably if it had been the same as it is now where they are putting them up fresh, they would be glad to take them and run them into market.

Q. The mackerel would not be worth much for making oil?—A. No, sir; I guess they never pressed any mackerel oil to make a business of it.

Q. What season of the year did pogies come here?—A. We used to look for pogies where I live about the 10th to the 20th of June.

Q. How long did they remain here?—A. Until October.

Q. They continue to grow fleshy as long as they stay here?—A. Oh, yes; they flesh up. Pogies generally get good and fat about the 1st of July and August; keep increasing until August.

Q. How heavy do they get before they leave in the fall; what would a school average in weight, undressed?—A. I suppose they would gain, in weight about one-eighth part.

Q. Well, gain so as to weigh how much in the fall, say in October?—A. I generally reckon on 4 pogies to the pound, dressed.

Q. But undressed?—A. They would be about half a pound.

Q. What use was made of them?—A. We used to use them for bait. When we went jig-fishing we used to have to grind them up for mackerel bait, and have used them for trawling.

Q. Did you ever know them to be used for food?—A. Oh, yes; a good many used to like pogies well enough to eat them.

Q. Did you ever know them to be corned for food; packed down?—A. Yes, sir.

Q. To what extent?—A. Not very much. I do not know as they were ever put up really for a market.

Q. But the people in the country put them up; the farmers?—A. Yes, sir; put up a barrel or two, just to eat.

Q. For winter use?—A. For winter use, just to eat.

Q. Did you ever eat them?—A. Yes, sir.

Q. How are they?—A. I think a good fat pogy is about as good as mackerel for my eating. I do not know as everybody would like them; some like sweet cake better than Indian bread, and some like Indian bread just as well.

Q. A man could live on salt pogies, I suppose?—A. Well, he would not starve, with good potatoes.

Q. They are cheap food?—A. Yes, sir.

Q. What do they sell for?—A. I never caught any to sell; but I have paid \$12 for a barrel of pogies; but the general average price used to be from 3½ to 6, down.

Q. Salted down?—A. Salted down for bait. They would be worth \$5 a barrel for bait.

Q. They would be more valuable, then, for bait than for food?—A. Yes, sir.

Q. Because you only put down the sides for bait?—A. There are a good many bones in pogies. I guess there are about as many bones as in any fish that swims. That is the reason, I suppose, there was not much market to sell them for food.

Q. How long is it since they disappeared here?—A. It has been three years since it was a total failure.

Q. Have they come back any?—A. I have not seen any down our way for the last three years. I have heard it reported there has been a few around Cape Cod and in Boston Bay, but we have not seen any this way.

Q. Did they begin to diminish when the steamers came fishing for them?—A. Yes, sir; they grew less every year. I can remember fifteen years ago, right in the place I live, in the reach, they used to come right in shore in schools, and we heaved rocks into them. There has not been anything like that since they began to catch them in these steamers.

Q. Your opinion, then, is that the steamers have driven them away?—A. That is my opinion; I do not know of any other cause.

Q. Have the factories stopped running?—A. Yes, sir; all the pogy factories on this coast of Maine have stopped.

Q. The factories remain there?—A. They remain—most of them. They have taken them for other use—lobster factories and canning mackerel, &c.

Q. Have not they taken the machinery out of some of them?—A. Yes, sir; they have removed their machinery south further; they built new factories and removed the machinery.

Q. How many steamers did you ever see at one time?—A. I have seen fifteen, twenty, and thirty down around where I live; but you could see only a small part, because they were cruising all around through all the bays and waters—different places. Really I do not know how many there were fishing; probably there must have been as much as seventy-five sail, I suppose.

Q. What legislation do you think is necessary to protect the fish here?—A. I think fish ought to be protected while they are spawning, and, as a general thing, mackerel, I think, get through spawning from the 20th of May up to the 15th of June; along there.

Q. During that season they ought to be protected?—A. Yes, sir.

Q. And during the whole of the season before that?—A. Yes, sir; the whole spring.

Q. Because they are then with spawn?—A. Yes, sir; I think that would be the only way you could protect them, without you should stop

fishing altogether. You take any kind of fish and they have a habit of going to certain places every year. Smelts love a brook and will go to it every year; alewives, and all those. We have protection, I believe, for that kind of fish. By law you are not allowed to trouble those fish when they are spawning coming into the brooks, but the law is not probably put in force much. You could protect the mackerel by not allowing any license to be granted until the fishing season, whatever time is appointed. If a license had to be granted by the State or by the United States, and if there was a fine, a heavy penalty, I think that would stop it.

Q. You have to take a license now, do you not?—A. Yes, sir; we have to fish under a license, but that would be a new law; that would be something added to it.

Q. The present law, you think, would not reach it?—A. No, sir.

Q. What is the license you take now?—A. We take out a license to fish as early and as long as we wish to. We take it out the 1st of January, and it runs until the next January.

By Mr. CALL:

Q. Issued by the custom-house?—A. Yes, sir.

Q. You mean the vessel has to take out a license?—A. That is the vessel's license. You fish the year around if you want to.

Q. What sized vessel?—A. Seven tons and upward; all above 7 tons up as high as you want to go; you can go 500 tons if you want to.

ORRIN B. WHITTEN.

The CHAIRMAN. We will be glad to hear any statement you may wish to make, but first please state your occupation and your connection with this general subject of the fisheries.

Mr. WHITTEN. My business is the fish business; both codfish and mackerel.

Question. You are a member of some association?—Answer. I am secretary of this Fish Exchange.

Q. What is that?—A. It is composed of the fish men here; fish inspectors and some of the fish dealers; more particularly the fish inspectors.

Q. How long has it existed?—A. About four years.

Q. You have a regular organization?—A. We have a regular organization; yes, sir.

Q. Now go on with your statement, please.—A. As I say, I am myself individually interested in the cod-fishery and mackerel-fishery. My impression in regard to the protection of the mackerel-fishery is the same as has been given here by men engaged in the same business, that is, that there should be some legislation whereby they could, if possible, prohibit the catch of the fish before the 15th of June. I do not know whether it can be done or not. It is pretty evident to my mind that, unless there is something done, in a few years mackerel will be still more scarce than they are at the present time. Now this year they are very scarce indeed, and it seems to me very plausible that if you catch fish during the spawning season it must necessarily diminish them to a certain extent, because it breaks up the schools, and where fish used to come along the shore they draw off, so that vessels will have to go 100 miles away to catch fish. Not only that, but the fish you catch in the early season are poor, and it is really an imposition upon the people who are obliged to have that kind of fish to eat, but you take it along in the

season, from July to August, they are really a very palatable fish. We consider them the best we put up, and we think there ought to be something done to protect them, if possible.

By Mr. CALL:

Q. Can you give us some idea of the magnitude of the mackerel interest?—A. Last year there were in the neighborhood of 100,000 barrels put up in this city alone.

Q. What would they be worth?—A. They would average \$8 a barrel.

By the CHAIRMAN:

Q. Those are mackerel caught and brought into this market?—A. Brought in here and salted; that has nothing to do with the fresh mackerel. The canning and the fresh mackerel business is very extensive.

Q. Really the mackerel furnish you food all the year round?—A. Yes, sir.

Q. Canned mackerel are sent to the market?—A. Sent all over the country. One concern put up \$50,000 worth last year, and there are probably four or five concerns doing it.

By Mr. CALL:

Q. Can you give us any idea of the amount of the canning interest; would you average the four factories at \$50,000 each?—A. I should think so, yes; and then the fresh mackerel is at least \$50,000; that is just the mackerel business alone.

By the CHAIRMAN:

Q. The mackerel that are eaten fresh?—A. Yes, sir.

Q. Do you ship fresh mackerel from here to any point except in cans?—A. The fresh fish dealers do; yes, sir. They ice them and send them all over the country. This is a very large fish market, all through this country and Canada.

Q. Do you send them to Canada?—A. Yes, sir.

Q. By rail, I suppose?—A. Yes, sir; by express.

By Mr. CALL:

Q. It is a very important industry, then?—A. It is.

Q. And I suppose increases as the population increases?—A. Yes, sir; the business increases; but the only question is, whether, unless they are protected, we will have the material to work with.

Q. But the demand increases?—A. Oh, yes.

The committee adjourned to meet at the call of the Chairman on Chesapeake Bay.

On July 17th at Berkeley, N. J., the Chairman addressed letters to Mr. Louis C. d'Homergue, Mr. Oscar Friedlander, and other gentlemen engaged in the menhaden business, who had previously given their views on the subject of the inquiry, inviting them to appear before the Committee and make any further statements, and present any statistics they wished to, and on the 25th of July received at Portland, Me., the following letter and inclosure from Mr. d'Homergue:

178 WASHINGTON STREET,
Brooklyn, L. I., July 18, 1883.

Hon. E. G. LAPHAM:

DEAR SIR: In reply to yours of the 17th, I have the pleasure of inclosing the statistics requested and the various views of members on fish legislation. My views remain unchanged and more than confirmed by the results of last year's business;

such veterans as R. L. Fowler, Henry Wells, John A. Williams, and others agree with me; we see that something must be done, and that the steamers are a curse to the business. If I am needed for further examination, will be pleased to attend at Brighton, Saturday afternoon.

Respectfully,

LOUIS C. d'HOMERGUE.

[Official.]

THE UNITED STATES MENHADEN OIL AND GUANO ASSOCIATION.

The Tenth Annual convention of the United States Menhaden Oil and Guano Association was held at the United States Hotel, this city, on Wednesday, January 10, 1883, to discuss several important matters affecting the menhaden industry that had been brought up during the past season. The inclemency of the weather prevented the attendance of many of the members, but when the meeting was called to order about fifty gentlemen were present. Among these were Messrs. R. L. Fowler, Guilford, Conn.; Louis C. D. Homergue, Brooklyn, L. I.; Austin Mathias, Tuckerton, N. J.; Thomas H. Watson, N. Y.; F. B. Griffin, Harvey's Wharf, Va.; W. J. Hooper & Son, Baltimore, Md.; J. S. Thompson, representing J. Parkhurst, jr., & Co., Baltimore, Md.; Oscar O. Frielander, New York; W. T. Carroll, Baltimore, Md.; Capt. J. W. Hawkins, Jamesport, L. I.; O. H. Stearns; New York; Leander Wilcox, Connecticut; J. G. Nickerson, Boston, Mass.; Thomas F. Price, George H. Tuthill, Capt. John A. Williams, S. S. Brown, J. H. Bishop, E. J. Foote, A. J. Morse, O. H. Bishop, James R. Polk, W. K. Holmes, John Jones, Jonas Smith, James E. Otis, Jasper Pryer, representing William Warden & Son; J. L. Morrison Raynor, H. L. Dudley.

The meeting was called to order by President R. L. Fowler at 11.45 a. m., and the minutes of the last annual meeting were read by Secretary Louis C. d'Homergue, and approved by the association. The secretary then read the following:

REPORT OF THE UNITED STATES MENHADEN OIL AND GUANO ASSOCIATION, FOR THE SEASON OF 1882.

	1882.	1881.
Number of factories in operation	97	97
Number of sailing vessels	212	286
Number of steamers	83	73
Number of men employed	2, 313	2, 805
Number of fish caught	346, 638, 555	454, 192, 000
Number of gallons oil made	2, 021, 312	1, 266, 549
Number of tons crude scrap made	10, 029	7, 592
Number of tons scrap dried	17, 552	25, 027
Number of gallons oil on hand January 1, 1883	53, 575	257, 133
Number of tons crude scrap on hand January 1, 1883	3, 420	250
Number of tons dried scrap on hand January 1, 1883	4, 130	175
The average of oil to 1, 000 fish	5.57	2½
Capital invested	\$2, 838, 500	\$2, 460, 000

The election of officers was then in order, and the following officers were chosen: President, R. L. Fowler, of Guilford, Conn.; first vice-president, W. K. Holmes, of Mystic, Conn.; second vice-president, A. J. Morse, of Hoffman's Wharf, Va.; treasurer and secretary, Louis C. d'Homergue, Brooklyn, L. I.; executive committee, R. L. Fowler, Guilford, Conn.; W. J. Carroll, 53 West Platt street, Baltimore, Md.; Oscar O. Frielander, 36 Broadway, N. Y.; committee on statistics, Luther Naddocks, for Maine; Isaac Brown, for Rhode Island; Leander Wilcox, from Rhode Island to Connecticut River; J. H. Bishop, from Connecticut River to New York, Connecticut side; Louis C. d'Homergue, for Barren Island; Thomas F. Price, for the east end of Long Island; David F. Vail, for Sandy Hook and Prince's Bay; James E. Otis, Sandy Hook to Cape May; William J. Carroll, Chesapeake Bay, West; A. J. Morse, Chesapeake Bay, East; E. T. Foote, Chincoteague to Capes of Virginia.

A letter was then read from Hon. F. F. De Blois, chairman of the committee appointed to secure the passage of laws favorable to the menhaden fisheries by the United States Congress, and also to get fishing licenses amended, in which attention was called to the efforts of Senator Aldrich in the fisherman's interest, and to the fact that he proposed to appear before the Committee on Commerce for that purpose. Mr. De Blois further stated that there will probably be no legislation at this Congress affecting the interests of the members of the association, and that it was quite as unlikely that any action will be taken next year.

The secretary called attention to the full report of last year's proceedings in the Oil, Paint, and Drug Reporter, 102 copies of which had been sent out to the members, and which deserved special mention as a most excellent report. It was not, he said, an advertising dodge, but a *bona fide* full and complete report, which every member should have read last year and should not fail to read this year.

A letter from Prof. C. Brown Goode was then read by the secretary, requesting members to contribute the various brands of scrap for the international exhibition to be held in London in 1883.

A recess was here taken of an hour and a half.

Mr. Friedlander inquired as to certain bills incurred in New Jersey for money expended in preventing certain legislation. Mr. Fowler stated that it had hitherto been the custom in said State for those interested in the business in that State to bear the expense, as, for instance, one year these expenses amounted to \$7,000, which was borne by the Maine members. Mr. W. K. Holmes stated that the whole association was benefited, and he thought it should be paid by the main body. J. A. Williams stated that individuals took hold and did the work, so the committee was not responsible. Mr. Holmes stated that the secretary was conferred with and these gentlemen simply advanced the money. Mr. d'Homergue verified the statement of Mr. Holmes, and stated and he believed that those who have lost their time and spent their money should be reimbursed. The association, he thought, was interested and should sustain these gentlemen's actions and pass their bills. Mr. Williams thought the committee and not the secretary should be consulted. Mr. Friedlander said if action had been deferred until the committee had met the action would have come too late. The whole association was benefited and the expense should be borne by the whole association. Mr. Fowler said the State legislation had always been considered as a matter outside the United States Association, but added that he had no objection if all the bills were paid in all the States where legislation had been had by the association in attending to State legislation, though heretofore it had been the practice for each State to attend to its own legislation.

Mr. Friedlander moved that a fund be raised subject to the joint order of the executive committee, which sum shall be \$4,000, and be divided between steamers and sailing gear—the steamers to bear one share and the sailing gear one-half.

Mr. d'Homergue moved as a substitute for the above motion that this assessment shall be for the purpose of protecting the menhaden interest throughout the United States, or where any of the members are. Motion seconded and carried.

Mr. Holmes moved that the association proceed to consider the question in executive session. Carried.

The reporters of the Oil, Paint, and Drug Reporter, the official organ of the association, upon motion were invited to remain and be present at the executive session.

The roll was then called and twenty-five members answered to their names.

Mr. Williams thought that such an important discussion should be postponed till more members were present.

Mr. Friedlander said that all the members had been invited, and if they dissented from the action of the association they must suffer for their negligence.

Mr. Friedlander moved that this association shall raise a fund of \$4,000 for expenditures that have been made, or which are to be made. Motion seconded by Mr. Holmes.

Different gentlemen called attention to the fact that there have been expenses in New Jersey and Virginia. Mr. Williams stated, if the motion was carried, G. S. Allyn & Co. must withdraw from the association. At the suggestion of Mr. Bishop the plan of raising the money was then discussed. Mr. d'Homergue stated that if the bills were paid incurred in New Jersey and by Messrs. Hawkins and Friedlander for a trip to Washington he must call attention to the fact that the gentlemen from Virginia would also be entitled to present a bill for expenses incurred in a more purely local matter. Besides the legislation in contemplation in Washington, a bill for New Jersey had been drawn up prohibiting fishing 3 miles from the coast and in Delaware and Prince's Bay. He proposed that the assessment be levied upon the capital reported of each member. Mr. Otis, of New Jersey, described the method and effect of the legislation proposed in New Jersey. He thought the secretary was mistaken about the proposed bill. The Supreme Court had decided that State jurisdiction only extended to low-water mark. Mr. Holmes said that the bill passed both houses and was only stopped by the governor's veto. Mr. d'Homergue said the gentleman was mistaken about the jurisdiction of the State, which had not been determined by the United States Supreme Court.

Mr. d'Homergue moved that whatever money it was thought proper to raise by vote be a percentage on the capital invested. Not seconded.

Mr. Bishop thought the tax should be on each seine and not on the capital invested.

Mr. Holmes called attention to the lack of knowledge in regard to the business of menhaden fisheries displayed in the daily newspapers, particularly the New York Herald, and said that some steps should be taken to remedy the apparent defect and supply adequate means of information.

Mr. Holmes was called to the chair.

On motion of Mr. Fowler, Mr. Friedlander's previous motion was laid on the table.

Mr. Friedlander moved that a fund be created to protect the fishing interests in the future, and to assess each double-gang steamer \$40, each single-gang steamer \$20, and each sailing-gang \$10. The motion was seconded by Mr. Bishop. Messrs. Fowler and d'Homergue thought the sum to be assessed was too large, and Mr. d'Homergue moved as an amendment that the double-gang steamers be assessed \$20, the single gang \$10, and sailing gangs \$5. The amendment was seconded.

Mr. d'Homergue stated that if such a fund be raised he shall move that some gentleman of the executive committee be made the treasurer of that fund.

The motion as amended was carried.

Mr. d'Homergue moved that this fund, when collected, be placed in the hands of Mr. O. O. Friedlander as treasurer of the executive committee, and Mr. d'Homergue also presents his resignation as treasurer.

On motion the resignation was accepted; and on motion the secretary cast one ballot for Mr. Oscar O. Friedlander as treasurer.

The secretary then read a communication addressed to Mr. Henry Wells by W. A. Abbey, in which the writer said:

"I thought it might be well to draw your attention to the importance of securing some legislation by Congress to regulate the menhaden fisheries. On general principles I am opposed to any interference, State or national, with free fishing, but so long as several States have already passed restrictive laws affecting our interests it seems to me best that a national law should be passed to govern the entire fisheries of the entire coast, providing that we can influence the passage of such a law as will protect rather than oppress our industry. * * * Professor Baird is strongly impressed with the idea that the salvation of our fishing depends upon the cessation of our indiscriminate and persistent spring fishing while the fish are on their passage to their feeding ground. * * * The professor stated that if petitions could be numerously signed by honest fishermen, praying Congress to pass a law preventing the landing of menhaden prior to June 1 or 16, such a law may pass, and if passed he could see no reason why our fishing should not be as productive as any other business. * * * Unless something of this kind is done our business must be abandoned."

Mr. Fowler agreed with the letter, and was of the opinion that unless something was done and some sort of a promise made by the association in three years' time the business would die out of itself.

Mr. Williams thought that the interests were so varied on account of the difference in the arrivals of the menhaden along the coast that it would be impossible to agree on a date to commence fishing. He advocated the 1st of June for the commencement of the season, but the 15th of June would suit him better. He agreed with the letter.

Mr. Friedlander said the Fish Commission was impressed with the idea of saving the fish with spawn, but were at sea as to the time when the fish do spawn. He had paid attention to the matter and found that in the spring they had no spawn, in the summer they were gaining, and in the fall they were full of spawn. The attention of the Fish Commission should be called to this fact, so that instead of commencing fishing later in the spring fishing should close earlier in the fall, say the 1st of October.

Mr. d'Homergue reviewed some of the testimony before the committee. He had there stated that it seemed to him that the fish were spawning all the time—spring, summer, and fall. They seemed to have a good time all the time. Eugene Blackford had testified: "From my experience in regard to all fish and the protection of fishing there is no doubt that the protection of the fish during the spawning season would give greater results and be most effective." And again he said, when asked when the menhaden spawned: "The exact months and the exact localities of spawning are not determined." If not determined, how are you going to legislate on it? However, if statistics are worth anything, statistics show that the business is deteriorating for some reason or another. Since the deluge sharks, bluefish, weakfish, and all sorts of fish have preyed on menhaden; but only in the last eight or ten years has there been that sort of fish known as the double-gang fast-sailing steamer. He had counted fifty-six of these craft between Cape May and Absecomb Lights. The reason stated why the fish did not go east was their good feeding grounds and Delmonico fare. Yet the statistics showed that the fish east were fatter and produced more oil to the thousand. Nothing could withstand the predations of the steamers. While in favor of free fishing, sometimes too much freedom was bad. Some restriction, he thought, was necessary, and if not adopted by the fisherman it might be forced on the association in such a shape as to put an end to the business.

Mr. Fowler had counted from his factory in Connecticut sixty-eight fishing steamers within 8 miles of the wharf. Next year there would be no fishing there, according to his experience.

Mr. Friedlander called attention to the body of menhaden seen last year, extending from Cape May to Chincoteague, that did not stir for six weeks. They were not frightened off by the steamers and did not go to Connecticut or Rhode Island, because

they found plenty of food there and were contented to stay. He had himself seen a body of fish extending from Sandy Hook to Cape May, more than the whole body of vessels could catch in twenty years.

As to the question when the fish spawn, Mr. Friedlander said he was furnishing Mr. Blackford some fish every week so as to watch the progress of the spawn. Mr. Holmes has seen the fish spawn in the spring; Messrs. Tuthill, Price, and Friedlander had seen them spawn in the fall.

