# XVIII.—*REPORT OF THE TRIANA TRIP.

By J. W. Milner.

Dear Sir: I have the honor to report, with reference to the expedition among the fisheries of the Potomac and Patuxent Rivers, that we went on board the steam-tug Triana at 10 a. m. Tuesday, April 27. Our party consisted of Mr. T. B. Ferguson, commissioner of Maryland; Dr. W. B. Robertson and Mr. Alexander Moseley, commissioners of the State of Virginia; Dr. Pearson Chapman, of Baltimore, whose intimate knowledge of the fisheries of the Potomac afforded us valuable aid; and Mr. G. Brown Goode, of the Smithsonian Institution. The three latter gentlemen left the steamer on the second day out, at Quantico, Va.

We visited two localities on the Potomac River the first day; Gut Landing, Md., fished by W. M. Elliott, being the first. This gentleman complained severely of the decrease of fish, and attributed it largely to the drift-nets which have thronged the river for seasons past. He said that the season was unusual in the marked decrease of herring. We remained at this fishery an hour or more, conversing with the proprietor and examining the species of fishes taken in the net. Very many male Rock-fish (*Roccus lineatus*), measuring from 12 to 18 inches, were found to be ripe, but no ripe females were obtained.

We next proceeded to Chapman's Point Fishery, Md., where a seine haul was made during a rain-storm. Besides shad and the two kinds of herring, constituting the bulk of the food-fishes there, we found, in the net, Rock-fish, White perch (*Morone Americana*); Yellow perch (*Perca flavescens*); Sun-fish (*Pomotis aureus*); the Gizzard shad (*Dorosoma cepedianum*); the Catfish (*Amiurus albidus*); the Bull-head (*Amiurus atrarius*); the Mullet sucker (*Ptychostomus aureolus*); and in addition twelve species, of forms too small to be marketable, and of which we

*The work of shad-propagation for the Potomac, inaugurated in 1873, was only moderately successful that year, as the station at Jackson City, Va., was the only one employed. In view of the proposed increase in the number of hatching-stations, it became necessary to obtain a more intimate knowledge of the fishing-grounds, and by the kindness of the Secretary of the Navy the steam-tug Triana was placed at my disposal for a trip down the river under the direction of Mr. Milner. The commissioners of Virginia and Maryland were invited to be of the party, as being directly interested in the results; Dr. Pearson Chapman, of Baltimore, because of his knowledge of the fishery-interests of the river and their history; and Mr. G. Brown Goode, of the Smithsonian Institution, because of his familiarity with the species inhabiting the rivers and brackish waters of the Atlantic coast both south and north.—S. F. Baird.

obtained a supply of specimens and preserved them in alcohol. We were hospitably entertained for the night at Mr. Chapman's house.

We went again on board in the morning and proceeded down the river to Stony Point, Va., before landing. The large seine, belonging to the Gibson heirs, is worked here. This is over 1,600 fathoms, or 9,600 feet, in length, and the linear extent of seine and lines is nearly five miles. A steam-engine is employed at either end, one of fourteen horse-power and one of eight. But two hauls are made in twenty-four hours, one on each ebb of tide. The haul which should have come on shore while we were there was prevented by the stubborn churlishness of the captain of a little vessel, who anchored within the circuit of the seine while it was being laid down, and refused to move his vessel out of the way, though Gibson proposed to send his men on board to lift the anchor. Calculating the time lost by eighty men, the lost trip of the tug chartered for the season, and the sustenance of the men during the lost time, which is by no means the whole outlay, the amount would be about $83.

Mr. Ferguson and I crossed over to High Point, Va., one of the larger fisheries, where we found the ordinary 1,000 fathoms seine managed with one eight horse-power engine. Proceeding to the Occoquan-Bay side of the point, we examined the shores, hoping to find a locality, sheltered from the winds and sea, that might answer as a shad-hatching station. We found a cove, landlocked from all points save southwest. From this direction the wind had a sweep of the entire width of the Potomac for fifteen miles, and the bars near by, that might cut off the action of the waves, were not shoal enough to prevent a sea sufficient to affect our hatching-boxes.