Mr. Friedlander did not think practical an agreement of the members present to put off fishing to the 1st or 15th of June. It must be a unanimous movement by all menhaden fishermen.

Mr. Carroll called attention to the bill before Congress regulating the size of mesh to 2½ inches. He had found 2¼, 2½, and 2-inch mesh unprofitable on the Chesapeake. Such a bill looked to him like district legislation.

Mr. Friedlander stated that the bill before Congress prohibited fishing 3 miles from shore.

Mr. Potter's experience as to size of mesh agreed with Mr. Carroll.

Mr. Friedlander thought a resolution should be passed; that is the opinion of United States Oil and Guano Association, now in session, that no discrimination be made as far as meshes are concerned, nor any limitations as to closing or commencing the season. No action was taken of this proposed resolution.

It was moved and passed that the proceedings be printed by the secretary and sent to each member.

The convention then adjourned.

LOUIS C. D'HOMERGUE,
Secretary.

OLD POINT COMFORT, VA.,
October 11, 1883.

WESLEY RAYNOR sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Long Island.

Q. How long have you lived there?—A. I have lived there my whole life.

Q. At what point on Long Island?—A. At West Hampton.

Q. What is your occupation?—A. Fishing.

Q. What branch of fishing?—A. Different kinds.

Q. Well, at the present time?—A. Catching oldwives now.

Q. With a steamer?—A. Yes, sir.

Q. Have you the command of it?—A. Yes, sir.

Q. How long have you followed that?—A. At different times for the last fifteen years.

Q. Have steamers been running as long as that?—A. No, sir.

Q. How long have you followed fishing with a steamer?—A. Three seasons.

Q. For whose factory are you fishing?—A. William D. Hall.

Q. Where is that factory?—A. Rappahannock.

Q. Do you know Mr. S. S. Hawkins, who has factories on Long Island?—A. I am not very well acquainted with him; I know of him.

Q. How many factories has Mr. Hall?—A. Two.

Q. Are they both on the Rappahannock?—A. One is on the Rappahannock and one is in Fairport.

Q. How many steamers has he?—A. He has none.

Q. Who owns the boat you run?—A. It is owned in Norfolk by O. E. Maltby.

Q. Do you run it for him or on your own account?—A. I run it for him.

Q. You said you were fishing for Mr. Hall?—A. I mean I am selling fish to him.

Q. But you are employed by Mr. O. E. Maltby?—A. Yes, sir.

Q. How many steamers has he?—A. One.

Q. How long have you fished in this vicinity?—A. Three seasons.

Q. How is the supply of menhaden or moss-bunkers or alewives, or whatever you call them, this year as compared with three years ago?—

A. They call them anything; they go by different names; they are all one fish. I do not know so much about it this season, for I have not been out much this season. My vessel has been sunk all summer and under repairs, and I have not been out much myself.

Q. Well, as far as you have observed?—A. There has been more, I think, than there was three years ago.

Q. In this bay?—A. Yes, sir.

Q. Where do you catch them mainly?—A. I go outside.

Q. What other menhaden factories are there in this region besides Mr. Hall's?—A. I could not tell you; there are a great many.

Q. How many do you know of?—A. I think I know of a dozen.

Q. Have they been running for a number of years?—A. Yes, sir.

Q. How long has Mr. Hall's factory been running?—A. I think about seven years.

Q. Has he any steamers?—A. No, sir.

Q. He does not catch fish at all then; he buys of others?—A. He catches fish, but not with steamers.

Q. What does he catch with?—A. Sail-gears.

Q. Purse-nets?—A. Yes, sir.

Q. What length net do you use?—A. One hundred and twenty fathoms.

Q. How deep?—A. Seven hundred meshes.

Q. What is the size of the mesh?—A. Two-inch.

Q. Do you know what amount of capital Mr. Hall has invested?—A. No, sir.

Q. Do you know what quantity of fish he uses in a season?—A. I do not.

Q. How many is the most you have caught for him in any one season?—A. Five million.

Q. When was that?—A. Two years ago.

Q. What was the average weight of those?—A. I could not tell you.

Q. What is the average weight of the menhaden you are catching now?—A. I do not know. I never weighed one to tell. I should think they would average about half a pound apiece.

Q. When your boats are in condition, how early in the season do you commence fishing?—A. The 1st of May.

Q. And how late do you fish?—A. From the 15th to the 20th of November.

Q. What is the condition of the fish in May compared with their condition in November?—A. Not quite as good.

Q. They have not a great deal of oil in them in May, have they?—A. Sometimes they have and sometimes they have not.

Q. But generally how is it?—A. I have seen good fish in May.

Q. Are any caught earlier than May here?—A. I should say there are some caught in April, a few.

Q. When they are caught at that season they are on their way north, are they not?—A. Yes sir.

Q. When do they start south?—A. They begin to drop down in October.

Q. They do not go down until cold weather approaches, do they?—A. No, sir; they go down a certain time of the year, whether it is cold or warm.

Q. What time in this month do they go?—A. They begin to drop down the first of October, working along.

Q. Do they keep on the surface then, just as they do earlier?—A. That depends on the weather.

Q. I suppose so; but in fair weather?—A. Yes, sir.

Q. How many is the most you ever caught at one haul?—A. About 100,000.

Q. You catch some other kinds of fish, I suppose, do you not?—A. Mighty few; do not get many more than we can eat.

Q. What do you catch in addition to them?—A. We get blue-fish.

Q. Blue-fish feed on menhaden, do they not?—A. Large ones do; the size we catch do not.

Q. Yours are the tailors, as they are called?—A. Yes, sir; that is, what we call tailors here.

Q. Taking ordinary luck, how many more fish will a steamer catch in a day than a sailing vessel?—A. It will catch one-third more.

Q. No more than that?—A. Sometimes you will, and sometimes you will not catch any more.

Q. You can catch fish with steamers when sailing vessels could not reach them, can you not?—A. When it is calm we can get around and they cannot.

Q. But with the steamer you can run wherever you see them, whether you could sail to them or not?—A. We can get along if it is calm, but they cannot.

Q. Is there any difficulty in surrounding a school of menhaden when you strike them?—A. I think there is considerable.

Q. Are they a shy fish?—A. Shy enough sometimes.

Q. They flee from fright, do they not, when they see you coming?—A. Sometimes they will and sometimes they will not.

Q. How are the blue-fish in that respect?—A. They are shy enough.

Q. Do you catch sharks?—A. We catch one once in a while.

Q. Any sheepshead?—A. I never have caught any.

Q. Any striped bass?—A. I never caught any of them in a purse-net.

Q. They are not down as far as here, are they?—A. Yes, sir; they are here.

Q. Are striped bass caught in this bay?—A. Oh, yes.

Q. How large?—A. I guess they get them 75 and 80 pounds; in fact I have seen them that large.

Q. How long have you followed fishing for menhaden with a sail-boat or steamer; you fished with a sail-boat before you used a steamer, did you not?—A. No, sir; I never fished with sail-gear; always fished off shore, when I fished home, with what you call a haul-seine.

Q. How is the supply of menhaden on Long Island compared with what it was formerly?—A. This year?

Q. Yes.—A. I do not know much about it, but from what I have heard it has been better than it has been before in some time. I do not know anything about it; have not been there, and have not heard much from there.

Q. How many sailing vessels are engaged in the catch about here?—A. I do not know.

Q. You can tell something about it. What we want is to get information as to the extent of the business here. We are asked to interfere with it, and we want to know what we are to interfere with; that is the reason of our sending for you. You can give some estimate, probably, as far as you know?—A. There are a good many on this bay.

I have not been above the Rappahannock but once this season, and do not know much about it.

Q. Now, if there is any statement you care to make in connection with this matter, you are at liberty to do so.—A. I do not care to make any.

C. S. MORRISON sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Up in Northumberland County, Virginia.

Q. What is your post-office address?—A. Fairport.

Q. How long have you lived there?—A. All my life.

Q. What is your occupation?—A. Fishing.

Q. How long have you followed that?—A. I have followed it about twelve years, I think.

Q. What kind of fishing?—A. Purse-net. I have been at it ever since it started on the bay. I think it has been twelve years, to the best of my recollection.

Q. For whom do you fish?—A. Capt. E. W. Reed.

Q. Does he own a factory?—A. Yes, sir; three or four.

Q. With what kind of vessel did you fish when you first commenced?—A. Sail-vessel.

Q. And now you run a steamer?—A. I run one now.

Q. How long have you run that?—A. Two years. I have been running sail-vessels all this year until about a month ago.

Q. To whom does the steamer belong?—A. Captain Reed.

Q. How many steamers has he?—A. He has but one.

Q. How many sailing vessels?—A. Two this year.

Q. How many menhaden factories do you know of in this vicinity?—A. I think there are about twelve or fifteen on Cockrell's Creek.

Q. Where is that?—A. That is up here in Northumberland County.

Q. Do they catch menhaden in that creek?—A. No, sir.

Q. But the steamers can run to the factories there?—A. Yes, sir.

Q. It is a navigable stream?—A. Oh, yes.

Q. Where does the creek empty?—A. The mouth of the Great Wicomico.

Q. You have stated the number on one stream; how many do you know of in all?—A. There are some that I have never seen, I guess.

Q. We will take your information about it.—A. I think there are twenty-five on the bay anyhow, if not more.

Q. Have you any idea of their cost?—A. No, sir; I have not.

Q. They all have to have an engine, do they not?—A. No, sir; all of them do not.

Q. Most of them do, do they not?—A. Most of them now do; some of them use kettles.

Q. Your steamboats have an engine and hoisting apparatus?—A. Yes, sir.

Q. And you load and unload by steam?—A. Yes, sir.

Q. How many is the most you ever caught?—A. We caught 136,000; that is the most I ever caught at a haul this year.

Q. How many fish does your employer use in a season?—A. Sometimes he gets more than he does at others.

Q. State the largest number you ever knew of his using in one year.—A. I guess he got about as many this year as he ever did. I think he got about nine million.

Q. Are they all caught with two sail-boats and a steamer?—A. Yes, sir.

Q. What proportion of them was caught with the steamer?—A. There was not many caught with her. I do not think that they caught 500,000 with the steamer. He ran three sailing gears until about a month ago.

Q. Until the time you took the steamer?—A. Yes, sir.

Q. The steamer and the three sailing vessels before that, and two since, have caught in all about nine millions?—A. I reckon about that; I do not know exactly; I think somewhere in that neighborhood.

Q. Do you catch anything besides menhaden?—A. No, sir; once in a while we catch tailors, but not as many as we can eat.

Q. And sharks?—A. Yes, sir; we catch sharks once in a while.

Q. What mesh do you use?—A. Two-inch.

Q. By 2-inch do you mean 2 inches square?—A. Two inches corner wise; an inch square; 2 inches in length.

Q. That will catch a fish weighing a quarter of a pound, will it not?—A. Oh, yes.

Q. A fish weighing a quarter of a pound would not go through your nets?—A. No, sir; I do not think it would.

Q. When are the menhaden in the best condition?—A. In the fall, I believe, as a general thing.

Q. They continue to grow fat up to the time they disappear, do they not?—A. Yes, sir.

Q. Grow large and fat and oily?—A. Yes, sir; I believe they do.

Q. They are much better for oil late in the season than early?—A. Yes, sir.

Q. About how early have you ever commenced fishing?—A. I have commenced the 1st of May. I commenced this year the 26th, I believe.

Q. Have you ever commenced earlier than the 1st of May?—A. Yes, sir; I commenced once the 15th of April.

Q. Which way were they going then?—A. They were going up.

Q. Going north?—A. Going up the bay.

Q. What time do they commence going down the coast?—A. They start down in October, I think.

Q. Are they now running down the coast?—A. I think they are; yes, sir.

Q. When they get full grown what is the size of the menhaden that you catch ordinarily?—A. I do not know. I do not know that I ever saw any full grown here.

Q. What is the size of the largest you catch, then?—A. I do not suppose they would weigh over half a pound.

Q. Did you ever see one that would weigh a pound?—A. No, sir; I know I never did.

Q. Do you know where they spawn?—A. No, sir; I do not.

Q. Is there any spawn in them in the early spring when you first begin to catch them?—A. I never saw any.

Q. Is there not in the fall?—A. I have never seen but one or two that had any spawn in them.

Q. Early or late?—A. There are a great many young fish about 2 or 3 inches long in the creeks in the fall of the year going out. I guess they must spawn in there some time during the summer or spring.

Q. There are myriads of them, are there?—A. Yes, sir.

Q. Do they go down too?—A. They go down the coast, yes sir.

Q. Do you know how long it takes a menhaden to grow; will those small fish that you see going out be large enough to catch next year?—A. I cannot tell; I do not think they will, hardly.

Q. You think it requires more than one season?—A. I think so; yes, sir.

Q. Those you catch vary in size, do they not?—A. Yes, sir; different sizes.

Q. You catch them as small as a quarter of a pound, 4 ounces?—A. I do not know; we may catch some that small. I never weighed one to know what they weigh.

Q. Where does your employer find a market for his manufactures?—A. In Baltimore, I think.

Q. He makes oil and fertilizers, I suppose?—A. Yes, sir.

Q. Are the fertilizers used any in this State?—A. Oh, yes; a great deal of it is used in this State.

Q. How is it considered compared with guano?—A. It is cheaper; but I do not suppose it is as good.

Q. Not as rich, you think?—A. No, sir; it is not.

Q. What do they put with it?—A. I do not think the farmers around with us put anything with it.

Q. But the manufacturers, do not they put in something besides the fish scrap?—A. I suppose they do.

Q. Do you know what they use?—A. I think they use this South Carolina rock, some of them.

Q. Phosphates out of the South Carolina beds?—A. Yes, sir.

Q. They use some acid, do they not?—A. I do not know.

Q. What does it sell for at your factory?—A. It sells from \$12 to \$26 this year, I think. Dried, I think it is worth about \$26; decomposed, about \$12.

Q. What does the oil bring?—A. About 35 cents, I think.

Q. What is it used for?—A. I do not know.

Q. Did you ever know it to be used for painting?—A. Yes, sir, I have; we use it for painting outside some.

Q. I understood that they mix it with linseed oil.—A. I do not know but they do. I have heard that they do.

Q. Does it make good paint?—A. It gets kind of dark after a while.

Q. It fades out?—A. Yes, sir. I do not think it would stand a long time.

Q. Now you have some idea of the amount of money invested in one of these factories about here; how much does it cost to put up one in running order?—A. I think Captain Reed's cost between \$10,000 and \$15,000.

Q. They will average about that, will they not?—A. I think they will.

Q. What do the steamers cost?—A. Different prices. I do not know what Captain Reed's cost. I think when he bought it he paid about \$4,000 for it.

Q. Second-hand, I suppose?—A. Since that he has had some repairs put on it, and I suppose it has cost about as much again, and it is not worth much now.

Q. What do sailing vessels cost?—A. He does not own sailing vessels; he hires them.

Q. What is about the value of one, such as they use for purse-fishing?—A. From \$1,000 up to \$3,000. I think the two he had were worth about \$2,500.

Q. What do the purse-nets cost?—A. About \$500.

Q. What length of net do you use?—A. One hundred and twenty-five fathoms, I think.

Q. What depth?—A. Seven hundred meshes.

Q. When you go around a school of menhaden how long does it take to purse a net?—A. About five minutes; sometimes longer.

Q. And then they are fast; they cannot get away?—A. After you get them pursed up they cannot get away unless they break the net or something.

Q. How near to the shore do you fish?—A. I have not fished very near it for two or three years; there have not been many fish inshore.

Q. How near?—A. About two or three miles, I think; three miles.

Q. How near to the shore could you fish with your boats if the menhaden were found along the shore?—A. Some places we could go closer than we could others.

Q. You can go wherever there is sufficient depth of water for your seines?—A. Oh, yes.

Q. Is it necessary that the water should be as deep as the depth of the seine?—A. No, sir.

Q. You can purse a net in water shallower than the seine?—A. Yes, sir.

Q. Do you fish in any of these rivers and bays?—A. No, sir; not with steamers.

Q. Do you with sailing vessels?—A. Sailing vessels fish in the bay, not in the rivers.

Q. Menhaden come into the bay, then?—A. Yes, sir.

Q. Of what rivers do you speak out of which the young menhaden come in the fall?—A. The Great Wicomico River, and from that I judge all.

Q. Are there myriads of them; are these little fish countless in number?—A. Yes, sir; there are a good many of them.

Q. You think, then, that the fish spawn in these streams?—A. I do; yes, sir.

Q. And hatch there?—A. Yes, sir.

Q. Spawn when they come up in the spring?—A. I think so; yes, sir.

Q. If there is anything else you wish to state we will be glad to have you do so; we want to get all the facts.—A. I do not know that there is anything.

Q. Are pound-nets used to any extent about here in catching menhaden?—A. They catch a few in them, very few, though.

Q. They do not catch large quantities?—A. No, sir.

Q. Do mackerel come as far south as here?—A. Yes, sir; they come in the bay here.

Q. What time of the year?—A. Along in July. There are some mackerel in the bay here now.

Q. Do you know whether they spawn here?—A. No, sir; I do not.

Q. How are they caught here?—A. They catch them sometimes in pounds—a few; do not catch many, though.

Q. Do they catch any with hook and line?—A. Yes, sir; catch them with hook and line, and gill-nets, I believe.

Q. What bait do they use?—A. Crab bait.

Q. Is the menhaden used for bait any here?—A. No, sir.

Q. You never heard of their being used for bait?—A. No, sir.

Q. Do the people corn them at all for winter use?—A. Yes, sir; some do.

Q. To what extent?—A. Very small.

Q. Do those who are accustomed to corn them like them?—A. Yes, sir; they have a barrel or two.

Q. Have you ever had a barrel of them?—A. I have had, but not for two or three years.

Q. What do you think of them as a fish for family use?—A. I do not think much of them; there are too many bones in them.

Q. There are not as many as there are in a shad, are there?—A. More, I think.

Q. Do shad ever get down here?—A. Yes, sir; we have shad here. I think menhaden have more bones than shad, in proportion to the size of the fish.

Q. How large are the shad that are caught here?—A. I do not know.

Q. Five or six pounds?—A. I guess about five pounds—about four or five pounds.

Q. Are they plenty in the season of shad fishing?—A. Some seasons they catch right smart.

Q. How are blue-fish caught here?—A. They catch them in pounds, I think, when they catch any. They do not catch many.

Q. Are they not caught with hook and line at all?—A. Some; but gill-nets, I believe, mostly.

Q. What bait do they use?—A. Crab, I think, when they fish with hook and line.

Q. How do they catch tailors?—A. I mean the tailors; no big blue-fish come in this bay.

Q. They are the same kind of fish, are they not?—A. The same, I think, only smaller.

Q. Good table fish, are they not?—A. Yes, sir.

Q. What do they feed on?—A. They feed on these little oldwives, I think.

Q. By oldwives you mean what we call menhaden?—A. Yes, sir.

Q. Do sharks feed on them?—A. I think they do; yes, sir.

Q. You cannot catch menhaden in the Chesapeake Bay this season, can you?—A. Not in a steamer.

Q. And that is why you come down here?—A. Yes, sir.

Q. Do the sail-vessels come here too?—A. They come down sometimes when they cannot find any fish up the bay; but there are more fish in the Chesapeake Bay this year than there has been for five or six years, I think.

Q. Have they disappeared from there?—A. Yes, sir.

Q. How long ago?—A. About a month or six weeks ago.

Q. May not the cold weather have had something to do with that?—A. It may have; yes, sir.

Q. Has it not been cooler here than usual?—A. Yes, sir.

Q. Have you had any frost?—A. I have not seen any; do not think we have had any.

Q. What are you waiting here for now?—A. We are waiting for good weather.

Q. You can surround the fish when a sailing vessel cannot, I suppose?—A. They can surround them as well as we can if they can get to them.

Q. But you can reach them where they cannot?—A. Oh, yes.

Q. You command a vessel?—A. Yes, sir.

Q. How many are the most fish you ever knew of being captured in one season for one factory?—A. I do not know. I reckon these factories down the bay here do better than those up above. I think they have made as high as 800 or 900 tons of chum; some of them run three or four gears.

Q. How many fish would that be?—A. About 10,000,000, I think.

MR. WESLEY RAYNOR. Down to the southward they made 1,900 tons.

Q. How many fish would that be, taking the average estimate?—A. I do not know.

Q. How many fish to a ton?—A. It would take about 9,000, I think; I think that is what they count on.

Q. And they made 1,900 tons?—A. That is what I understood.

The CHAIRMAN. That would be over 17,000,000 fish.

Q. (To Mr. MORRISON.) Do you concur in that, that they made 1,900 tons in one season?—A. No, sir; I do not know anything about it.

MR. RAYNOR. I learned it: they had twelve gears.

BACK RIVER, VA., *October 13, 1883.*

JAMES S. DARLING sworn and examined.

By the CHAIRMAN:

Question. Where is your residence?—Answer. Hampton, Va.

Q. How long have you lived there?—A. I have lived there seventeen years.

Q. What is your occupation?—A. My occupation formerly was milling. Now I only attend to the oyster interest and this menhaden business. I am not the practical man in this business, but will give what information I can, and my opinion.

Q. How long have you been connected with this menhaden business?—A. It is six years since I first went into it.

Q. At this place only?—A. No, sir; we first located at Fisherman's Inlet.

Q. Have you more than one factory now?—A. Only one; that is this one here.

Q. What do you call this place?—A. Back River.

Q. How long have you been here?—A. Five years.

Q. What amount of menhaden do you manufacture annually?—A. I should say the average has been about 20,000,000, probably 22,000,000; say 22,000,000 would be somewhere near the average.

Q. What kind of craft do you have for catching them?—A. Sailing vessels entirely.

Q. You have no steamers?—A. No, sir.

Q. Never have had?—A. No, sir.

Q. What time do you commence fishing for them?—A. We have commenced as early as March—the 15th of March—but our experience has been that it does not pay; that we fish too early.

Q. The fish are too poor?—A. They are too poor, and we catch them when they should be protected. They have spawn in them until about the middle of May. When Mr. McDonald was here before we had not as much information upon that point as we have at the present time.

Q. Where do you think they spawn here?—A. In the rivers.

Q. Did you ever see young menhaden?—A. Yes, sir.

Q. Multitudes of them?—A. Yes, sir.

Q. Where do they go in the fall?—A. I have no idea; my impression is, though, that they go off to deep water in the bay and stay there.

Q. Did you ever see them with spawn in the fall before they leave?—A. Yes, sir; I think I have. I think I have heard the fishermen speak of it, more particularly late in the fall.

Q. How late do you fish?—A. We generally fish here until November; sometimes the middle of November; just as the fish run.

Q. In the fall the fish are going down the coast, are they not?—A. I think they are; yes, sir.

Q. And in the spring they are coming up?—A. It would sometimes appear that way; at other times they appear to strike the Long Island coast full as soon as they do here, if not before; that I cannot account for.

Q. What fish have you here that feed on the menhaden?—A. The blue-fish, and the bonita, and the porpoise, I think, feed on them.

Q. Do sheepshead?—A. No, sir; I think not.

Q. Have you sheepshead here?—A. Yes, sir.

Q. Have you blue-fish in any quantity here?—A. Yes, sir; they sometimes come in great quantities. When they are in any quantities among the alewives we cannot catch the alewives, because blue-fish are their natural enemy and they keep them scattered.

Q. You cannot get them into schools?—A. No, sir; they scatter them.

Q. Have you ever had any practical experience on the boats catching menhaden?—A. No, sir.

Q. You speak from information merely?—A. Yes, sir; from hearsay.

Q. You make oil and fertilizers, I suppose?—A. Yes, sir.

Q. Where is your market for your products?—A. Our market is principally Baltimore, Savannah, and Philadelphia. We have sent a little to New York and some to Maine.

Q. What do you get for your oil?—A. This year the average is light; what little we have had has been about 35 cents a gallon.

Q. And what for your fertilizers?—A. I will refer to last year. Last year we got \$38 a ton for our entire make. This year our average has been somewhere in the neighborhood of \$28.

Q. What do you put with it?—A. Nothing. We sell just the raw material as it is dried on the platform.

Q. You do not manufacture it, then?—A. No, sir.

Q. It is manufactured, is it not?—A. Yes, sir; it is all manufactured—ground up.

Q. But you sell it in a crude state?—A. In a crude state.

Q. Where did you get \$38 last year for that?—A. We had a contract for our entire make with Mr. Grafling, of Baltimore, and sent it around. I think he used up the most of it in his works.

Q. He probably lost money?—A. He did. If we had had our usual make he would have lost very heavily. With the short make it declined about \$6 a ton before the year expired.

Q. What amount of capital have you and your partner invested here?—A. Originally we put in about \$45,000, but the place needs a great deal of repairs; it has declined. Probably the present worth would be \$25,000 to \$30,000.

Q. Around the circle of Hampton Roads how many menhaden factories do you know of?—A. On the bay, do you mean?

Q. Taking this whole group, yes.—A. I think there were last year somewhere in the neighborhood of seventy, small and large; but a great many of them were very small. They have what they term kettle works.

Q. Do any of them run steamers?—A. Yes, sir; I think two or three of them do.

Q. How many steamers do you know of in use?—A. I saw five yesterday. That is the greatest number I ever saw on the bay. I think three or four at the most are all that have been used.

Q. If you prefer sailing vessels why do you prefer them?—A. Cheap-

ness is one thing. When we started our business we induced men and helped them to buy their sailing vessels, and their property was in that class of vessels. We were satisfied if steamers came in numbers they would have to go out of the business necessarily.

Q. I suppose you can get a school of menhaden with a steamer when you could not with a sail-vessel?—A. Yes, sir; they used to before last year—before the law was passed in our legislature—come right up and take the fish away from our boats; but last year and this year they have run the other way, and it makes quite a difference.

Q. What law do you refer to?—A. The law of the legislature of Virginia.

Q. What is the effect of it?—A. It is a law against the use of steamers on the bay.

Q. They have passed such a law?—A. Yes, sir.

Q. But do not prohibit sailing vessels?—A. No, sir.

Q. Do they prohibit steamers for any purpose, or just for menhaden?—A. Just for menhaden.

Q. Purse-nets?—A. Yes, sir.

Q. Do they prohibit it during the whole year?—A. Yes, sir.

Q. They forbid them absolutely?—A. Yes, sir.

Q. From using their steamers?—A. Yes, sir; inside of the capes.

By Mr. McDONALD:

Q. Has there been any contest over that law?—A. Yes, sir.

Q. Has it gone into the courts yet?—A. The last decision was, I believe, that they could not, according to the law—it was defective—confiscate the property, but they could fine the captains and crews. The law provided for confiscation.

By the CHAIRMAN:

Q. That went to the remedy merely; to the consequence of the judgment?—A. Yes, sir.

Q. But the law was held valid?—A. Yes, sir; the law was held valid.

Q. Have you any State law prohibiting the catching of other kinds of fish during the spawning season—a fish or game law, as it is termed?—A. I do not know that there is. Our observation is that what they call pound-nets do a great deal of damage. They catch the fish early in the spring, at the time they are spawning, when they should be protected. They gill all kinds, both little and big; they get fast in these traps and die, many little bits of things not longer than your finger, and they catch them at the very time they should be protected.

Q. What size nets do you use?—A. We use what we call the inch bar.

Q. What length?—A. That I could not give certainly, and I have ordered, I suppose, fifty of them.

Q. Nor the depth?—A. No, sir; but my partner, and the fishermen can give you all that information.

Q. Do not you believe that your industry would be better off if all kinds of seine fishing, pound-nets and all, were stopped until the middle of June or the 1st of July?—A. I think by the 1st of June the spawn is entirely out of the fish. I think it is very necessary that it should not be allowed before the 1st of June. It would shorten the business too much to postpone it later than that. Our observation is that the spawn is out before the middle of May.

Q. You have mackerel and shad here, have you not?—A. They are in the bay; yes, sir. We never catch any kind of fish but these menhaden, except the blue-fish, and very few of them.

Q. The pound-nets catch shad, do they not?—A. They catch every thing.

Q. Do you know what is the season for their spawning here?—A. No, sir; I know it is early in the spring.

Q. The mackerel is still later, is it not?—A. That I could not say. You can get all that information from some of our fishermen. To make it the middle of June or the 1st of July would shorten the business up to about three months. I think it would hardly pay people to engage in the business for that short length of time. We are as anxious as any one that the fish should be protected during the spawning-season. If they are not we are "killing the goose that lays the golden egg," and we shall recommend to our State legislature also to prohibit catching until the 1st of June certain.

By Mr. McDONALD:

Q. That would be a very satisfactory law?—A. Yes, sir.

By the CHAIRMAN:

Q. How far out from shore do you fish?—A. Sometimes outside the capes, but seldom.

Q. Your fishing is mainly in the bay?—A. In the bay. The sharks are so thick generally in the summer time, when our sailing boats are safe out there, that they eat the nets all up; they destroy the nets so much that it does not pay us. This year has been an exception; there have not been a great many.

Q. Do you ever market any fish?—A. No, sir.

Q. Suppose you catch a school of blue-fish?—A. We do not allow our people to catch them.

Q. Are they regarded here as a valuable fish?—A. No, sir; not like they are North. On Long Island they are regarded as a choice, excellent fish, but the people here do not care much for them.

Q. Do you have striped bass here?—A. Yes, sir; they call them rock-fish here; we have very fine ones.

Q. Do not they feed on menhaden?—A. I think not; we never caught one to my knowledge in among them. I cannot say how the business is carried on North, but here the impression has been among a great many that our business destroys a great many food-fish.

Q. Yes, that is the charge.—A. But in our factory here we employ two men constantly to fish with hook and line to get food-fish.

Q. You think the menhaden interest would be protected by a restriction up to as late, at least, as the 1st of June?—A. Yes, sir; I do decidedly.

Q. But still your catch here is a great deal earlier than it can be up North?—A. Yes, sir; it is earlier, take it one year with another.

Q. While the 1st of June might satisfy you, the 1st of July would not be proportionately as late there?—A. No, sir; it would not.

Q. There is that difference?—A. Yes, sir; all of that difference, I should think.

Q. You get them earlier and later both?—A. Yes, sir.

Q. You get them when they are making their way down the coast in the fall?—A. Yes, sir.

Q. Now, on the New Jersey coast they do not catch many after the middle or the 20th of October?—A. Very few.

Q. I suppose you catch them clear up to—well, you do not have any winter.—A. Not really hard winters; no, sir; we do not, like they do there.

Q. You catch them almost as long as you choose to fish for them?—

A. We catch them, but not in paying quantities. Our run this month has been between 400,000 and 500,000, and we are going to hold on a little longer.

Q. You do not expect to fish much longer, then?—A. About two weeks. We have had fish, but the wind has been so much easterly we could not catch them.

Q. Are you a member of the National Association?—A. No, sir.

Q. You never have gone into that?—A. No, sir.

Q. Have any of these factories here, to your knowledge?—A. I think not; we have an association in the State.

Q. But there is a National Association, with headquarters at New York. We have all their statistics, but they do not embrace your fisheries at all, as I understand?—A. No, sir; I think not; we are not represented in that.

By Mr. McDONALD:

Q. Does not your association publish a yearly statement of your work on the Chesapeake Bay?—A. We undertook to do that before this steam question came up, and a few were identified with steamers. The conflicting interest rather broke the thing up, and we have not called any meeting.

By the CHAIRMAN:

Q. Do you not believe in the steamers?—A. No, sir; for this reason: they are at the mouths of the bays and inlets before the fish are there; they do not allow the fish any time for rest. Now, with the sailing vessels there are often days we cannot get to where the fish are, if we want to, and we cannot go outside because it is not safe for us; that gives the fish a chance to work into our bays and inlets, but the steamer is there every day; constant fishing drives them off.

Q. They fish, rain or shine?—A. Yes, sir; and the constant fishing drives them to some other points where they are not so much disturbed.

Q. Well, the inclination of these fish all the while is to get into shore, into the bays and rivers and into the shore?—A. Yes, sir; I think it is.

Q. Have you any suggestion as to the distance from the shore of the ocean that the prohibition ought to extend?—A. No, sir; I do not think I am well enough informed to give any opinion on that.

Q. Under the maritime law of nations 3 miles from the shore is the accepted distance.—A. If the fish are protected that distance from the shore that is all the protection they need.

Q. That will give them a chance to get into the bays and rivers?—A. Yes, sir.

Q. Do you ever catch them out in the open ocean with your seines?—A. We have, but very seldom; we have not caught any out there this year.

Q. We have evidence that the steamers catch them 40 miles out.—A. Oh, yes; they go away off 50 miles; where they do damage is in close to the coast, in the mouths of the bays and rivers, and they can be there at all times. The reason we have not gone into steamers is not want of capital; we have the capital to do it. I went north to buy two steamers, and talked with some of the best men in the business, and they advised me against it; they said they believed it had been detrimental to their business there.

Q. We have a letter from the secretary of the National Association in which he says steamers are the curse of the business.—A. Yes, sir; I took the advice, among others, of Miles & Co., of Milford, Conn., who

had been in the business about as long as any one, and they told me if I knew when I was well off I would let them alone.

Q. Do you know Mr. Church, of Tiverton?—A. No, sir; only by reputation.

Q. Do you know Mr. Hawkins, of Long Island?—A. Yes, sir; I know him by reputation; my partner got his first information about the business from Mr. Hawkins.

Q. They are largely interested in the business?—A. Yes, sir.

Q. It seems to me as though we will have to select some middle ground.—A. Yes, sir; I think so.

Q. You have got a very important industry to the country.—A. Yes, sir.

Q. Yet if it is destroying the food-fish which nature has provided for the people, to that extent you have got to yield.—A. It is not doing that, only in this way: if these fish are the food for other fish it may do it in that way.

Q. Well, they are the food of the blue-fish?—A. Yes; but the question is whether these fish would naturally die out. The theory of Captain Church, who has been a long while in the business, is that the length of life of these fish is from six to seven years, and if they were not caught by man or their natural enemies they would about die out in that time.

Q. How is the supply of menhaden this year?—A. It has been more than usual.

Q. More than last year?—A. Yes, sir; a great deal more, but a different class of fish; they are a young fish.

Q. Smaller fish?—A. They are a fish, from our observation, that is about two years old; no oil in them to speak of; no large fish.

Q. It hardly pays to catch them?—A. Yes, sir; last year all we could catch were large fish.

Q. What would those large fish average in weight?—A. I suppose they would weigh somewhere in the neighborhood of three-quarters of a pound to a pound.

Q. What is the weight this year?—A. I should not suppose over a quarter or a half a pound.

Q. Your inch nets will catch fish weighing less than a quarter of a pound?—A. About a quarter; smaller than that get through.

Q. Well, in other words, while you want to prosecute your industry you do not want to do anything to injure the food-fish?—A. No, sir.

By Mr. McDONALD:

Q. You stated that you have more information now in regard to the spawning of the menhaden than we had four years ago?—A. Yes, sir; that is, in the spring of the year. Then we could not tell at what time they spawned. You recollect we found some with spawn in late in the fall, but the principal spawning season is along in the early part of May. It runs all along from March until the middle of May.

Q. Is that statement based on your personal observation or hearsay?—A. It is based on my personal observation.

Q. That is, you found the ripe fish?—A. Yes, sir.

Q. You found roe in them?—A. Yes, sir.

Q. What color was it?—A. It is a little reddish color; pink.

Q. Then they are near spawning undoubtedly; and you think they spawn after they get into the bay?—A. Yes, sir.

Q. Why do you think so?—A. I think so from the fact of seeing them early in the season with the spawn in, and then catching them later with the spawn out and the fish very poor.

Q. How small are the smallest menhaden that you have seen in schools?—A. The smallest I have noticed were probably about 3 inches long—2½ to 3 inches.

Q. What time of the year?—A. The last part of summer and the first part of fall.

Q. If they spawned in our creeks and rivers would not you expect to find much smaller fish than that?—A. I presume they are here, but you do not notice them until along in the fall; little bits of things. I never noticed them in large schools smaller than about 2½ or 3 inches.

Q. I have never found any one who had seen very small menhaden?—A. I have never noticed any along the wharves less than 2½ inches; that is a very small fish when you take him from the head to the tip of his tail.

Q. Well, a shad does not get to be that length until he is three or four months old?—A. I should think these menhaden are about six months old.

Mr. McDONALD. I believe, with Captain Darling, that they do spawn in our creeks and rivers, but I have never been able to get the evidence that would establish it conclusively.

The CHAIRMAN. I can very well see why they spawn here when they would not spawn in Maine. They stop here to deliver their spawn and then go up; they are depleted and arrive there in the condition in which the evidence shows them, bereft of everything, nothing in them really when they reach there early in the season; they are good for nothing and it does not pay to catch them.

The WITNESS. But how do you account for this, that they always have more oil in them, even early and late in the season, on the Northern coast than they do here?

The CHAIRMAN. They improve as they go north undoubtedly.

The WITNESS. After they get over the spawning.

The CHAIRMAN. Yes; they begin to recuperate right away. You think your early fish are not as good for oil as they are farther north?—A. No, sir; they are not.

Q. That would indicate that you take them off the spawning beds?—A. Yes, sir.

By Mr. McDONALD:

Q. Are the two-year-old fish ever fat?—A. No, sir.

Q. Even when you catch them late in the fall?—A. They improve very much; they improve from no oil at all to about a gallon and a half, perhaps two gallons.

By the CHAIRMAN:

Q. What do you get from the best fish you catch?—A. We have got as high as 9 or 10 gallons a thousand fish.

Q. And you use 20,000,000 fish?—A. Last year our catch of old fish was somewhere about 16,000,000 to 18,000,000.

Q. How much oil did you make?—A. Last year we made a rise of 900 barrels.

Q. And how many tons of fertilizer?—A. We made about 1,400 tons. This year our catch of fish has been about, I think, 27,000,000; our make of oil has been about 150 barrels, against last year between 16,000,000 and 18,000,000 fish, 900 barrels.

Q. And how much fertilizer?—A. This year we will make in the neighborhood of 2,300 tons.

Q. I suppose they make about the same amount of fertilizer whether you get oil or not?—A. Yes, sir; about the same, not quite as much, for

there are more bones and scale in poor fish. There is more solid matter in the fat fish.

Q. Are the menhaden used here at all for corning by individuals?—A. No, sir.

Q. Did you ever hear of that?—A. Oh, yes; I have heard of it, but to no extent; a few like them.

Q. Did you ever eat them?—A. Yes, sir; I have tasted them; they are a very sweet, nice fish.

Q. The New Jersey people say they would rather have them than mackerel?—A. I think they have two or three bones to one for the shad. If it were not for that they would be an excellent fish.

Q. The flavor is good then?—A. Yes, sir.

Q. What time of the year do you catch shad here?—A. They begin as early, I think, as the last of February; the first of March.

Q. That is their spawning season?—A. Yes, sir.

Q. Ought not that to be stopped?—A. It seems so to me; but the question is, could you catch the shad at all if you do not catch them at that time?

The CHAIRMAN. It has been suggested that the catching of shad should be prohibited from Saturday night at 12 o'clock until Sunday night at 12 o'clock, giving them one day's rest to go to their spawning beds.

Mr. McDONALD. I think it will be a great deal better to cut the season shorter.

The WITNESS. The shad is quite a difficult problem; you can only catch them during the spawning season.

Mr. McDONALD. That is true of most of our fish. It is true of the blue-fish; it is true of the trout, which is taken during the spawning season; mackerel is taken during the spawning season.

The CHAIRMAN. Captain Darling, if there is anything more that you desire to say about this matter we will give you an opportunity to make any statement you choose.—A. There is nothing that I know of. I am only decidedly opposed to the use of steamers, for the reason that they keep the fish out of the inland waters.

By Mr. McDONALD:

Q. Do you propose to go to the legislature this winter to request a law prohibiting the purse-net fishing until the first of June?—A. I do, if I have any influence there. I think it is necessary for our protection.

LORENZO DOW MOGER sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. I live in Elizabeth City County.

Q. How long have you lived here?—A. I have lived here nearly seven years.

Q. What is your occupation?—A. Fishing.

Q. How long have you followed that?—A. About seventeen years; nearly all that time in the summer season.

Q. What fishing did you follow before coming here?—A. The same as I do now, catching these alewives.

Q. For whom?—A. I have fished for several different parties. I have fished for Wicks & Co., for Gillott & Co., and for Smith & Co.

Q. Were you in their employ or did you fish and sell to them?—A.

Yes, sir; I suppose the way I was fishing then I was in their employ; I used their seines.

Q. How many menhaden factories do you know of; take this whole circle of Hampton Roads and the bay?—A. On this bay?

Q. Yes; about how many?—A. I suppose twelve or fifteen. I know there are a great many more than that, from what I have heard.

Q. Is this establishment of Darling & Smithers one of the largest?—A. I think it is.

Q. Are you in their employ now?—A. Yes, sir.

Q. Do you run sail or steam vessels?—A. Sail-vessels.

Q. Have they any steam-vessels?—A. No, sir.

Q. Have any of the manufactories in this region steamers?—A. Yes, sir.

Q. How many steamers do you know of?—A. I know of four.

Q. What do you think of the steamers; are you in favor of them?—

A. No, sir; I cannot say that I am.

Q. What reason do you give for opposing the use of steamers?—A. My reason is that years ago, when we first commenced fishing, fish were more plentiful when I was home than they are now. While we find beds of fish now every season equal, perhaps, to those that we did fifteen years ago, yet they are apt to be further in the capes here, or in the middle of the bay or out of the bay, and north where I lived, on the south side of Long Island—I lived there before I came here—we used to have plenty of fish close to the shore.

Q. These steamers scatter them, do they not?—A. I think they do.

Q. Scatter them or frighten them; is it fright, or what is it?—A. It is a general thing with all fish, I suppose, that the more water is navigated, the more steamboats and vessels, the scarcer the fish. Here the steamers come very close in; they work right in with the fish.

Q. Your fishing is in the Chesapeake Bay mainly, I suppose?—A. Yes, sir.

Q. You never go out in the ocean?—A. No, sir.

Q. Do the steamers?—A. Yes, sir.

Q. How far out from shore do they go?—A. I could not say, but sometimes they go out a long distance. I believe they are not allowed to fish in the bay.

Q. Have you ever seen menhaden full of spawn?—A. Yes, sir.

Q. When?—A. In the spring.

Q. Early in the spring?—A. Yes, sir.

Q. What month?—A. I think the menhaden spawn from the first of March until May.

Q. What is the condition of the fish at the end of this spawning season?—A. The fish we get then are generally scattered about in different sizes, and poor.

Q. No oil in them?—A. Not much oil. If we get any oil fish at all they are the very first we get in the spring.

Q. They continue to improve up to the time they leave in the fall, do they not?—A. Generally so; yes, sir. I do not think, though, that we get any of the spawn fish during the summer.

Q. Why not?—A. I think that after about May these spawn fish, most of them, are scattered about, and do not come here in bodies like the fish that come in the capes.

Q. What are the fish that you do catch, males or fish that have spawned?—A. I do not know about that, but my impression is that only a certain class of those fish go up in the rivers.

Q. In what month do you get the richest and best fish?—A. We get them in October and November.

Q. What do they average in weight?—A. I think that the fish we have been getting this season are a little smaller sized. I think they would average a pound apiece.

Q. And this year they are smaller than before?—A. Yes, sir.

Q. How do you account for that?—A. Last year, during all the season, there was a great number of small fish, four, five, or six inches long, all over the bay here; the bay was literally alive with them all the season, and I think those fish have grown.

Q. And are bringing your harvest this year?—A. Yes, sir; and no doubt next season those fish will be here in full size. I have seen more fish in one day—to-day—go out of the capes than we have caught this season; I am satisfied they went out of the capes.

Q. Do you run a vessel?—A. Yes, sir.

Q. How many do you catch at a haul ordinarily?—A. Ordinarily we get 20,000, 40,000, 50,000; that is, summer-time fish.

Q. What other fish do you catch, if any, besides menhaden?—A. Occasionally we catch some tailors.

Q. What do the tailors feed on?—A. I think they eat the alewives.

Q. They are a kind of blue-fish, are they not?—A. Yes, sir; the same thing, I believe.

Q. A good pan-fish, are they not?—A. They are in some seasons of the year.

Q. What do the sheepshead feed on?—A. I know what they catch them with on the hook; they catch them with clams.

Q. They are a bottom fish?—A. Yes, sir.

Q. Have you striped bass here?—A. There are a few; yes, sir.

Q. What do they feed on?—A. I believe they feed mostly on roots and such things on the bottom.

Q. Then the catching of menhaden interferes more with blue-fish or tailors than any other fish?—A. I do not know that.

Q. I mean those are the fish that feed on menhaden more than any others?—A. I believe they do; yes, sir.

Q. How is the supply this year, compared with former years?—A. Of the alewives?

Q. Yes.—A. I think it is about an average season.

Q. Smaller, are they not?—A. They are smaller; yes, sir.

Q. How do you account for that?—A. Well, that is just as I just told you; I think the same fish that were here last year, small, have grown a little larger this year, and they are the fish we are catching.

Q. Do you think the pound-nets interfere with them at all?—A. I do not think they do much, except as to the time of the year for spawning. They do not catch a great many of them, but they catch them in the spawning season.

Q. Catch them when they are breeding?—A. Yes, sir.

Q. Have you ever seen the small menhaden in the streams?—A. Yes, sir; I have seen them tolerably small.

Q. How small?—A. I have seen them two inches long; three inches, I think.

Q. In the rivers?—A. Yes, sir.

Q. What time do they spawn, according to your idea?—A. I think they spawn somewhere from March to May.

Q. Did you ever see any with spawn in them late in the fall?—A. I do not know whether I have or not?

Q. But you have seen them in the spring?—A. Yes, sir; I have seen them in the spring.

Q. They are full of spawn in the spring?—A. Generally; yes, sir.

Q. Like the shad?—A. Yes, sir.

Q. And the mackerel?—A. Yes, sir; they are full of spawn in the spring; that I know, and I think I have seen them in the fall, but I would not say that I have.

Q. But in the spring you know that the menhaden are full of spawn?—A. Yes, sir.

Q. Are the mackerel full of spawn then?—A. I do not think I ever caught one at that season of the year.

Q. Are the shad?—A. The shad are; yes, sir.

Q. How many has your factory caught this year?—A. I think it has caught about 25,000,000.

Q. All caught here in the Chesapeake Bay?—A. I think that is a little overestimated; I think, perhaps, 20,000,000 to 25,000,000.

Q. Well, they are all caught in the Chesapeake Bay?—A. I know there are ten nets, and I know what I have caught, but I think they are not all doing quite as well.

Mr. McDONALD. Twenty-seven million Captain Darling reported.

The WITNESS. Well, he knows; that is correct.

By the CHAIRMAN:

Q. They average less than a pound, I suppose?—A. Oh, yes.

Q. Less than half a pound?—A. No, sir.

Q. More than half a pound?—A. Yes, sir.

Q. From half a pound to a pound?—A. Speaking of ordinary sized summer fish, I think they would go not far from three-quarters of a pound.

Q. Did you ever eat a menhaden?—A. Yes, sir.

Q. Do the people want them to corn?—A. Sometimes they do.

Q. Do they like them?—A. Yes, sir.

Q. Have you sold them for that purpose?—A. Yes, sir.

Q. Are you not prohibited from selling to farmers?—A. No, sir; not that I know of.

Q. If they apply for them do you sell to them?—A. No, sir; we do not sell to them, and the reason is because we are engaged at the factory to supply the factory. I do not know of any law that prohibits our selling.

Q. Did you ever eat them?—A. Yes, sir.

Q. Did you ever corn them?—A. Yes, sir.

Q. For winter use?—A. Yes, sir.

Q. What do you think of them?—A. Some people think they are right nice fish; I think there are plenty of bones in them; I do not think they are very nice fish.

Q. Not as good as mackerel?—A. Oh, no, sir.

Q. Well, they will keep a man from starving?—A. Yes, sir.

Q. They are a rich fish, are they not?—A. An oily fish; yes, sir.

Q. I mean when they are caught late in the season?—A. Yes, sir; such fish as we corn.

By Mr. McDONALD:

Q. Where did you begin fishing for menhaden?—A. On the south side of Long Island; out of Fire Island Inlet.

Q. How does the supply of menhaden in the Chesapeake Bay now compare with what it was along Long Island at the time you fished there?—A. The supply in the Chesapeake Bay is better now than it was the first season I fished at Long Island.

Q. The first season you fished at Long Island was a good season?
—A. No, sir; very poor; considered by the fishermen to be the poorest for years.

Q. That was seventeen years ago, was it?—A. That was in 1866.

Q. Did you continue to fish there until they got so scarce as to be unprofitable; was that the reason for the change?—A. No, sir; my last season there was in 1876, and we did a fair season's work that season.

Q. How long do the menhaden make their appearance here in the Chesapeake before they do on Long Island?—A. There is very little difference; there is generally a run of fish strike the east end of Long Island before they do here.

Q. Before they get into the bay at all?—A. Yes, sir.

Q. Would you suppose the movement of those fish, then, was from the south up along the coast?—A. I think so.

Q. You think they follow the Gulf Stream all along up?—A. Yes, sir.

Q. What direction are they moving when you see them along the coast; do you first observe them close up along the coast or some distance out at sea?—A. We find them first along the shore, but in the spring-time, and up until the last of August or in September, on the Long Island coast, they are generally bound east on the south side of Long Island; that is where I used to fish, generally working to the eastward.

Q. When you fished on Long Island did you notice them with spawn in them in the spring, just as they are here?—A. Yes, sir.

Q. Do you know what they mean by cart-wheeling in the schools of menhaden; have you ever noticed them swimming around in the water?—A. Yes, sir.

Q. Do they always swim in the same direction?—A. No, sir.

Q. You have seen them moving first in one way, like the hands of a watch, and then in the opposite direction?—A. I do not know that I have observed them closely enough to see that. I have noticed them go around.

Q. The question is how they go around. Now, the shad always go with the hands of a watch, and I was curious to know about the menhaden in the ocean.—A. If my memory serves me right I have noticed them go with the hands of a watch. I have seen them going around hundreds of times, but I never had the curiosity to see whether they were all going one way or not. It is very common in the summer time to find them going that way.

Q. I know; but what you call cart-wheeling; they just go around in a circle?—A. Yes, sir; just go right around.

Q. You are not sure, then, that they always go in the same direction?—A. No, sir.

W. G. SMITHERS sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. I live in Elizabeth City County, right on the beach here. Hampton is my post-office.

Q. How long have you resided here?—A. I have been here ever since the war.

Q. What is your occupation?—A. My occupation is the manufacture of this menhaden oil and guano.

Q. How long have you been in that business?—A. This is the sixth season; six years.

Q. Had you any experience before that?—A. None at all.

Q. Here is your first enterprise, then?—A. We first started at Cape Charles, over on the eastern shore; we were there one season.

Q. What amount of menhaden do you manufacture here annually?—A. I suppose the average will be somewhere between 22,000,000 and 23,000,000. I have not added up my fish account yet; it will be somewhere within a fraction of 27,000,000 this season, and last season we did not get over 20,000,000. I suppose the average would be somewhere near 24,000,000, as near as I can get at it.

Q. You use sailing vessels only?—A. Sailing vessels only.

Q. You never used steamers?—A. No, sir.

Q. Have you any objection to them?—A. Yes, sir; we have serious objections.

Q. What are they?—A. We think so many steamers harassing the fish one day with another will drive them away, whereas with sailing gears we have so many calm days when we cannot get at them that we do not harass them so much; we think in the end steamers will be a disadvantage on that account, and I believe that is the conclusion that a great many men who own steamers have come to.

Q. What is your impression as to the season of the year when you could be prevented from catching them without detriment to your business?—A. In the spring, I think.

Q. Up to how late?—A. I think about the first of June would be a very good time to commence fishing.

Q. You think you would make as much from June on as you do now?—A. I think we would make rather more. My experience in this fish business is that the month of April is worth more to us than May. If we could fish the month of April and knock off and leave the month of May out, and go to work the first of June, we would like it.

Q. Why April; what is their condition then?—A. We have a run of fish in April.

Q. Are they not spawning?—A. That I could not say. I do not think those we get in April are spawning fish.

Q. When do the menhaden spawn?—A. That I could not tell you.

Q. Where do they spawn?—A. They must spawn up the heads of these rivers and the head of the bay, somewhere.

Q. Have you seen young menhaden in the waters?—A. Any quantities of them; have seen them in the fall. I judge by that they spawn in the spring.

Q. What size?—A. I have seen them so very small you could not catch them with anything but a mosquito-net.

Q. One or two inches long?—A. About 2 inches; a 2-inch fish is a very small one.

Q. And you think they spawn in the rivers and bays?—A. I do, in the spring of the year; yes, sir.

Q. Have you ever seen any with spawn in them in the fall?—A. I have once or twice, but not often. Last fall there was one week we caught some fish that had spawn in them, but as a general thing we do not catch them.

Q. What was their condition?—A. Very fat.

Q. They continue to improve up to the time they leave in the fall, do they not?—A. Yes, sir.

Q. How late do you catch them?—A. We fish until about the middle of November as a general thing; sometimes we knock off a little earlier than that, but I never fished any later than the 15th of November.

Q. It depends upon the season, I suppose?—A. It depends entirely

upon the weather. As a general thing we knock off about the 1st of November.

Q. What fish have you here that feed on the menhaden?—A. We do not have any fish in this bay except the bay mackerel and blue-fish that come in.

Q. They feed on menhaden?—A. They feed on them, and the bonita I think feeds on them; that and the shark is about the only fish we have here, leaving out the blue-fish and bay mackerel; there is no fish native of the bay except the bonita that feeds on them.

Q. What mackerel do you speak of?—A. Spanish mackerel.

Q. Are they in large quantities?—A. No, sir; they catch at times right large quantities over on the eastern land; they do not come up on this western land much in the fall.

Q. They are a valuable fish?—A. Yes, sir.

Q. Are they corned or used as fresh fish?—A. They are used as both. They catch a great many of them in what they call pounds, fish-weirs, or traps, and they ship most of those fresh to the Northern markets.

Q. Do not the pound-nets destroy fish as well as yours?—A. Yes, sir; the pound-nets in summer, that is, from the 1st of June until along about the 1st of August, are very destructive to small fish, small spots and trout and such fish as that; they catch large quantities that are not salable; too small.

Q. What size mesh do you use?—A. We use inch bar, 2-inch mesh.

Q. That is, 2 inches from corner to corner?—A. Yes, sir.

Q. And you can catch fish weighing a quarter of a pound and less?—A. No, sir; I do not think we can catch them as small as that.

Q. How large do the menhaden grow by the fall of the year when they leave here?—A. We do not have them as large as they have them on the eastern coast. My impression is that when menhaden arrive at a certain age they leave this coast altogether; for instance, when they are working down this coast late in the fall after they leave the eastern coast, if they hit good weather in November, they may work in along by the Thimble Light and get into Hampton Roads.

Q. Well, you catch them earlier and later than they do further north?—A. We do not catch them quite so early, and we hardly ever fish as late as they do at Long Island. That is, one peculiarity of this fish that we do not understand. They get a run of early fish that we do not get.

Q. You never fish in the ocean at all, do you?—A. We do not go outside at all.

Q. Do the steamers?—A. Yes, sir; a few steamers on the bay that profess to fish outside altogether.

Q. They can run to them whenever they find them?—A. Yes, sir.

Q. How many factories are there around this bay?—A. That I could not tell you. I do not know.

Q. You can give an estimate?—A. There are a great many small works. I could not give you a correct estimate even. I could tell you the principal factories, but there are so many small kettle works that I could not keep the run of them.

Q. Are there any that manufacture more than you do?—A. I think not.

Q. You think you are the largest?—A. I think we are, as near as I can get at it.

Q. Where do you sell your oil?—A. Mostly in New York; New York is our principal market. Now and then we will run a small jag into the Baltimore market.

Q. What do you get for oil?—A. Various prices; it varies all the time.

Q. What is the range of price?—A. The range of our oil is about thirty cents; about the average.

Q. What is it used for?—A. For so many different purposes it would take a long while to enumerate them.

Q. Is it used for house-painting?—A. Yes, sir; rough house-painting, and they manipulate it and call it linseed-oil. In mixing these chemical paints I imagine a large percentage of it is used.

Q. Is it a good lubricating oil?—A. No, sir; it is too gummy. It is used a great deal in tanneries, too.

Q. Where do you sell your fertilizers?—A. Baltimore is our principal market; we sell to Baltimore men, and the majority of it, as a general thing, is shipped South.

Q. Do you manufacture it or sell it crude?—A. We sell it crude. They manufacture it afterwards.

Q. They put phosphates with it?—A. Yes, sir.

Q. How is it, compared with Peruvian guano?—A. They prefer it, now, to the Peruvian guano that they get; they cannot get the genuine article of Peruvian guano like they used to; the majority of Peruvian guano will not go over 11 per cent. of ammonia, and I have made fish to go very nearly 13. A good article of this dry fish with a fair analysis will go 12.

Q. How does this business affect the health of people engaged in it?—A. It is very healthy.

Q. There is no disease?—A. None at all; on the other hand, you take one of these factories in a locality where they are troubled with these malarial diseases and it will destroy them. I have been told by gentlemen up the Great Wicomico and Cockrell's Creek that before they started in this business the chills and fever bothered them very much, and they have very little of it now.

Q. Will it cure consumption?—A. I have been told so. I have had several men pointed out as men who had consumption when they went to work in this business, and they were hearty-looking men at that time.

Q. Where are you from?—A. I am a native Virginian.

Q. What amount of capital have you invested here?—A. I do not know that I could tell you accurately.

Q. Approximate to it.—A. I suppose it is some forty odd-thousand dollars on the beach in the works, and we have bought property and nets. I suppose some \$60,000 would cover it; somewhere in that neighborhood. Of course that is not accurate figuring.

Q. Are you members of the National Association at New York?—A. I think Mr. Darling sent our names in for membership.

Q. He told us not.—A. I am not certain about that; he was talking something about it. I never attended those meetings there.

Q. When would you be willing to have the catching of menhaden with purse-nets stopped?—A. Stop it?

Q. Yes, by an act of Congress or by an act of the legislature of Virginia either?—A. I think from the 1st of June to the 15th of November would about suit me.

Q. That would be the season that would cover your best business?—A. Yes, sir.

Q. What would you do in the earlier part of the season?—A. Instead of commencing to fit out as we do now in the month of March, which is a very stormy disagreeable month for such work, I would not fit out until the middle of April.

Q. You would not engage in other fishing, then ?—A. No, sir ; I should put it off until the weather got better in the spring and would gain there also.

Q. The season you think would be as profitable to you as it is to fish as you do now ?—A. I think rather more so. We hardly ever make expenses before that. We would like it if we could fish April and stop May, which we cannot do, of course ; we cannot stop a month and go to work again. We have a run of fish that comes in in April.

Q. Are they not spawning ?—A. No, sir ; they are not spawn-fish ; the most of the April fish that I handle are usually not a full-grown fish.

Q. But they have more oil than they do in May ?—A. No, sir ; they have not more oil, but they are more plentiful.

Q. You catch more of them ?—A. Yes, sir. If we have good weather in April we have a run of fish then on which we can make expenses and a little more, and that run of fish passes and we do not have any more fish of any consequence until the last of May and first of June, when our summer run of fish comes on. The spring run of fish is the best up the bay in April, and there are only a few scattering fish in May that drop down out of these rivers that do not amount to anything, and we are just hanging on all through May looking for that summer run, and sometimes we do not get them until about the 10th of June. That has been my experience for the last two or three seasons.

Q. Then your boats and men are idle ?—A. They are idle.

By Mr. McDONALD :

Q. How many men have you employed at your factory ?—A. Now, about 42, I think.

Q. I mean when you are in full operation ?—A. My force varies with the work. As a general thing from 60 to 75 men ; average about 60.

Q. How many men aboard of your vessels ?—A. We work 10 to a crew ; that is 100 men in the fishing fleet besides the caraway boats whenever we employ them.

Q. You have, then, about 160 men employed ?—A. About 160 men ; yes, sir. The average is a little better than that take it all through ; about 175 men a month would be the average.

Q. What is the gross product of your factory ; that is, what are your total receipts for your fertilizers ; it varies of course ?—A. Mr. Darling might give you that information, but I could not tell you ; he attends to all that.

By the CHAIRMAN :

Q. You calculate to make a little money every year ?—A. Oh, yes, we make some money of course, or we would not work at it.

Q. You do not get rich fast, I suppose ?—A. There is such a heavy expense attached to the business and so much lost time.

Q. What wages do you pay generally ?—A. I pay \$20 for laboring men and \$30 for the ordinary men on the nets.

Q. And board them ?—A. Yes, sir ; we have to pay rather more wages than we pay for ordinary work.

By Mr. McDONALD :

Q. Do you buy any of your fish by the thousand ?—A. Yes, sir ; we buy most of them by the thousand.

Q. You pay so much a thousand ?—A. Yes, sir.

Q. Do you make any difference in the quality of the fish ?—A. Yes, sir.

Q. What is the range of prices you pay?—A. We pay a dollar for summer fish, and then as they get a little better in the fall we pay \$1.25; if they still improve we pay \$1.50 and sometimes \$1.75, according to the quality of the fish.

Q. How many fish will it take to make a ton of scrap?—A. That depends entirely on the quality.

Q. I mean your average summer fish?—A. Of summer fish, such fish as we have been handling this season, dried down to 9 per cent. moisture, it takes about 16,000 to the ton.

By the CHAIRMAN:

Q. How much oil?—A. From a thousand fish?

Q. Yes.—A. I did not get enough oil this summer from a thousand fish to grease your shoes. In pressing a million fish you could just perceive on the receiving tanks, into which the oil is supposed to run from the presses, a seum on the water like iron rust. There might be an ordinary bucketful of that; you could not call it oil. The best fish I have handled make about 10 to 12 gallons; that is in the fall.

By Mr. McDONALD:

Q. Fifteen thousand fish make a ton of scrap?—A. It took 16,000 such fish as we handled this season, dried down to 9 per cent. moisture, remember. Of course you may ask some men on the bay, and they would tell you it would not take 12,000 or 13,000, but that is owing to the amount of water in it, but when you dry down to 9 per cent. that is as low as the atmosphere will let it go.

By the CHAIRMAN:

Q. A law of Congress prohibiting the catching of fish within three miles of the shore of the ocean would not affect you at all?—A. Not a particle.

Q. You are all dependent on State legislation?—A. Yes, sir.

Mr. McDONALD. It would affect your fishing in this way, by throwing all that prohibited plant outside into the bay in competition with you.

The CHAIRMAN. Of course we cannot do anything with the fishing in the Chesapeake Bay; that is a State matter entirely. We can only act upon the waters of the ocean outside low-water mark, and that would not interfere with you at all.

The WITNESS. No, sir. You can only claim three miles from the shore outside, cannot you?

The CHAIRMAN. That is a question that is mooted; that may be so or may not.

The WITNESS. I can tell you one thing that I have noticed in regard to these fish. I have only been in the business about six years, but I have noticed that between each run of fish there is a slack time. The summer before I went into it I was very green, and went to Long Island to investigate it. I was at Greenport and Shelter Island where Mr. Hawkins and Captain Cartwright have factories, and at Sag Harbor and at Mr. Price's, and a good many others. I wanted to find out as much as I could in regard to the fish business.

Q. Did you ever go to those Rhode Island factories; the Church's?—A. No, sir; I did not go to those. I went to those places, and the season before they had it very slack in the fish business, and they were very blue; they were depending entirely upon the oil; the scrap, as we term it, had not got to be in such demand as a fertilizer, and they were depending on the oil, and the season before they had had a very

slack time; some of them had failed on account of it, and when I was there they were getting a large quantity of fish, the same as we have handled here this summer, about half-grown fish with no oil in them. The next season I went in the business, and the same kind of fish that they were handling, the season that I went in the business, had gotten pretty well grown and were in good order, and I had first-rate fishing and a very fair quality of fish. Next season I had good fish, and the next season it slacked up a little, and then last season it got to be very slack, but what fish we handled last season, the large fish, were good all the way through; but last season the bay was full of these small fish that we could not catch in our nets. Now this season we are handling the same kind they had when I first went to Long Island, half-grown fish with no oil in them. I have not seen this season any fish of the quality we worked in last season.

By Mr. McDONALD:

Q. Do not you see any small menhaden here?—A. Yes, sir; more or less. We have not seen any of those very small ones this summer; what we have been handling this summer are those half-grown fish. I was talking with Dan Church, the oldest one of the brothers, and he says that is his experience; that a run of fish come on and attain their growth, and it does not make any difference whether a man catches them or not, when they get ready to go they go; he thinks they must die; they cannot live always and they disappear, and between that run of fish and the next you will have small fish. His experience of the fish is that if we let them stay here, did not catch a single fish, when they arrive at a certain age they leave, and then it would be slack until that run of fish came again. He related a circumstance that happened in Rhode Island the time they tried to get legislation there to prevent haul-seines and pounds on account of breaking up a little eating fish there they call the porgy; they became very scarce, and they claimed the fishermen broke them up, and the fishermen themselves said they were breaking them up, but he said the next season the bay there was literally alive with these little small porgies, and the next season they had splendid fishing, just as good as they ever had in their lives; that run disappeared and then it was slack time again; and he said that was his experience all the way through, and he had been in the business thirty years, more or less.

CHERRYSTONE, VA., *October 15, 1883.*

WILLIAM P. HILLYER sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Cherrystone, Northampton County, Virginia; I live about a mile from here.

Q. How long have you lived here?—A. I have been living in this place two years next January.

Q. Where prior to that?—A. Before that I lived in Nansemond County, Virginia.

Q. What is your age?—A. Sixty-one yesterday.

Q. What is your occupation?—A. My occupation has been fishing all my life; oysterman and fisherman; that is the same thing.

Q. Hand fishing?—A. Yes, sir; I have been hand fishing; from that to pound-fyke fishing, gill-net, and almost all kinds.

Q. You have given your attention to that business?—A. Yes, sir.

Q. Take the mackerel fishing; how is it here compared with what it was twenty-five years ago?—A. Twenty-five years ago there were very few mackerel caught here unless they were caught in a seine or gill-net. At that time pounds were not thought of hardly anywhere in the United States. There were one or two pounds at Newport that they set there to catch these bunkers and porgies; these sand porgies used to go down there. I have been running down there for thirty-odd years in the sweet-potato trade in the fall of the year, and almost every year went down with a load of watermelons or something, and there was the first place I saw a pound; but in Virginia we had not thought of it. Finally I made up my mind, if I could, to get into the pound fishing, and went down there almost expressly to get plans and patterns; but I could not get any information. They appeared to be a little afraid of me; did not want to give me any instructions. Finally I was laying there with a load of sweet potatoes, and I got a pilot, whose brother had a pound, to take me to New Bedford, and I asked him to take me off to the pound. I went off and took a pattern of it as near as I could, and his brother was lifting alongside, and I wanted him to lift, but he would not lift until I came away, so I took a rough sketch of it and came away. On my way home I heard that they set pounds at Sandy Hook, so I stopped at New York, took the Long Branch boat that runs down to Sandy Hook, and went down there and got a boat and took a look at the pound. I found it was altogether different. I came home and wrote to Mr. Snedeker, who became my partner afterwards, that I thought there was a fine prospect down here to set a pound, and I heard they had had a successful year and I should like them to come and see me. They came right off, and we went out on the James to look at the location there; thought it was very favorable, and finally brought his stock all down and went to work and made a very successful year. That was, I think, in 1867, but I was fishing fykes for several years before that; in fact I set fykes in New Jersey.

Q. That is a gill-net, is it not?—A. No, sir; it is a hook-net. It is a good deal on the plan of a pound, only it is on a smaller scale and done with hooks.

Q. You have followed pound fishing from that time to the present?—A. Yes, sir.

Q. How many pounds have you now?—A. Two.

Q. What size?—A. Forty by sixty feet.

By Mr. McDONALD:

Q. You mean the bowl of the pound?—A. Yes; inside the bowl of the pound.

By the CHAIRMAN:

Q. What are you catching now?—A. We are catching trout. It is hardly late enough yet for trout to come down.

Q. What fish do you catch through the year?—A. We catch Spanish mackerel, sheepshead, porgies—a variety of all kinds of fish that run in the bay; we catch once in a while a silver fish, and sometimes, but not very often, very heavy sharks.

Q. Do you know where the alewives or menhaden spawn?—A. I take notice that in the fall of the year they have spawn in them, and in the spring of the year, when they come down the bay, they have no spawn. They go up the bays; they go in fresh water. I catch them on the James in the winter season in the seines.

Q. You catch them on the James River through the winter?—A. Yes, sir.

Q. Do you ever see the young there?—A. Yes, sir. About the 1st of September, and sometimes before that, we see the young in schools in the coves, just between the fresh and the salt water, millions and millions of them, so thick that you can almost scoop them up with the scoop-net anywhere.

Q. So that you think they spawn in the rivers?—A. Yes, sir.

Q. Through the winter?—A. Through the winter. I know that what we are catching now are heavy with spawn.

Q. At this season?—A. At this season; yes, sir.

By Mr. McDONALD:

Q. Have you any ashore now?—A. No, sir. I saw the men cleaning the other day, and they had a fine spawn—some of them.

By the CHAIRMAN:

Q. How early do they come on the coast here?—A. I hardly ever see any in the bay; they come down in the spring, when we are fishing on the James. Last spring I went over there with my net, and commenced fishing the 17th of March, and they are the first fish we catch—before the shad or anything. We caught sometimes twenty-five or thirty bushels a day.

Q. What did you do with them?—A. We sold them to Dr. Lawson, over there, for compost. He gave me headquarters there, and I told him I would give him my offal fish.

Q. How early do you catch the shad?—A. Sometimes we will catch a scattering one even the last of February, but catch but very few shad up to the 17th.

Q. How long does that last?—A. After the 17th of March they will run March and April; after April we generally knock off.

Q. They only run during the spawning season?—A. That is all; when they begin to run down the river we knock off.

Q. How is it with Spanish mackerel?—A. Spanish mackerel—we commence here and catch a very few about the 25th of June. We catch a good many blues before that if we set for them, but the law will not let us set. A good many set what they call pound-fykes, but they are nothing but a pound, with the exception that they put a funnel into them. Last year I set a pound-fyke, and we caught blues by the 17th.

By Mr. McDONALD:

Q. Do you mean tailors?—A. Yes, sir.

By the CHAIRMAN:

Q. How long does the mackerel season last?—A. Along until August, and running up any time from that to the 15th or 20th of August; they run pretty scattering the latter part of August.

Q. When do they spawn?—A. They must spawn when they go up; they always have spawn in when they go up, and do not have it when they come down; the latter part of August or September they are spawned out generally.

Q. They are not in as good condition then?—A. They do not appear to be, but they get pretty fat again the latter part of the fall; what few we catch then get fatter. The spawn does not appear to affect them as much as it does other fish.

Q. They do not spawn in this region?—A. No, sir; I think not.

Q. They go up the coast?—A. They either go up the coast or bay to

spawn, one or the other. When they come in they have the spawn in them, of course.

Q. When they first appear in the spring?—A. Yes, sir; and whether they go out or up the bay I do not know.

Q. Do you catch striped bass?—A. Some in the fall and some in the spring.

Q. How large?—A. They vary in size; once in a while we catch one forty or fifty pounds; I have caught them as high as one hundred.

Q. What do blue-fish feed on?—A. They feed mostly on alewives, bunkers, I think.

Q. What other fish feed on them?—A. I think the trout will feed on them too.

Q. Do not the mackerel?—A. No doubt but what the mackerel do.

Q. Do sheepshead?—A. I do not think sheepshead feed on them.

Q. Sheepshead are a bottom fish?—A. They are a bottom fish. What makes me know that mackerel and blue-fish feed on them is that when we raise the pound it is full of these menhaden all cut up.

Q. What is your opinion as to the propriety of stopping the catching of menhaden and mackerel during the season of spawning?—A. As far as menhaden are concerned I have no interest in them one way or the other, but my opinion is that if this purse-netting could be stopped we would have a great many more mackerel and a great many more blues.

Q. Do they come here with steamers?—A. Yes, sir; and that is one way of catching them which, if I had my way about it, I should stop, for the simple fact is that they are getting very wild. According to the law, as near as we can find out, they have no right to purse in the Chesapeake; they have to go out to the capes with the steamers; but they do not regard the law at all. You can see them come down in the morning sometimes and go off in the bay, and if they see a school they dive for them, put their nets out, and in the evening they will be up to the factory again.

Q. How many factories do you know of?—A. New Point and Back River are the only two I know of personally. I have never been to any of those factories up the bay; have not had time to go up there for several years, but they have them all the way up to Stingaree Point.

Q. How many steamers have you seen operating at once?—A. Two at a time is the most I have seen; they come in here often for a harbor.

Q. They run sailing vessels too, I suppose?—A. Yes, sir.

Q. So far as destroying fish is concerned, do not the pound-nets do it as well as the purse-nets?—A. They do in a measure, but in my opinion the pound fishing is the best fishing that there is in the whole United States for preserving the small fish; they escape.

Q. What size mesh do you use?—A. We use on the sides of our seines inch mesh; but if I had the making of the law, I should put it an inch and a quarter; there should not be a net less than an inch and a quarter for any kind of fish; that has always been my theory.

Q. How far from shore do you go?—A. About 300 yards; sometimes 400.

Q. Suppose the use of the purse-nets were prohibited within 3 miles of the shore, would not that remedy the evil?—A. Well, that is the law now in the rivers and bays.

Q. But I am speaking of the ocean.—A. It might possibly; mackerel and blue-fish might feed inshore more, but it has been the opinion of the eastern fisheries that these steamers somehow or another have a tendency to drive the fish offshore.

Q. Frighten them?—A. Yes, sir. I have talked with a good many of the fishermen down there, and that is what they say.

Q. Moss-bunkers are a timid fish, are they not?—A. Well, after they get disturbed once or twice they do not rise; sometimes here in the bay you can go the whole length of the bay and there appears to be plenty of bunkers; but they do not rise.

Q. How many men do you know in this region engaged in using pound-nets?—A. I think there are about seventeen men engaged in it, from the cape up; there are more than that probably, but I am speaking of those that I know. I know but very few of their names, but there are seventeen that I know of from the cape up above Swattox; there are four or five now this year up there.

Q. The amount of capital, I suppose, is not very large; what does a pound-net cost?—A. Our capital is about \$2,000; some of them have double that on account of setting double-headers.

Q. What does a purse-net cost?—A. About \$600.

Q. So that relatively their investment in money is a good deal more than pound-net fishing?—A. Oh, yes; with the steamers and one thing or another a great deal more.

Q. And sailing vessels have to be made especially for the purpose, with tight compartments, cribs, or something to throw the fish into, I suppose?—A. Yes, sir.

Q. Do you pack any fish to sell?—A. None at all, only for our own use. We sell them fresh to the markets. We send our fish to Washington, Baltimore, and Philadelphia—scatter them around wherever is the best market.

Q. Name the leading varieties of fish which you catch for market, taking the season through.—A. The fish of the most value is the Spanish mackerel, and next is the blue-fish. Those two are the principal fish we fish for in the summer time. We catch a few sheepshead.

Q. The blue-fish are valued highly, are they not?—A. Yes, sir; it has got to be quite a leading fish in the market now.

Q. They did not use to be regarded as worth anything?—A. Hardly anything.

Q. They follow the moss-bunkers, do they not?—A. Yes, sir, and feed upon them.

By Mr. McDONALD :

Q. In what year did you first set pounds in either the Chesapeake or its tributaries?—A. The first year, I think, was 1867.

Q. In what locality?—A. Then I was fishing in the mouth of the James.

By the CHAIRMAN :

Q. At Newport News?—A. A little above Newport News.

By Mr. McDONALD :

Q. Did you set the first pound-net that was set on the bay shore?—A. The first that I knew of being set in the bay, with the exception that Mr. Fitzgerald and Dr. Wilkins brought one down and tried to set it, but it would not stand. With that exception we were the first that ever set one in Virginia.

Q. What was the locality?—A. The pounds then were just the same as they are now, and we set it in Burrill's Bay.

Q. Where is that?—A. Just above Newport News, on the south side.

Q. You mean on the bay side; when did you first set them on the bay shore itself?—A. I never set any myself; I was merely interested with

a party that did set down here—Mr. Snedeker and myself. We dissolved partnership, and then he came over here and set the first pound that was set on the point. That was in 1870, down at Pickett's Hole.

Q. Down near the cape?—A. Yes, sir. I was slightly interested with him only. I think that was 1870; I will not be sure.

Q. That is the date I want to get, when they first set the pounds in the bay and began the mackerel catch. How did the catch then compare with the catch to-day?—A. I think the catch last year was equally as good; not this year, but last year, I think, was equally as good with any of the pounds as the first day they set them.

Q. How did the size of the mackerel compare?—A. I think the size of the mackerel latterly has been fully as large and a little larger.

Q. You stated that before they began to set the pounds very few mackerel were taken in the bay?—A. Very few, except with the seines; sometimes they would catch several hundred.

Q. To what do you attribute that, that they were not here?—A. No, sir. I think they were here, but a mackerel is a very active fish. I have known them to jump over the cork-line just as fast as mullets would. At other times they are not so active; the same way with mullets. And before that they caught all the fish in seines; did not have anything else to catch them with.

Q. When did they begin the gill-net fishing for mackerel?—A. They commenced that up the bay before I can remember anything about it; but down this way I do not remember any until some six or eight years ago; but probably they did before that. Old Captain John Sterling and old man Lawson, who owned this place right here, say they used gill-nets here thirty years ago.

Q. Did they take mackerel then as abundantly as they do now?—A. I never heard they used to get mackerel, but they used to catch blue-fish; men came down here to salt them, but how many mackerel I could not say. For the last seven or eight years they have been catching them in gill-nets.

By the CHAIRMAN:

Q. Are blue-fish as plenty as they were twenty years ago?—A. I think they are full as plenty. We will have an unusual year sometimes, and they do not catch as many, and then another year—the next year probably—they will catch full as many. Now, early in this season I have taken out a thousand or two thousand, but they have been very scattering the latter part of the season. I do not know whether they went out or up the bay; as we did not catch them as they came down I think they went out.

Q. What has been the general character of the season where you failed to make an average catch?—A. Whenever we have prevailing winds to the eastward we never have a full catch.

Q. What is the effect of that upon the temperature of the water in the bay?—A. Of course it is reasonable that the temperature of the water is cooler; when we have a great deal of northeasterly weather the water is not so warm, and they go out. In fact I know this year they were not up the bay, from the fact that it was very favorable all the time, but they did not come down.

Q. Is not the bay very cold this year?—A. Yes, sir; it is colder than I ever saw it.

Q. Suppose we should stop this purse-netting up to the 1st of July, would not that remedy the evil to a great extent?—A. Yes, sir; it would remedy it, in my opinion, in this way—that the fish that would come in

the Chesapeake Bay would stay here. We now have so many of these purse-nets around the cape that the fish go further north; and I think the factories would be just as much benefited, because the alewives are poor anyhow the first of the season, as they would be by commencing early.

Q. If they were stopped up to that time?—A. Yes, sir; that is my opinion.

By Mr. McDONALD:

Q. At what date do the mackerel generally make their appearance in the bay?—A. Well, we are not allowed, as I said before, to set a pound up to the 25th of June.

By the CHAIRMAN:

Q. Under your State law?—A. Yes, sir.

By Mr. McDONALD:

Q. That is on this shore?—A. And, of course, last year, I think it was, I set a pound-fyke.

By the CHAIRMAN:

Q. Is that a general law prohibiting the use of pounds for any purpose?—A. I think so. It only applies to Northampton and Accomack. It does not affect the Back River men at all. I think there ought to be a law to have an inch and a quarter mesh, and no smaller. That is one feature of the law that I have always been in favor of.

Q. And not to use them until the 1st of July?—A. Yes, sir; that would do first rate.

By Mr. McDONALD:

Q. What is the size of the mesh of your leaders?—A. Inch and a half; everything goes through that.

The CHAIRMAN. What we want is, if possible, to have a law governing the ocean, and have the States all conform to it; make the same regulations for the bays and rivers that we make for the 3 miles of the ocean, and in that way this whole subject of the fisheries can be regulated, and the spawning season will be protected.

The WITNESS. Yes, sir. Now as to shad, we have to catch them in the spawning season.

Mr. McDONALD. You have to catch mackerel in the spawning season too. They spawn all summer; they begin spawning opposite Crisfield about the 20th of June, and they are spawning from that time on up to September.

The WITNESS. As I was saying a while ago, I have never set a pound before the 25th of June. I have set a pound-fyke and did catch a few mackerel earlier than that, but I do not remember the date now. Mackerel do not come in much before the 20th of June, but blues will run as strong, say the 10th of June sometimes, as they do any time.

By Mr. McDONALD:

Q. They come in with the menhaden?—A. Yes, sir; they follow them.

Q. Now, captain, you have two other important fish in the bay, locally important, certainly, the salmon trout and the common gray trout?—A. Yes, sir.

Q. What can you tell us about their spawning season?—A. The gray trout certainly spawns in the spring.

Q. Do they spawn in the bay or in the creeks?—A. They go up be-

tween the fresh and salt water; they do not go in clear fresh water to spawn.

Q. They do not spawn in the bay?—A. No, sir. My experience in the Raritan River, New Jersey, was, that you might go anywhere in that river in fresh water, which is very near the mouth of it, and you could not catch a gray trout, and just outside, down by the docks at Amboy, you could catch as many as you wanted; that is what made me think they do not go up to fresh water at all; just between the fresh and the salt.

Q. What time in the spring?—A. Trout run in the last of March, and they appear to be full of spawn, very few bucks among them. There is one consideration that, in my mind, ought to be looked after; a man should be finable, and heavily too, who sets a net of any kind to catch trout in Chesapeake Bay. There are thousands and thousands of bushels of them caught in Chesapeake Bay, and also in Lynn Haven Bay, that are thrown away, so small they cannot be marketed. Thousands of them come in, and I have known people here haul out a hundred or a hundred and fifty bushels and put them right on their farms. Now, that is wrong.

Q. They catch them in nets for alewives?—A. Yes, sir. Those pound-fykes they are setting are the ones that do the most damage. The seines ought to be stopped entirely in the spring of the year, not only here, but on Lynn Haven beach.

Q. You mean on the bay shore?—A. On the bay shore.

Q. But not in the rivers?—A. Not in the rivers. Shad go in the rivers; very few are caught anywhere in the Chesapeake, with the exception of a few in the pounds. After you get in the rivers you will avoid catching the trout. They do not set a seine, but get around the law by setting pound-fykes. It is the same thing, only it has got a funnel in it, and if you stop them you do more than anything else you can do.

Q. The question is if you land no fish up to the middle of June, what is the market going to do for fish?—A. Depend on the shad.

Q. And river fish?—A. Yes, sir; they take the lead anyhow.

Q. And the hook-and-line fishing?—A. Yes sir; let the hook-and-line fishermen have a chance. I am a pound fisherman, but I have not seen any money yet for any of us in the spring of the year, except in the rivers. I go over to the James River in the spring.

Q. How is the run of shad in the James River this year?—A. Very light.

Q. How does it compare with the last two or three years?—A. Not 20 per cent. We did not catch as many shad there by 80 per cent. as we did the year before; we had freshets in the river that backed the shad down entirely.

Q. And you had cold weather?—A. Very cold, and the water was just like a mud-puddle, the yellowest I ever saw. When I was over there I was catching, in one pound-net, 200 a day, and that was very light, and I put in the other pound-net, and by the time I got it in it settled down to 8 or 9 a day.

Q. My impression is that there ought to have been a better run of shad on this shore than there was; in other words, that the shad would have followed this shore on account of the warmer water?—A. I should think so too.

Q. How has it been?—A. We did not catch many.

Q. You had not anything to catch them with?—A. We had the pound-fykes.

Q. How is it up these small rivers—the Pocomoke River?—A. They had a better catch in the Pocomoke than anywhere else; they caught more around Tangier Island than anywhere else on the Eastern Shore; they made a very good catch around there for about three weeks.

Q. They made a very heavy catch on New Point?—A. Yes, sir; they made a good catch at New Point for one week.

Q. Is the seine fishing on the Eastern Shore very large?—A. No, sir; not very; seine fishing is pretty much all done away with; there are a few down close to the cape that haul—a Mr. Halliott for one, and Dr. Wilkins here has one; that is all I know of now along the shore. We had one last year, but it got played out, and we do not intend to get another one.

Q. Have you heard anything about the catch of mackerel with gill-nets at Tangier this year?—A. We have two men over at our fish-house from close to Tangier; they are from Deep Creek, and they say there have been quantities of fish up the bay this season—more than ever—more spots, more trout, and there was for a while a good many mackerel; but I did not hear them say how they catch them, or how they knew.

Q. When is your main run of mackerel up?—A. July is our heaviest run; the latter part of July to the 10th of August.

Q. You think the run up the bay continues until about the middle of August?—A. Yes, sir; they generally slack off then; they did last year, and they did this year; they slack off and just play back and forward, and then run down.

Q. How do you judge when the down-run begins?—A. The only way I can tell is we catch them on the low-water slack, and on the upper run we catch them on the flood, the high-water slack. At high water, when they are going up, if we lift we catch more than we do any other time, and on the run down we catch them on low water. Our pounds are so situated they can come in from either way, and if they come in on the ebb we think they are running down; they may not be; they may just be swimming backward and forward.

Q. In other words, you think they are swimming with the direction of the tide?—A. In the direction of the tide.

WASHINGTON, D. C.,
December 18, 1883.

SETH GREEN sworn and examined.

By the CHAIRMAN:

Question. Where do you reside?—Answer. Rochester, Monroe County, State of New York.

Q. Have you given attention to the subject of fish, and if so, for how many years?—A. I have been a practical fisherman and fished as a business since 1830.

Q. What office, if any, relative to that subject do you now hold in the State?—A. Superintendent of the Fish Commission.

Q. How long have you held that place?—A. I do not know what year I was appointed. It was after the first year when the Fish Commission was appointed. Governor Seymour, another gentleman, and myself were appointed Commissioners for the State of New York. I held that one year, and the next year was appointed Superintendent.

Q. You have given attention more or less to the subject of the pro-

creation and preservation of fish, I suppose, have you not?—A. Yes, sir; that has been my whole business for the last twelve years.

Q. What varieties of fish do you hatch?—A. We have hatched the salmon trout, brook trout, two varieties of the California trout, and have been making some hybrids lately. I have got some salmon trout crossed with the brook trout, and we have the spawn taken from the hybrid and crossed again with the brook trout and crossed back with the salmon trout, so that we have them three-fourths brook trout and three-fourths salmon trout. Then we have crossed them again with the brook trout three-quarters and they have cast a spawn, and now we have got them seven-eighths brook trout and one-eighth salmon trout, and it has made a new kind of fish. To all appearance this three-fourths brook trout is a large brook trout; they are going to be a brook trout, and I should not be surprised if this straight hybrid would be a river and lake fish both. I think the three-fourths will, too. They will be so large a fish that with the exception of our largest trout streams, and may be some rivers in which they would live, they will have to go to the lake to find water enough, and we impregnate as good a percentage of those as we do of the straight fish.

Q. Did you ever raise shad?—A. Yes, sir; I suppose I hatched the first that was ever hatched in this country or any other, artificially.

Q. How many have you ever hatched in one season?—A. I hatched 40,000,000 in one year.

Q. Of what?—A. Of shad, in the Connecticut River, in 1868. I discovered a way of hatching them in 1867, and the next year I hatched them again. I hatched 15,000,000 in 1867, and in 1868 I hatched probably 40,000,000. It is going to be the means of having shad there forever. Without that they would have been out of shad before now, so that they would not hardly have known what they were.

Q. Where do you mainly distribute those you hatch?—A. The shad we put in the river they are hatched in, except some that are taken to other waters; they have been all over the United States.

Q. How about brook trout?—A. The brook trout nearly all in the State of New York.

Q. How with these hybrids you speak of?—A. They will be distributed in the State of New York.

Q. In the lakes?—A. Put some in lakes to experiment with them and see what they do. We are putting in some Californias. We have two kinds of Californias; we have what is called the McCloud River trout, that I have seen as big as nine pounds. The other trout belongs to a smaller family of trout. The largest I have seen them is about $2\frac{3}{4}$ pounds, but in all the streams in California nearly fish vary; they vary a little as to size and marking. So the salmon trout do in every lake. The marking of salmon trout in Lake Ontario is not like the marking in Lake Huron, for instance.

Q. Have you ever bred the salmon trout from the Sacramento River, California?—A. Yes, sir; a great many of them.

Q. Did you succeed well with those?—A. We succeeded in hatching them and raised them. We never could raise them to a large size.

Q. Where are your trout ponds?—A. They are in Livingston County, near Caledonia.

Q. At the Caledonia Station, I suppose?—A. Yes, sir.

Q. How many trout do you estimate you have there, if you have any idea?—A. I do not know. We must have over 50,000 now of trout of all ages; that is from one year old to seven or eight.

Q. They are all brook trout?—A. All brook trout; yes, sir. We are taking the spawn from them now.

Q. What experience, if any, have you had on the subject of ocean fisheries?—A. I have visited it nearly every summer, I guess, for the last ten years perhaps.

Q. You know something of the fish called the menhaden, I suppose?—A. I know something of the fish. I know there are a great many boats after them. Great South Bay has been my territory mostly.

Q. Where is that?—A. It is a bay that runs into Long Island. Fire Island light is the principal outlet.

Q. Have you any opinion as to the spawning season of the menhaden?—A. No, sir.

Q. You never paid attention to that?—A. I never have, but I should think it was a very easy thing to find out.

Q. We have been at work two years at it and have not reached it yet?—A. I think any practical man could tell certainly by opening a dozen of them every month and examining to see the state of the spawn.

Q. Through the year?—A. Through the year. The sac contains the spawn for several years; with a low-power magnifier seven can be seen; that is, the different sizes right along.

Q. In the same sac?—A. In the same sac. The largest one is cast off the next year; that is cast off, and in about two weeks or three at least that sac is healed up and is just as perfect as it was before, only it is a thing that would not be observed except by some practical man who was looking for it but it is there; and that keeps growing every day. When the spawn is matured ready to be cast, those that are going to be cast are about as loose as though they were in a bottle, and all the rest are fast in this little sac.

Q. They never cast the sac, then?—A. No, sir; never cast out the sac.

Q. Do you know anything of the habits of the bluefish, as to what they feed on?—A. Yes, sir; I know what they feed on. They feed on smaller fish, nearly all kinds. I remember catching some summer before last, and I supposed that they were feeding on young bunkers, but when I came to cut them open and took them out they were little snappers, little bluefish.

Q. Bluefish had eaten their own species, then?—A. Yes, sir; they will eat their own species if they cannot get other food; that is natural with all kinds of fish that have teeth, particularly the kind of fish that belong to the dog family.

Q. Have you any knowledge on the subject of the supply of fish on the ocean coast, whether it is diminishing or otherwise?—A. Yes, sir; I have no doubt at all about its diminishing.

Q. From what cause?—A. From the fishing with a hook and line, for instance. There are a great many boats that go out from Fire Island. The whole coast of Great South Bay is lined with gentlemen's residences and with large hotels, and all those hotels have a certain number of little ten or twelve ton yachts that stand there for hire, the same as hack stands, and one of the men told me last fall that he had been out a great many times; that he had not caught one bluefish during the season. Another one told me he caught two, another five, another six, and it was a common thing years ago to catch anywhere from five to twenty-five a day.

Q. Do you know anything about these menhaden steamers with which they catch fish for the factories?—A. I know they have steamers; I could see them every day coasting.

Q. The main point on which we called you here, Mr. Green, was to get your view of the question as to whether the supply of fish in the ocean can be destroyed or greatly diminished as well as in the inland waters of the States?—A. Yes, sir; I think it can. I have not the least doubt of it at all.

Q. What is your theory upon that subject? What reasons do you give for that opinion?—A. In the year 1837 I commenced fishing on Lake Ontario as a business. We run set lines, and it was not an uncommon thing for us to catch 150 salmon trout that averaged 8 pounds apiece on 300 hooks. I had another man and a boy. That lasted that year. The next year it grew a little less, so much so that I moved down the lake about ten miles. There I caught them as I had above. We kept moving and other parties kept fishing in the same way we did. In about four years the catch ran down to about 15 or 20 on the 300 hooks averaging about five pounds; they caught the new stock. We caught up all that old stock that was there. Then we used to fish with little nets down to the lower end of the lake, and it was not an uncommon thing for a net to put up 400 or 500 barrels of whitefish or twice as many herring. Then it began to get thinned out. Then came the pound-nets with a quarter of a mile leader, and that lasted for four or five years and paid first rate the first year; the next year a little less and a little less, and it has got so now it does not pay to set them at all, and there is scarcely any fishing done in Lake Ontario now because it does not pay. The fish are not there; they are fished out; there is no mistake about that. It is so in Lake Erie, Lake Huron, and Lake Michigan, and now they are swarming the upper lakes with pound-nets and gill-nets. They clean them out sure. A family of fish that is hatched in a certain locality remain there. They take a trip or two each year, go off on a cruise and come back. The whitefish does not take but about two trips. They take a trip on the spawning ground in November, and in July they take a pleasure trip and go all over the lake, make a regular run and strike on certain points on the lake. I know I have fished with hand's share and I got one-twelfth of what was caught and sold them for two cents a pound; my share came to \$19. That has been a regular thing until now they do not catch any. They did not catch 300 this year, and it is not an unusual haul to catch 5,000.

Q. Pound-nets are very destructive to fish, are they not?—A. Yes, very. I suppose there are now about five flocks of pigeons in the United States; they go in flocks, a flock with millions in it. They go to a certain woods and there make a roost and hatch. Then they move off and their young will go right where they go, if it is a thousand miles; they will follow right on; they go flock after flock for three or four weeks. So these menhaden go in schools. There are a great many more schools, of course, but there are just so many schools. It might run up to hundreds of thousands, but every school that is taken out is one less, and it is proved to be an injury. Did you not find the fish scarcer down at the lower end where the menhaden fishing began first?

The CHAIRMAN. They were all gone.

The WITNESS. Well, that is just what is the matter.

The CHAIRMAN. They began on the coast of Maine.

The WITNESS. Now they are getting scarcer, and now they are in Florida. These fellows have played this thing out.

Q. When did you find that?—A. I would like to tell you a little history about the pound-netting, how it was done on our lake. I had some men at work for me who were fishermen on Lake Ontario. My aim in all my works has been to get the best men I could, and the best

men I could get were the boss fishermen. Where I could find a young man along 20, 25, or 30 years old who was a boss fisherman—

Q. A practical fisherman?—A. A practical fisherman, I would hire him. I had three; I have two now—whose ground was completely played out, and I will tell you how it was done. Some parties came from Connecticut or Massachusetts who had fished a pound-net down there. Suppose this man here had a fishery where he hauled his net; he made a nice little thing hauling his net. You come along and say to me—suppose I am a fisherman—"Mr. Green, why don't you set a pound-net here?" I am not able to set a pound-net; I have not money enough. You ask me what I catch; I tell you about what I catch. You know that a pound-net will catch lots of fish there. You say: "Now, Mr. Green, why don't you set a pound-net?" I say: "I am not able." You say: "I will tell you what I will do; I will bring the pound-net here and set it and you tend it, and I will give you one-half of the fish that are caught here." The thing strikes me right off; I am supposed to be an ignorant fellow; do not know there are just so many fish; do not know that there is one family, and that when that family is caught off that is the end of them. Well, you bring the pound-net and set it, and go along to other fishermen and make arrangements to put another here, another there, and another there, and give each one of those fishermen half. At the end of three years you come around; the nets begin to be old. The fourth year you come around about the time to set it, and you say to me: "Mr. Green, you ought to own the whole of it." The fish have been growing a little scarcer every year, but I thought it just happened so. I say: "I am not able to buy; what do you ask for it?" You tell me you will take so much for it. A good pound-net is worth about \$1,000. You say: "I will sell it to you for \$400." You know very well that that net will not last more than another year without a great deal of patching, and you know it is not going to catch any more fish to pay. You will take \$400, and I have got \$200. I pay that and give a mortgage on my place for the balance. I know plenty of men who have lost their places in that way; they fished on expecting the fish would come another year, but they did not come, and the reason why they did not come was because they had caught the family of fish that ran in that bay. Now, in Great South Bay it does not hardly pay to fish pound-nets.

Q. They used to fish pound-nets there?—A. Oh, they do now to a small extent, but nothing like what they used to, because it don't pay; they have caught the family up.

Q. What kind of legislation do you think ought to be applied to the ocean?—A. I think the proper way would be to find out the time that all kinds of fish spawn if you intend to make any laws about it. I have not given it any thought, but this just struck my mind as you spoke of it, that you should find that out, and then make a law that there should not be any fishing done during the natural spawning time, whatever it might be. Fish differ very much on that. For instance, a brook trout in our stream, which is different from all others that I know of, commence to spawn the last of October and last away into May, all during the winter, but as a rule they are anywhere from six weeks to two months. The whitefish, of course, have different times in different waters, anywhere from 12 to 20 days; a month would cover the whole thing in any one single water. The salmon trout would be about the same.

Q. How is it with the lake trout?—A. That is what I mean by salmon trout.

Q. Our law prohibits the catch of lake trout from October to March

or April, does it not?—A. Yes, sir; our State law, but it is so twisted up you cannot stop them.

Q. And brook trout too?—A. Yes; the brook-trout law, as a rule, is lived up to. The law is so mixed that you have got to catch a man right at it.

Q. Would you prohibit the catch of fish in any mode in the waters of the ocean as well as in the lakes?—A. During the spawning season I think I would. But, at the same time, there is not fish enough taken with the hook and line now to make any material difference. The salmon trout, for instance, feed but very little during the spawning season, and neither does any other fish. Now these hybrids do not feed at all scarcely.

Q. You cannot catch them with a hook except when they do feed?—A. Except when they do feed, so that there is not much danger from angling with hook and line.

Q. It is the nets, then, mainly, that you would guard against it?—A. Yes, sir.

Q. There is no law prohibiting fishing in the great lakes, Ontario, Erie, Michigan, or Huron, is there?—A. No, sir; not on our side; there is on the Canadian side.

Q. Have they laws?—A. Yes, sir.

Q. Do you know what their regulations are?—A. The closed season with them is only about ten or twelve days. It is somewhere from about the 1st of November until about the 10th; that is the time the most spawn is taken; from about the 25th of October until the 10th of November.

Q. In enacting a law on this subject with reference to the ocean, how far from shore would you think it advisable to have the law extend?—A. I could not tell.

Q. All fish, I suppose, naturally seek the shore?—A. Nearly all the ocean fish can live in pretty warm water; that is, moderate temperature, say 70, some 75, even more perhaps, but our lake fish, whitefish and salmon trout require very cold, deep water, and they never come ashore, except it is early in the spring or late in the fall. You hook a salmon trout down in 100 feet of water, and you reel him along until he gets within 8 or 10 feet of the top, or 7 or 8 feet, he is another fish entirely; he will fight you, but when he gets into 5 or 6 feet of water he becomes crazy, and hold him there and he will die in five minutes; he will not live as long as he would out of water.

Q. It is the water, then, that kills them?—A. It is the warm water; it is suffocation; they suffocate.

Q. Are there any other kind of seines that you would cover by law, except the pound-nets and the purse-nets, as they are termed, used by the menhaden boats; ought gill-nets to be suppressed?—A. Not in the ocean; there are no fish of any account caught in the ocean with gill-nets, except it is codfish and haddock perhaps; all those bottom fish. Now, codfish and haddock ought to be preserved during the spawning season, for say twenty days or something like that, and it would make a great difference.

Q. Do you know how it is with the mackerel?—A. No, sir; I do not know anything about them.

Q. You do not know what their spawning season is?—A. No, sir.

By MR. McDONALD:

Q. You stated that you thought the proper way to legislate intelligently in regard to the matter would be to find the spawning season and then prohibit fishing during that season?—A. Yes, sir.

Q. How would you apply that to the river fish ; for instance, take the shad and herring for example ?—A. My notion of that is that neither kind ought to be caught in the river at all ; when they come into the river to spawn they ought not to be caught ; at no time.

Q. How will you catch them at all, then ?—A. That is the point ; that is the thing I am getting at. The fish is good when he first comes into the river and he keeps getting leaner and leaner until he goes down a mere skeleton. Now, if they were not allowed to be caught, some ingenious person would learn how to catch them outside ; there is where they ought to be caught. The fish is good when he gets back in the ocean from spawning ; they live where there is abundance of food, and within thirty days after he gets into the ocean he is a fat fish again. They are very ravenous when they get over it and get back, and my notion is that somebody would find ways to catch them outside ; then you would have plenty of shad in the country.

The CHAIRMAN. Right on that point, Mr. Blackford suggested this idea, that there should be a prohibition against catching shad from 12 o'clock Saturday night until 12 o'clock Sunday night ; give them a rest of 24 hours.

The WITNESS. That is an old thing ; that has been the talk for the last 12 years to my certain knowledge, and I have argued before the legislature in all sort of ways, and I guess we have had such a law some time, but there never was anybody paid enough to look after it. One neighbor would not tell on the others, because his mouth was stopped with fish, and so it went. But it can certainly be found out how they can be taken and it will be some time, and they will not be taken in the rivers at all.

By Mr. McDONALD :

Q. Your idea in regard to the river fisheries is to prohibit anything but hook and line ?—A. Yes, sir. But this thing cannot be done all the time, because you could not make such a law as to prohibit all shad fishing in the rivers. You would have the people going at you with all sorts of clubs and everything else. It is a thing that cannot be done now, but I think it is a thing that will be done some time.

Q. During what season are the pounds set to catch whitefish in the lakes ?—A. In the fall of the year when they are spawning ; they set them now so far out that they take them all the year round ; they get them away out in 60 feet of water ; they have pounds with leaders three or four miles long and five or six heads or traps on it a half or quarter of a mile apart, and that trap fishes both ways. It is just on the principle of an old-fashioned mouse-trap. It is a funnel that leads right up into the middle of the square, as large as this room, right up into the middle of the net, anywheres from 6 to 12 feet from the bottom and the fish when they come around go all around, over and under it, and perhaps once in a while one strikes here and goes out, but he runs right in here and goes right back in the net again.

Q. Is not the pound-net fishing for whitefish practically confined to the spawning season ?—A. In large measure, yes, sir.

Q. Is not that the principal method by which the whitefish are taken in the lakes ?—A. At that time of the year it is—oh no, they are taken in gill nets in large amounts. I have caught tons of them. I have done as much towards cleaning out Lake Ontario as any oth fellow. I worked 100 men catching and selling fish before I quit it.

Q. So that it amounts to this : to protect the whitefish it would be necessary to pass a law to prohibit netting entirely ?—A. No, that would

not necessarily follow. I will tell you the great thing about it. Professor Baird and the Commissioners of the States of Michigan, Ohio, and Wisconsin have been particularly interested in that fish and they hatch a great many millions every year. We have done something at it in the State of New York.

By the CHAIRMAN:

Q. Whitefish you are speaking of?—A. Whitefish I am speaking of. Those fish so hatched and put in the water in the lake are just as good and just as sure to live as though they were hatched naturally, providing they have been handled right. The reason why artificial hatching is better than natural hatching is that the egg is protected and the young are protected. If there is any sediment gets on the egg and allowed to lie, so that it does not have the free action of the water it will die. Of course different kinds of fish are different. I will explain the whitefish. The young, when he does hatch naturally, is just as good as though he was hatched artificially, but in the natural hatching I do not suppose that there is one whitefish hatched that comes out mature in at least 3,000, I think 5,000. I know we dredged in the Detroit River once until we caught about half a peck, and in that half a peck we had only about ten that were live spawn, if that is anything to go by, and I don't know why it is not. The fish when they get ready to cast their spawn, work around together and come up together; they come up with a trembling motion and roll so that their vents come right together, and they are going all the time; they will run about 10 feet with their vents together. I am telling you what I have seen myself. You might think it very curious to see whitefish because they are a deep water fish, but in order to explain it and make it more clear I will say that I have seen it in pounds. On the Detroit River they have large pounds, twenty rods long; two inch plank driven down, half an inch apart clear to the shore; then there is a heavy timber spiked on that all the way around, so that it can be walked on, and once in a while they put one inside to support it; that is what they call the pound. They used to pound them; put in thousands of them, and take them out and sell them all during the winter. They had their hauling ground and would haul them on the platform, and right into that pound, so that they did not hurt the fish at all. I put a plank across the corner of those timbers and used to lie there on a sunshiny day and watch them. The brook trout and salmon trout mate. Brook trout make a nest, and when they get mated they are as sacred as man and wife. I have watched them many times for hours. It has been written up through the papers that the female casts her spawn and the male casts his milt, and it went on and impregnated, but that is not common sense. Shad cast the spawn the same as the whitefish, only they do it a little nearer the top of the water; they most always break the water. The governor of Virginia sent to me to come down and examine the rivers; they gave me a steamer and I went up, and in going up the river the way I found the spawning ground was by the noise they made. You can hear it in a clear night half a mile. They run together when they make this noise, and then they fall apart, so that when you become accustomed to it, there is no mistaking it.

Mr. McDONALD. They call it on the river "shad washing." If they were to prohibit net fishing on the great lakes during the spawning season how would you catch whitefish?

The WITNESS. For what?

Mr. McDONALD. For the markets.

The WITNESS. I did not tell you why what Professor Baird and all these other Commissioners are doing does not show, why it is not a great thing and the fishermen do not feel it. The reason is that they have got that pound net with a mesh so small that it takes them of the size of the herring by thousands and thousands; there are tons of them sold in New York for herring. They get about half a cent apiece for them, whereas that fish has passed all the children diseases, has got out of the way of all his enemies, and would be a full grown and full sized whitefish in another year. It would weigh 3 pounds and fetch 12½ cents. There is where the fisherman stand in their own light, by taking that fish one year too young. They cannot catch them the year before, because they would go through the mesh. The mesh should be restricted during all seasons of the year for whitefish.

Q. You think they should be allowed to fish with a larger mesh?—A. Yes, sir; that is, during the summer.

By the CHAIRMAN:

Q. But not allow them to fish at all, as I understand you, during the spawning season?—A. During the spawning seasons, but that would knock our fish breeders pretty bad. Now the way it is carried on, we go and take the spawn from the fish. I have three or four or half a dozen men there perhaps; you are running a boat and taking your fish to market. I put one man in your boat, and one in another boat, and one in another boat, and whenever you get a ripe fish my man strips the spawn from it, and the fish goes to market just the same. The fish is just as good as if he had not been stripped. The most of them are dressed, and the fishermen do not care when they are sent to market whether the spawn is in or out.

By Mr. McDONALD:

Q. Is it not a fact that all our great commercial fisheries are carried on during the spawning season of the fish?—A. Yes, sir.

Q. The cod, shad, and whitefish?—A. Yes, sir.

Q. Is not it necessarily so in order to get a supply at all?—A. I do not think it is; we could invent some way to catch them in the ocean. The time was in old times when the cod fishing was done by a single line by one man, right off New York, all along. A dozen men would get on a sail boat and anchor, and those men would haul the cod up. Then they got setting lines for them; then setting gill-nets for them. A man cannot go now and bob off there and catch any; cannot begin to catch enough to pay. The price keeps up, and the amount of fish keeps up, because there is so much more fishing-tackle used; so much more fishing done; the fishing-tackle enlarged; the improvement of fishing-tackle has kept up with everything else.

Q. What would be the condition of our markets in regard to fish if we had to rely simply upon hook and line fishing?—A. They would not be very well stocked. But you understand these different kinds of fish; they do not all spawn at one time.

Q. No; but the perplexing question to me is that having to take all these fish in the spawning season, how to get the supply; take the shad for example, you have to catch them in the spawning season; take the alewife; take the cod; take the Spanish mackerel; all the main market fish that I know of, except the bluefish, are taken in the spawning season, and taken necessarily so.

The CHAIRMAN. To what mackerel do you refer?

Mr. McDONALD. I mean the bay mackerel; it is taken in the spawning season, and necessarily so.

The CHAIRMAN. That is the only time they come where they can be caught.

Mr. McDONALD. Yes, sir.

The WITNESS. Well, those things can be worked out if it is really necessary, and the shad fishing can go on as at present until some way of taking them outside is found, as I have no doubt they will keep catching them until they do.

By the CHAIRMAN:

Q. You are seeking to supply the waste of shad by artificial hatching?—A. Yes, sir; in the Connecticut River. I say the Connecticut River, because the advantages there are better than any other that I know. There are times when you can do quite a clever thing on the Potomac and many others; but there is a fishery at Holyoke where nearly all the hatching is done. That fishery pays about \$2,000 a year to the owner of the net. With that fishery loaned to the Government or to the States or taken in any way so as to control it and not have any fishing done there at all except at night after the spawn is ripe and then let those go that are not ripe, I have not the least doubt that there could be at that fishery anywheres from 50,000,000 to 75,000,000 a year hatched. Then the question would be whether there was food enough for those young fish to grow up and live there the first year. My idea is there would be, because they could be scattered down the river thirty, forty or fifty miles on a steamer or any other way to get them down. You know what the report was of the Connecticut and Massachusetts fisheries the third year after I did the artificial hatching; that is, that there was as many caught in one year as had been before in years; they came in so plenty that the vessels outside came in and reported that the shad were coming, and they did come and the nets were placed. Now that can be done every year. I say that shad can be made very plenty, particularly in the Connecticut River, because that is the best hatching place. There is no hatchery can be gotten up any better than the old-fashioned way where you have got the shore and the ground, the bottom, all just right; that is the best thing there is. I have hatched 10,000 all but 7, and another time 10,000 all but 10 by count. You count 300 and put them into a tumbler and then measure them afterwards, so that you get at it exactly, and one time I only had 7 dead ones in it, and another time I had 10, so that by scattering them down the river I have no doubt there would be plenty of food to grow to a year old; then they would go to the ocean, and when they got there they would find plenty of feed. They live on small members of the crawfish family or lobster family and they are all great breeders. The lobster is all playing out, but they are the greatest breeders of anything in the world almost. Black bass is a tremendous breeder, because they cast their spawn and lay over them and fan them for about three weeks right around, like an old hen with a chicken; most all the bass family does that. The bullhead does that. The bullhead digs a hole in the bank, will work at it until he gets it large enough, and go in and cast his spawn, and then lays over them and gives circulation with his fins, and when they are hatched they come out and follow the bullhead for at least three weeks; they look like pollywogs. I have seen a great many taken out with a spear and then see the little young ones laying outside three or four days afterwards dead. The wall-eyed pike has never been a great success, because they

plant their spawn broadcast; they cast it very much as whitefish cast theirs; as a general thing close to the shore on a rocky reef.

Q. What kind of spawn was this you spoke of taken out of the Detroit River?—A. Whitefish.

Q. And you think not more than one in every 3,000 to 5,000 were alive?—A. No, sir.

Q. How do you account for that?—A. Lack of circulation.

Q. Now, out of 5,000 eggs treated artificially how many would you hatch?—A. That would depend. If I had the hatchery right there, and everything perfect, I ought to hatch 90 per cent. The reason why we do not hatch the salmon trout it is a rough and tumble thing to go and get them; the boat is rustling around and half the time we have to take care of ourselves.

Q. Take the brook trout?—A. We hatch about 80 per cent. of them. We can raise a larger per cent. of brook trout than the salmon trout or these hybrids or anything else. No per cent. as large can be raised when it comes up to thousands and hundred of thousands. I am talking about a hundred thousand. We can take 100,000 and hatch and raise a better per cent. of them than to take 100,000, or 200,000 of anything else in any one locality. I said the other day, talking to my men, "You can just cipher it down to three things: in the first place, plenty of water; in the next place, plenty of food; and cleanliness, cleaning it every day." "Yes, Mr. Green," said one of my men, "there is one more." I said, "What is that?" "Keep them from getting away." That is one big point.

By Mr. McDONALD:

Q. Is your commission hatching now every year on the Hudson?—A. Yes, sir. Governor Cornell vetoed our appropriation, so that we did not hatch for two years.

Q. What is about the average turn out in the Hudson now?—A. It runs anywhere from 2,000,000 to 5,000,000.

Q. Your crop of eggs?—A. Yes, sir.

Q. And your catch is pretty close up to 1,000,000 a year?—A. I don't know how much it is; I have never seen it estimated. The fact about it is that we hatched about as many the first year or two or three as we have ever since, because when the third year came around the fish were plenty, and there were twenty nets where there was not one before, and there are now 20 nets fished in the Hudson every year where there was not one when we commenced hatching; and it is just so with the Connecticut River.

By the CHAIRMAN:

Q. Is it practicable to breed the varieties of ocean food-fish the same as you do our lake and river fish?—A. I have never had any experience with them except the shad and salmon. I think it can be done; that is, with some kinds of fish.

Q. Take the bluefish, for instance?—A. I do not know anything about that; I have nothing to say about it at all. I am told the codfish spawn floats. Now the only enemies that they have is small fish—I include the crawfish and shrimp, all that sort of thing—and driving ashore. If the spawn could float, and float right outside and not be interfered with, that is the best hatching apparatus you could have. The only thing in this codfish hatching is to get an apparatus by which you can protect them and hatch them and turn them loose. The thing in hatching artificially is to give circulation and keep sediment from them. I do not

know that there was ever any hatched and raised to any amount, but the young fish want to be fed seven or eight times a day until they are six or eight months old and then three or four times a day until they are a year old, and when they are a year old twice a day, and the next year once a day; they want to be fed regularly and kept clean. Meat thrown in goes to the bottom and when it begins to decay it has the same effect on the fish in the water as though it was on the land where we breathe. Fish die very easily.

Q. You say you were in the South last summer?—A. Yes, sir; I was down in Florida.

Q. And you say they were building these menhaden factories there?—A. Yes, sir; along between here and there.

WASHINGTON, D. C., *January 22, 1884.*

MARSHALL McDONALD sworn and examined.

The CHAIRMAN. I would like to have you, without questions from us in the first instance, make any statement you desire in your own way.

The WITNESS. There seem to be two fundamental questions connected with this inquiry. In the first place, as to the possibility of the impoverishment or exhaustion of the fisheries in the ocean as well as in the rivers by the interference of man by fishing or by other agencies, and if this be true what measures of legislation are necessary in order to protect and maintain the fishing industries. Now in regard to the possibility of the serious impairment and even destruction of the river fisheries by man's interference, there is not the slightest question, and I would like to illustrate by some examples. Beginning first with the river fishery, we know that the important species—I mean the species which are the object of important commercial fisheries—are what are termed anadromous, the salmon, shad, and alewife being the principal members of the series of important fishes. They all spawn in fresh water, and access to fresh water is the fundamental condition for reproduction; the young spend a portion of their lives in the streams and then go to the ocean and remain one, two, three, or more years; there get their development, and they return to the rivers only for the purpose of reproduction. Now if, as in the case of the salmodine, the spawning grounds are at the headwaters of the rivers and we erect obstructions, such as dams, and thus prevent them from reaching their spawning grounds, the effect of those obstructions will be to exterminate the species entirely in the waters thus obstructed. They will continue to come into the stream for several years; all that come in will be caught up in time, and failing to reach their spawning grounds so as to maintain the species by reproduction, the river will be absolutely exhausted. We have a very marked illustration of this effect in the Connecticut River. The natural spawning grounds of the salmon in the Connecticut are above Hadley's Falls, on the main river, and in the upper portion of the Farmington. Before the Hadley's Falls dam and the dams on the Farmington were erected the run of salmon into the Connecticut was as important as the run of shad in that river. Salmon, indeed, were as cheap an article of food as shad in the valley of the Connecticut. The erection of the Hadley's Falls dam and of the dams on the Farmington had the effect in the first place of vastly increasing the catch of the salmon at Hadley's Falls for two or three years; then it dropped off very rapidly, and now no salmon at all enter that river.

Q. What becomes of the spawn in case the fish cannot reach their spawning ground; suppose they strike a dam?—A. The spawn goes on developing until it passes the period of maturity and it spoils in the fish, the female meanwhile exhausting her energies in vain efforts to surmount the obstruction and reach suitable spawning grounds. In the case of the shad the blighting of the eggs by being retained in the ovaries beyond the period of maturity is a very common occurrence. I give this extreme instance to show how it is possible by excluding any species of fish from its spawning grounds to exterminate it entirely in streams where such insurmountable barriers are interposed.

The CHAIRMAN. Let me mention a case that may not have fallen under your notice. Salmon used to come up the Oswego River from Lake Ontario and strike the point where the Canandaigua outlet and Seneca River unite, and come up the Canandaigua outlet into Canandaigua Lake, where I live. They used to come in there in the early days in vast quantities, but the dams that have been constructed across that stream, especially the large dam at Oswego, completely shut them out, and there has not been a salmon seen there in fifty years.—A. These obstructions have been erected not only on the Oswego River, but on all the streams tributary to Lake Ontario, and as a consequence salmon are now rarely taken either in the lake or the streams tributary to it. Recently the State of New York has, under the direction of the superintendent of public works, erected fishways on the four lower dams on the Oswego, with the view of restoring the salmon fishery in that river and the extensive system of lakes which drain into it. It will probably be necessary to colonize the stream by artificial plantings before a run of salmon can be re-established.

Now, I have cited the case of the salmon fisheries of the Connecticut for the reason that the spawning ground of this species being entirely above the obstructions, the effect of the dams has been to work absolute extermination. But what is accomplished by a dam is, in a measure, accomplished by fishing. If fishing is pushed to such an extent in any river as to take—and it may be—all the mature salmon that enter that river, of course it needs only a few years to work absolute extermination. If it is not carried to this extreme, but is pushed far enough to prevent a sufficient number of the fish from reaching their spawning grounds to maintain the loss by capture or natural casualties, then the fishery will be impoverished year by year, and the depletion will go on in increasing ratio; so that, practically, although the salmon may not be exterminated, the fisheries in that river will be destroyed by being rendered unremunerative.

Now, in the case of the shad and alewife, the same result will follow overfishing. As an illustration we will take the Chesapeake basin, into all the tributaries of which there is each season a run of shad and herring. The shad enter these streams in February, and early in March, for the purpose of spawning. Successive schools of them are passing up to their spawning grounds from April on as late as July. The young fish that are spawned remain in the rivers feeding and growing until the cool weather of the fall comes on. They then begin to drop down stream, and by the last of November they have passed out into the bay, and we lose sight of them until they come back as spawning fish. Now, the probability is that of a hundred that go out not more than one returns to the river. As young fish in the river they are the food of the rock, the white perch, the bass, and other species of predaceous fishes that are found in the streams. As soon as they reach the salt waters of the bay the number of their enemies multiplies, and

from the time of their birth up to the time of their return to our rivers they are incessantly preyed upon by other fish, so that they are not decimated only, but of one hundred that leave the rivers, hardly one reaches maturity and finds its way back to them, there to deposit its eggs and contribute to the perpetuation of the species. While man's destructive agency in the matter, when we come to consider the number captured by him, seems very insignificant in comparison with the destruction by natural causes, yet if natural causes destroy 95 per cent., and man takes the other 5 per cent. which is necessary for the maintenance of supply, then he destroys the fishery by the capture of that 5 per cent. That small proportion would have been sufficient to maintain production and make up the waste through natural agencies. So there is no question that modes of fishing, prosecuted to their utmost limit, can be made the means of destroying our river fisheries.

What I have said about the shad is equally true in regard to the alewife or river herring. Its habits are the same, and its geographical range about the same. On the other hand, we are confronted in our river fisheries with this important question: The fish only entering the rivers for the purpose of spawning, and our fisheries necessarily being prosecuted in the spawning season, how are we to control fishing and yet at the same time maintain reproduction? That is one of the questions that has given rise to more discussion, greater diversity of legislation, and greater controversy than any other question connected with the fisheries. Several methods have been proposed by different State commissioners to accomplish the desired end. One of them is to establish a closed season in each week; to prohibit fishing from Friday evening until Monday morning, or from Saturday evening until Monday morning, and some States have gone so far as to prohibit fishing three days in the week.

Q. During the spawning season?—A. During the fishing season. In other States they have adopted a different plan; they have attempted to fix the period of the beginning and end of the season. Maryland has such a law on the Susquehanna. The United States has enacted such a law in regard to the District of Columbia. No nets are allowed to be set in the District after the 1st of June, and the effect of that law has been very conservative upon the river. I have no doubt that it has supplemented very largely the work of the Commission of Fish and Fisheries in artificial reproduction, because the spawning grounds of the shad and herring in the Potomac are largely within the limits of the District of Columbia.

Q. Did I understand you right that they prohibit it after the 1st of June?—A. After the 1st of June no nets are allowed to be set.

Q. Do not they spawn before that?—A. Yes, sir; but the considerable number of shad and herring left in the river after the 1st of June being permitted to spawn unmolested contribute largely towards maintaining production.

Q. They are allowed to be caught during the cool weather, and stopped early enough to let them reproduce?—A. I would like to say that in the District it is proposed to go still further, and a bill is now pending in Congress to prohibit all fishing with nets in the limits of the river under United States jurisdiction; and were the law now proposed by the petition of the fishermen enacted it would be a very important experiment. It would not bear hardly upon the fishermen, because they can find fishing-grounds outside of the District. It would be a law that would not, I am informed, encounter much opposition from the fishermen, and it is believed that the effect would be to permanently increase and perpetuate the fisheries of the Potomac.

Q. Prohibit it the whole year?—A. No, sir; I would allow the fall fishing. The proposition is now, I think, before Congress and will probably come up before the Committee on Fish and Fisheries. In regard to the ocean fisheries we have to keep one important fact in view, that all the great fisheries of the world are prosecuted in the spawning season of the fish; the herring fisheries everywhere; the cod fisheries; in part the mackerel fisheries. In regard to the menhaden we do not yet know, but I am speaking of the great commercial food fisheries; they are prosecuted in the spawning season.

Q. Is that so with the blue fish?—A. No, sir; we do not know when or where the blue fish spawn, unless Mr. Blackford can tell from his investigation; but I am convinced from the results of the investigations that have been prosecuted for some years that the spawning grounds of the ocean fishes are just as definitely localized in the ocean itself as the spawning grounds of the shad and herring are now in our rivers. The influence of the great ocean currents and of meteorological conditions reacting upon the temperature of the water is such as to define and circumscribe geographically areas of water in which suitable conditions of temperature for the development of the eggs of different ocean species prevail during the spawning season of the species.

To these areas, thus circumscribed or defined, the ocean species in the season of their spawning resort as certainly and invariably as do the shad and the salmon each in their season to our rivers; such being the case, it is possible in the case of the sea fishes that destructive or exhaustive methods of fishing, pursued on their spawning grounds, may result in the destruction or exhaustion of the schools thus localized. It is true that the amount taken by man's agency may be infinitesimal compared with the aggregate destroyed by natural causes, but man's supply is taken from the remnant which has escaped destruction by natural causes, and all or nearly all must be permitted to spawn in order to maintain production. I think, therefore, that both in regard to the ocean species and the river species the question whether we can affect the supply by man's agency is to be answered beyond a doubt in the affirmative.

Now, as regards the menhaden, which is the principal object of this inquiry the investigations in the Chesapeake region, as the chairman will remember, although the evidence was circumstantial, showed beyond a doubt that the menhaden on entering the Chesapeake Bay in the spring of the year entered there full of spawn; that by the middle of May that spawn had been cast and the fish were then lean and impoverished. As to the menhaden in the Chesapeake region, though usually regarded as an ocean species, spawning broad off from the shores the probability is, and the conviction of the fishermen is, that it spawns in that region in the tidal creeks and salt-water estuaries of the rivers, and of course it would be under the same conditions and as far as exhaustion is concerned, affected by the same agencies as the river species. If this question be settled in the affirmative, and the question of legislation to maintain production and control the fisheries comes up then we are at sea. We are at sea if we attempt any general law that aims to control the methods and prescribe the apparatus of capture. But as regards our great sea fisheries, viz, the mackerel and the menhaden, it seems to me that legislation should be directed not so much to prohibition of fishing during the spawning season, about which we are not yet fully certain, but rather to such general regulations as will contribute to maintain production and put that product in the market under the most profitable conditions to the fisherman.

Now, the result of our investigation on the coast, I think, defines very

clearly the character of the legislation not only that is necessary, but that will be acceptable, or at least accepted by the fishermen themselves. The mackerel fishermen, or rather the men who handle the mackerel and control the fishermen, are found to have a very general concurrence of opinion in favor of a national law prohibiting fishing for mackerel before the 20th of June.

The CHAIRMAN. The Portland witnesses were unanimous on that.

The WITNESS. Yes; and I think in Boston, with probably one exception. In the Chesapeake region we found that the principal men engaged in the menhaden fishery, those who had the largest money interest in it, were willing for the enactment of a similar law in regard to the menhaden fishery. So, it seems to me, we are brought up to the point where legislation may be enacted that will increase the production of those two fishes, put them into the market under better conditions, and therefore indicates a proper policy in legislation in regard to the matter. To go further than to prohibit purse-net fishing prior to definite date each season I do not see the way for.

Q. Would not you stop the pound-nets for a certain period?—A. Well, the pound-nets on the sea-coast are not a very important agency of destruction. In our river and in our interior waters they are, but how to reach them by Congressional legislation is a question. If it were possible or proper to enact a law in regard to the river fisheries I would say prohibit all modes of fishing at such a period in the season as would leave enough in the river to maintain the supply.

Q. The States do that.—A. Well, they pass a law but do not enforce it.

Q. Our State does. Now take the New Jersey coast; pound-nets are used all along that coast.—A. On the sea side, from Cape May to Long Branch, there are very few.

Mr. EUGENE G. BLACKFORD. There is a very large number on the sea shore, commencing at Sandy Hook and going to Barnegat.

The WITNESS. Yes; but at Cape May there are only two and they are on the bay side.

The CHAIRMAN. But there will be no harm in forbidding their use if they are not in use to prevent multiplication of them, and to stop them from being used if they are an agency, like the purse-nets, that would lead to the destruction of the variety and specie?

The WITNESS. The only question about that is this: I believe it would be better for the fishing industries if the control of the commercial fisheries was entirely under the jurisdiction of the General Government, especially in waters like the Potomac, which drain several States.

The CHAIRMAN. That is impossible.

The WITNESS. But to complicate any matters of legislation with a question of that kind would be to defeat any legislation at all.

The CHAIRMAN. The law here, although a Federal law, arises under the jurisdiction given to Congress by the Constitution. This is a State for that purpose. We could not, as a national legislature, touch the Potomac. It is only by the provision of the Constitution giving absolute jurisdiction to Congress that we can prohibit the catching in the waters within the District by law; just as the State of New York or New Jersey may prohibit, in their own waters, the catching of fish.

The WITNESS. There is one other thing that is clearly under the jurisdiction of the Government, and furnishes very appropriate subject of legislation, to which I wish to call the attention of the committee. We are now expending a very large sum annually in the artificial propagation and distribution of different species of fish in our waters, and, at the same time, in those very streams in which we are making plants of the anadromous

fishes, the Government has erected, and is continuing to erect year after year, obstructions that negative every result of artificial planting. In other words, salmon and shad—these being the two principal species—are being placed in the headwaters of our streams in all sections of the country in vast numbers, and yet the Government, through its engineers, is engaged at the same time in erecting obstructions that render all this work of no avail so far as those sections of the country are concerned that lie above the obstructions, and a vast section of country it often is. Now, I am convinced that if we permit the fish to reach their spawning grounds by destroying or providing the means to enable them to pass the obstructions which year by year are contracting the breeding areas of the shad and the salmon, and restore to them the range that they had before we put obstructions in the rivers, we will accomplish as much year by year by natural means as we are now accomplishing by artificial, and it seems to me it would be a proper suggestion for the committee to make in this connection that whenever the plans for the improvement of the navigation of any of our rivers contemplates the erection of obstructions which will intercept the passage of fish, the engineer in charge of such improvement be instructed to provide in his plans and estimates for suitable fish-ways, to be erected in accordance with plans prescribed by the United States Commission of Fish and Fisheries.

If the General Government will set the example by providing suitable fish-ways over the obstructions now erected, or to be erected, in our navigable rivers the useful results will be soon apparent. The several States will follow, and the areas of production thus recovered will determine a permanent increase in the productive capacity of the river.

There is not a State in which there are not already in existence numerous dams, which effectually bar the ascent of the salmon and the shad to their spawning grounds. They are erected by the Government in connection with plans for improving the navigation of our inland waters. Until effectual means are provided for the passage of fish over them they are the standing menace to the perpetuity of our valuable river fisheries.

THE CHAIRMAN. I see that the papers are claiming that the destruction of shad in the Connecticut is fearful, notwithstanding all the efforts that have been made there. Now, there is only one question that occurs to me, and that is the question aimed at by this bill as proposed, as to the prohibition of the menhaden steamers absolutely, at all seasons; have you thought of that?

THE WITNESS. Well, only in a casual way. It has been my view all the time in connection with the fisheries that legislation ought not to be directed at special modes or apparatus of fishing. You never know where it is going to stop. Of course, men will (and it is the policy of the Government to permit it) catch fish in the most economical way. It is in the interest of the general public that it should be done. If restrictions are imposed they ought to be such restrictions as will not strike at a particular mode or apparatus, but control all alike.

Q. It does not strike at the industry so much as it does at the particular mode or apparatus of capture. Of course they can continue, as they formerly did, the use of the purse-nets when wind and weather will permit their use by sails, but the steamers will plow through the ocean to a school of menhaden at any time and in any weather.—**A.** But in curtailing the season, as you propose to do, the relative advantage of steamers over sailing vessels is greatly diminished. I mean the vast expense incurred in maintaining the steamers for so short a period would impose a heavy tax upon them.

Q. Then you would pursue the same rule in regard to the menhaden that you would in regard to the shad and the salmon, prohibit fishing for them during the spawning season; that is, if we can ascertain what that is?—A. I would not fix the prohibition for the “spawning season,” but I would fix a definite time.

Q. Of course we would have to name a day?—A. Some mackerel may spawn after the first of June; I do not know. The shad I do know do not spawn all at once. There is a great glut that comes in at one time, but small schools or bunches are entering and ascending the rivers for several months, and the duration of the spawning season is from the middle of April to early in July. The same may be true in regard to the mackerel. I do not think it is true in regard to the menhaden.

Q. You remember those witnesses at Portland, who on the average had had fifty years’ experience, almost begged of us to prohibit the catch of mackerel earlier than the 20th of June. They said they were unanimously in favor of not having mackerel caught before that time.—A. They gave as a reason that it was in their own interest—to the advantage of the men actively engaged in fishing.

The CHAIRMAN. Well, the interest of the public, which is their interest, of course.

EUGENE G. BLACKFORD recalled.

By the CHAIRMAN :

Question. I would like to have you state now, in your own way, the results of your examination as to sea fishes which you mentioned to us at our meeting at Coney Island.—Answer. I would state that I have made a brief abstract of our examinations, covering the entire period of ten months, a portion of which I think I gave you at your last session; but in these figures I include the whole period up to the present time, from the first of March, 1883, down to last Friday, and I selected some four varieties of fish from which to give the figures. It does not, of course, take everything we have examined—inland and other fishes. Those fishes are the striped bass, the cod fish, the blue-fish and the menhaden. The whole number of striped bass examined during the period named is 770, varying in size from one pound up to 70 pounds each in weight, coming from all sections of the coast, from Canada on the north to North Carolina on the south. We found in the stomachs of those fish the following varieties of food: Mullet, spot, porgy, alewife, smelt, tomcod, cod-fish, white perch, a fish that we know in the market by the term of white bait, which is a very small, diminutive fish, about an inch or an inch and a half long, sand-launce, eel, stickel-back, butter fish, gurnard, parrot fish, capeline, shrimp, lobster, crabs, squid, gammarus, sea-worms, sea-lettuce, grass, shells, fish-hooks, an iron nut and bolt, and have found menhaden on fifteen different occasions in about a hundred specimens of fish. The iron nut and bolt was found in the stomach of a striped bass that was caught off the coast of North Carolina. As to the dates of spawning and conditions, we found on March 23 the first nearly ripe striped bass. On May 12 we found one from North Carolina so ripe that the spawn was flowing right from it. On June 9 we found the first spent fish, a male fish, evidently indicating that the spawning season had just passed, and on July 28 we found the last ripe fish. So that, so far as my investigation goes, the spawning time of the striped bass would occur between the 20th of March and the 1st of August.

Q. Does that furnish you any means of determining where they spawn?—A. No, sir; no more than they apparently spawn on different portions of the coast. We find the largest number of ripe spawning fish in the more southerly waters. Along in July we find that, and about the first of August is the last striped bass we find with ripe spawn. Then we first find ripe spawning fish again in the more southerly waters along in April and May.

Q. Mr. Green spoke of some varieties of fish that do not go to spawning beds at all—spawn in the open sea, in the water?—A. Yes; there is no doubt about that.

Q. How is it with bass?—A. As far as my investigation goes I should say they spawn right in the immediate vicinity of the coast, in little inlets and bays, but not in the open sea. At the present time we are taking striped bass, weighing from 1 pound up to 40 and 50 pounds each, through the ice in the Hudson River in the vicinity of Peekskill. We find the roe or melt in a very immature state. We find the stomachs entirely empty of all food with the exception that there seems to be a thick coating on the stomach or chyle-like substance which we do not find at other seasons of the year. The bass are apparently in a partially torpid condition. The nets in which they are taken are very small fine thread, you may say, a net which a striped bass of 5 pounds weight would tear all to pieces in summer time. These nets are set through the ice, and the mass carefully brought up without any sign of activity whatever.

Q. They do not struggle at all?—A. No, sir. Of cod-fish we have examined 302, varying in weight from 4 to 30 pounds each, and we find the assortment of food in their stomachs consists of crabs, clams, mussels, fish of many species, sand worms, mollusks of various kinds, various kinds of small crustaceous, grass, jelly fishes, ova of other fish, sea cucumbers, sea anemone, and such odds and ends as pieces of wood, lumps of coal, stones, the eggs of the skate, ray-fish, piece of beef-steak, and skull of another fish. On October 16 we found one with ovary quite yellow and soft, approaching ripeness. That is about the time that the cod-fish first make their appearance in our vicinity, off the south side of Long Island. They evidently come to the shore then in large numbers for the purpose of spawning.

Q. Is that the rock-cod?—A. No, sir; it is not what we know as the rock-cod; it is the ordinary cod, the gray cod. Our rock-cod comes from the vicinity of Nantucket. On December 7, we first found a ripe fish. On December 12 we found one spent fish, showing that between October 16 and December 12 the fish had been spawning, and on the 23d of March, last year, which was about the time that we first commenced our investigations, we found the last ripe one, showing that their spawning period covers the period from October 16 to March 23. There is no doubt that by continuing these investigations over a series of years we would find these dates vary a month later or a month earlier, according to the temperature of the water. The condition of the water determines, of course, the time of the appearance of the cod. If the warm weather lasts well into the fall and winter months, it would be a later period; they seem to come on with the first cold weather. It is also shown that these fish are obtainable in the largest quantities for market purposes at the very time that they make their appearance on our coast for spawning purposes.

Q. Well, the menhaden fishing does not apparently interfere with the cod fish?—A. No, sir; we have not found any menhaden in the stomachs of any of the cod-fish examined up to the present time.

Q. What time in the spring do they disappear?—A. We catch cod-fish in our vicinity, the south side of Long Island and the vicinity of Sandy Hook, up to about April 15.

Q. And they do not return until cool weather?—A. Sometimes they disappear sooner when large schools of dog-fish, a variety of shark, make their appearance on the coast. As soon as the fishermen discover these schools of dog-fish, they take that as an indication that it is time to wind up their season and go home; the cod-fish are driven off. Of blue-fish, the whole number examined was 322. I should have examined a very much larger number of blue-fish were it not for the fact that about 90 per cent. of all the blue-fish that come to our market are eviscerated before reaching us, so that we do not have any opportunity to examine them. The same remark applies to striped bass. The comparatively small number that we have examined arises from that fact. The plan of examination, I think I stated before, was taking from four to six specimens of each variety every day and examining them. The whole number of blue-fish examined was 322. We found in the stomachs, as food, shrimps, alewives, amphipods, butter-fish, young blue-fish, mullet, weak-fish, king fish, spot, gurnard, sand lance, percy, squid grass, menhaden, and chum, which is menhaden apparently cut up, and we could not determine from the condition of the fragments as to whether they had been cut up artificially and thrown overboard for bait purposes, or whether it had been the fish that had been chewed up by the blue-fish themselves.

Q. Are you able to say what food predominates, what you find the most of?—A. I have not the figures, but we find the alewife and menhaden oftener than we find any other fish. On July 14, we found one blue-fish with transparent ova, showing indications of ripeness. On July 16, we found the first ripe fish ready for spawning. July 23d, we found the first spent fish, and on August 3d, we found the last ripe fish.

The CHAIRMAN. That is a very short spawning season.

The WITNESS. Showing that the season is very short and quick, and we find another peculiar fact of a quick ripening. For instance, in a lot of fish taken off the south side of Long Island on one day we found nothing like ripe spawn, and the very next day, in the same sized fish, coming from the same spot, we found very ripe fish, showing that they ripen marvellously quick, and all the evidence goes to show that the spawning season is very short.

Q. You have no idea that they spawn more than once a year, have you?—A. No, sir. We found the last ripe fish, as I stated, August 3, and commencing about a month from that time, and for a space of two months, we find the young blue-fish, weighing from two ounces to a quarter of a pound, evidently the young of that season, showing that they grow with great rapidity. Those young blue-fish are called snapping-mackerel. You may have heard the people talk of catching them; it is very good sport. They are very ravenous and bite freely at any bait.

The CHAIRMAN. That, if I remember right, is what they are generally termed.

Mr. McDONALD. Along the Jersey coast they call them snapping-mackerel.

The WITNESS. Of menhaden the whole number examined was 871, coming from various localities, as far east as the coast of Massachusetts, and from as far south as Beaufort, N. C. We found the food consisted almost entirely of minute crustacea. On November 28 last in a lot

of 50 fish received from Beaufort, N. C., nearly all were nearly ripe. On December 7 we received a lot of menhaden from West Tisbury, Mass., in which was found ripe fish, so ripe that the eggs were flowing right from the fish. The spawning season seems to be from this time on; how late we have no data to determine. As to these fish coming from Beaufort, N. C., I have arranged with a factory there to ship me 50 three times each week, but I only succeeded in getting two shipments; the first were nearly ripe and the next were almost ready for spawning. I have arranged with a fisherman at Savannah, who tells me that he catches menhaden with the spawn very ripe in the month of February, to send me at least once a week a shipment from there. Our information as to the catch of menhaden during the past year goes to show that there has been an enormous catch in the latter end of the season, so much so as to bring it up to one of their best years. We find the fish we have examined during the early part of the season very poor in condition, very deficient in fatness, thin and small, and in the early part of November at once we discover large, fine, fat menhaden, evidently a new school that came into the shore. These large, fat menhaden were, according to the reports of different fishermen with whom I conversed, in larger numbers than they had ever seen before. As one captain of a fishing smack expressed it, he saw in one day, he thought, "more menhaden than had ever been caught since the time of the present fishery down to the present time."

I would say that, so far as my own investigations go, they would lead me to think that any legislation which would seriously affect any of the fisheries would not be advisable just at the present time; that we cannot generalize enough from the comparatively few opportunities we have for getting at the exact habits of the fishes to frame legislation which will accomplish what we all aim at; that is, a proper protection of each industry, and also a proper protection of the food supply for the people. For instance, we could not conclude that striped bass are in the habit of feeding on nuts and bolts because we find one with them in it, and we find facts to vary from month to month. It is my determination to carry on these investigations over another year, if not another still, because we feel that they are an absolute necessity in order to obtain facts that will help us to protect the fish industry. The New York State Fish Commissioners are just about presenting their annual report to the legislature, in which the secretary, General R. U. Sherman, of New Hartford, refers to this menhaden fishery and deprecates the overfishing, as he calls it, on the part of the steamers. I give this in order to show the views of the Fish Commission of New York. The Commissioners themselves are not all agreed.

The CHAIRMAN. The secretary of the United States Menhaden Oil and Guano Association, in a letter sent to us at Brighton Beach this summer, and which is printed in the testimony, affirmatively says that the steamers have got to go. He admits the trouble is with those steamers.

Mr. BLACKFORD. Have they communicated with you since their last annual meeting?

The CHAIRMAN. No, sir.

Mr. McDONALD. They passed a resolution subsequent to that letter, and transmitted it to Professor Baird, in which they protest against any legislation.

Mr. BLACKFORD. At their annual meeting held at the United States Hotel within the last month, the matter was discussed at considerable length, and they passed a resolution in which they did not actually

protest, but they gave it as their opinion that it would be unwise to have any legislation. That was the newspaper report.

Mr. McDONALD. This, I think, was in response to a letter from Professor Baird, suggesting that they should invite such legislation as they thought desirable.

The CHAIRMAN. I will read the secretary's letter:

178 WASHINGTON STREET,
Brooklyn, L. I., July 18, 1883.

Hon. E. G. LAPHAM:

DEAR SIR: In reply to yours of the 17th, I have the pleasure of inclosing the statistics requested and the various views of members on fish legislation. My views remain unchanged and more than confirmed by the results of last year's business; such veterans as R. L. Fowler, Henry Wells, John A. Williams, and others agree with me; we see that something must be done, and that the steamers are a curse to the business. If I am needed for further examination, will be pleased to attend at Brighton, Saturday afternoon.

Respectfully,

LOUIS C. D'HOMERGUE.

Mr. BLACKFORD. Well, I can see one reason for his writing that. Up to that time the menhaden fishermen were all despondent, and were losing money on account of the poor yield of oil, but the late catch helped them out.

The CHAIRMAN. Then any law we should propose, to prohibit their fishing up to the 20th of June, would not be very much in their way?

Mr. BLACKFORD. No, sir; I would suggest, from my knowledge of the business, which is merely casual, that a limitation which would prevent them from fishing before the 20th of June would not interfere with their profits or business, and it certainly would give an opportunity for those fish that do make their appearance previous to that time to draw on the other food fishes that feed upon them, and would make the food fishes of our coast more plentiful.

Q. Would not that practically protect the blue-fish, if they were prohibited catching up to the 20th of June?—A. Yes, sir; it would, if the blue-fish needs any protection. The blue-fishing generally has been wonderfully good; the catch has been very large, larger than we have had for three years.

Q. At what points?—A. On the Massachusetts coast, and on the south side of Long Island, and along the Jersey coast. I cannot say so particularly large on the Jersey coast as on the Long Island, Rhode Island, and Massachusetts coast. During the most abundant time in market, some 250,000 pounds of blue-fish were taken in the market and frozen up and are now being sold during the winter months.

Q. Mr. Frye was mentioning to me the other day that blue-fish, he gathers from observation and inquiry, are a periodical fish; that they absent themselves for a period of twenty-five or thirty years entirely from our waters and then return again.—A. There has been one such period on record.

Q. When was that?—A. I think something like seventy-five to one hundred years ago. The fact is mentioned in the report of Professor Baird, Commissioner of Fish and Fisheries. He gives the data in regard to it, that for a long period the blue-fish disappeared entirely from our coast, and then when they did reappear it was in vast numbers, and at that time our people had not become educated up to liking blue-fish, and they were used for manure, &c. The blue-fish, from being formerly despised and belittled, is now one of the most sought after.

Q. Now what is your opinion as to the use of pound nets along the ocean coast?—A. So far as the pound nets that are set on the coast in

the ocean are concerned, I do not think that they can affect to any appreciable extent the production of the fish. I think that they catch but a very small percentage.

Q. The New Jersey witnesses say that they used to catch very largely before the menhaden steamers began.—A. A pound net set out in the ocean along the coast, as you can readily see, with a large school moving up the coast, can catch only a very small portion of them. It is different to what it would be, of course, in a bay or mouth of a river. In some places where pound nets are set almost across they take in everything; but any legislation which would affect the pound nets would very seriously diminish the supply of food for the markets, because a very large portion of the food supply is derived from the pound nets.

Q. Are they used for catching shad?—A. They are used to a very limited extent. They are not allowed in the rivers of our State and they are not allowed in the Connecticut River, but they are set at the mouths of those rivers, at the bay portion, on one side. For instance, in Gravesend Bay, right near to Coney Island, there are some pound nets, but they really catch but a small proportion of the shad. They do not seem to be in the way of the shad as they come in. A large proportion of the shad coming from the Connecticut are caught at the mouth of the river in these pound nets. There is a series of pound nets extending from the mouth of the Connecticut River west, along the shore—west of the Connecticut River—that furnish about one-half of the shad that are sent to the market.

Q. They are mainly operated by individual enterprise, are they not?—A. Entirely.

Q. They are not the result of companies or combinations?—A. They are not the result of corporations or large companies. I receive shad from what we call four companies; each company consists of from three to five fishermen who join together to operate these nets.

Q. I suppose you would concur with other witnesses that the use of the purse nets along the coast in the early part of the season, when the menhaden appear naturally, has the effect to drive them off the shore; to send them away from the shore?—A. Yes, sir; there is no doubt about that in my own mind.

Q. They are not only caught, but they go away from fright?—A. The tendency of a steamer running into a school of menhaden and casting a large purse net is to break up the school; to stampede them.

Q. How do you account for their coming in such quantities to the shores in the early part of the season, if it is not their spawning season?—A. My own theory is they are in search of food; they are in poor condition.

Q. They are hungry?—A. They are hungry.

By Mr. McDONALD:

Q. I understood from your reading your notes that once a menhaden was examined on the coast of Massachusetts in the winter that had nearly ripe spawn in it?—A. It was flowing. That was a sort of stray lot. We were very much surprised at receiving them, as it seemed to us an unusual time of the year to find them on the Massachusetts coast.

Q. I found one in Hampton Creek, in Chesapeake Bay, the week before Christmas that was not flowing, but the eggs were so that it made the impression that it would spawn in a day.—A. But that is a good deal further south than Massachusetts, a good deal higher temperature.

Q. I think both the inquiries and the testimony of the Chesapeake fishermen show beyond a doubt that they spawn in the early spring.—

A. There does not seem to be any question as to that. The investigation shows that they do not commence to spawn at least until the latter part of November in any part we have heard from yet, and I think I gave in my first testimony before the committee an account of receiving very small, minute menhaden, about an inch long, from the south side of Long Island; I think it was during the month of May or June.

Q. Now, what is your impression—of course it can only be an impression, but still I would like to have it on record—as to the locality of their spawning; do they spawn broad off the coast as they come in, or spawn in the late fall and winter before they go out?—A. I think they spawn in the fall and winter before they go out.

Q. So far as reproduction is concerned, then, they are in the same condition as the fish that come into our rivers to spawn; that is, they spawn, I believe—and I think your evidence and all the evidence goes to confirm it—in our creeks and rivers. I do not mean in the fresh water, but in the estuaries that run up into Chesapeake Bay. Now, I have seen as early as April in the creeks in the Chesapeake Bay, vast schools of menhaden, so thick that you could almost catch them in your hands, dip your hand in the water; they drop very quickly when you make a motion at them, and they were a fish not longer than that (an inch).

The CHAIRMAN. Very many of the witnesses we have examined are of the opinion that the menhaden spawn very early in the season in our bays; that they come here for the purpose of spawning.

Mr. BLACKFORD. When you say "early in the season," you mean during the months of March and April?

The CHAIRMAN. Yes; but you found none that spawned after you commenced in March last?—A. No, sir.

Q. Where were those caught?—A. They were caught principally on the south side of Long Island.

Q. But they had obviously recently spent their spawn; their condition would indicate that?—A. Judging from the condition of the ovaries they had but recently spawned those young fish that I spoke of coming from the south side of Long Island; their size would indicate that they certainly were not over three months old.

Q. I suppose there are more fish marketed in New York than along all the rest of the coast?—A. Yes, sir; I guess that is the fact, that New York is first and Boston second in importance.

Q. Although in mackerel Portland exceeds either of those cities?—A. In the number of mackerel; yes, sir.

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IN THE SENATE OF THE UNITED STATES.

JULY 29, 1886.—Ordered to be printed.

Mr. PALMER, from the Committee on Fisheries, submitted the following

R E P O R T :

[To accompany bill H. R. 5533.]

The Committee on Fisheries, to whom was referred the bill (H. R. 5533) relating to the importing and landing of mackerel caught during the spawning season, beg leave to report as follows :

This bill is designed to prevent the taking of mackerel by seines and purse nets between the first days of March and June of the five years succeeding its enactment.

It is urged with practical unanimity by the vessel-owners and fishermen engaged in this industry, and is opposed only by commission dealers in fresh fish.

The testimony taken by the committee, which has been printed, and is submitted as a part of this report, shows an alarming decrease in the better grades of mackerel suitable for salting as food.

The average yearly catch in amount for the years from 1809 to 1872, inclusive, was 166,184 barrels. The average yearly catch from 1872, the time purse-nets came into general use, to 1885, inclusive, was 201,204 barrels.

It will be seen that the average annual amount caught for the last thirteen years is only about 20 per cent. greater than for the sixty-four years from 1809 to 1872, notwithstanding the improved appliances which should have insured a vast increase in the catch, stimulated as the business has been by a greatly increased demand from a rapidly increasing population and improved methods of distribution.

Far more to be deprecated than the deficient catch has been the deterioration in quality, as shown by the decrease in percentage of No. 1s.

In 1865 No. 1 mackerel was 59 per cent. of the whole catch ; in 1866 it was 64 per cent. ; in 1867 it was 58 per cent. ; in 1868 it was 51 per cent. ; in 1869 it was 31 per cent. ; in 1870 it was 21 per cent. ; in 1871 it was 40 per cent. ; in 1872 it was 40 per cent. ; in 1873—the year that seines became generally used—it was 45 per cent. ; in 1874 it was 44 per cent. ; in 1875 it ran down to 25 per cent. ; in 1876 it was only 14 per cent. ; in 1877 it was 17 per cent. ; in 1878 it was 9 per cent. ; in 1879 it was 6 per cent. ; in 1880 it was 8 per cent. ; in 1881 it was 6 per cent. ; in 1882 it was 15 per cent. ; in 1883 it was 14 per cent. ; in 1884 it was 8 per cent. ; and finally, in 1885, it was 7 per cent.

The fish taken in the time included in the bill, both male and female, are poor, unfit for packing, and not very acceptable for the table.

The schools appear on our coast, off Cape Hatteras, in March, and

thence proceed northward, and spawn on the coasts of Massachusetts and Maine.

On their first appearance the mackerel fleet meets them and they are harried and harassed from that time until winter.

Although it is contended by some scientists that all that man can do will have no appreciable effect in depleting the ocean of fish, it is believed by many that the unrelenting pursuit mentioned above has a tendency to deflect them from their course or to prevent many from returning in subsequent years. This latter fact may account for the diminished percentage of No. 1 mackerel.

The whole mackerel fleet is owned in Massachusetts and Maine, consists of nearly 400 sails, employ about 5,000 men, and is now engaged in seining mackerel from March to November.

During April and May of last year the catch was so great that it glutted the avenues of distribution, and many thousand barrels were thrown away. There is some conflict of testimony as to the amount of this waste, but it was probably between 60,000 and 75,000 barrels.

Your committee have amended the bill to allow fuller latitude to the taking of mackerel by hook and line, and recommend that the amendment be concurred in, and that the bill when so amended do pass.