We returned to the steamer with additions to our collections, and steamed for Quantico, Va. Mr. Goode, Mr. Moseley, and Dr. Chapman left us at this point. We came to anchor for the night off Blackistone Island.

On the morning of the 29th we were early under way, and entered Chesapeake Bay, keeping close along the west shore. The Maryland State steamer "Lela" was seen near the mouth. At Mr. Ferguson's request, the captain consented that we should obtain a pilot for the Patuxent from the oyster police boat, a short distance up the river.

We found the State oyster-boat at Drum Point, some distance up the Patuxent Bay, and took on board Captain Forrest, who was to pilot us to the head of navigation at Bristol, if the draught of our steamer would permit her to ascend so far.

At the lower end of the river, numerous oyster-dredging schooners were seen, occasionally of considerable size. They were all busily engaged, as it was near the end of the season. The law prohibiting taking oysters after April 30, the entire fleet had to make their cargoes by the next night, when they would all set sail for market.

As we got higher up the river, no dredgers were seen, the tongs-men

in small boats replacing them on the oyster-beds. An eastern schooner was buying their cargoes at one point, and a large fleet of the "tongsmen" had gathered around her, some of them alongside, transferring their stock of oysters to her hold, and others lying anchored near by awaiting their turn.

Our pilot carried us through the narrow passage of the Benedict Shoals without stopping. The channel at this point has 13 feet of water, but is very narrow and flanked on each side by a shoal with only 7 feet soundings. Opposite Northampton we ran aground in the mud, but soon got off. The lead was thrown continually during the afternoon. The navigation was difficult for a steamer drawing nearly 10 feet, and we were aground several times, and at last gave up the attempt to reach Bristol, and tied up to a fishing-dock on the west shore known as "Half Pone."

Seine-fishing shores were seen at numerous points along the river, but we learned that fishing was stopped as soon as hot weather set in. No communication by railroad is available for the shores, and the use of ice for shipping by steamer has not been introduced.

The boat was lowered and Mr. Ferguson and I started for Bristol. The men raised a sail, as the wind was fair, but even with a small boat we soon ran aground. We reached Bristol after a half-hour's sail. Mr. Oren Chase, with an assistant, was there in charge of the Maryland shad-hatching station, just organized by Mr. Ferguson. About 50,000 shad-eggs were in the boxes, but the temperature was 48° and the eggs were in bad condition. A seine-haul was made before we left, but no ripe fish were taken. But little success was looked for until the water became warmer.

It was very dark, and blowing hard, when we started to return, and we were soon lost in the shoals and mud-lumps; and the men pulled back and forth for two hours before we reached the steamer. We were early on our way on the 30th, and passed the shoals quite successfully on our return, though we were aground once. We steamed into the Potomac and came to anchor for the night at Nanjemoy Stores.

At Freestone Landing, Va., May 1, a little after 8 a. m., Captain Cook, Dr. Robertson, Mr. Ferguson, Mr. Gee, and I landed at the fishery. On the southwest side of the peninsula on which the landing is we selected a site for a station. A cove formed by an arm of land extending into Powell's Creek was sheltered from nearly all directions; it was sufficiently near the fishery to take advantage of all the hauls, and the proprietors expressed their willingness to afford us spawners, as in fact did many of the fishery-proprietors at other points.

Another locality which would be quite favorable is the vicinity of Fort Washington, where the Piscataway Creek flows into the Potomac. Gunsen Cove and Doag Creek, on the Virginia side, also afford sheltered places for stations.

At Alexandria Dr. Robertson returned to Richmond by rail.

The Triana reached the navy-yard a little after 4 p. m., having been away about four days and six hours.

Throughout the Potomac waters, although examining the shad continually, no ripe ones were found. The Patuxent-shad eggs which had been obtained at Bristol were suffering from the low temperature of the water, and will fail to come to maturity; so that it is evident that it would be premature to begin shad-hatching operations at present, though a week may make a change in the aspect of things.

We gathered a good deal of valuable information with reference to the fisheries. A list of the fishing-shores, from Point Lookout northward, is given herewith, and the seines in operation this season.

The quantity of shad and alewives (herring, as they are called here, *Pomolobus pseudoharengus*), is said to be far below that of any preceding year. The larger seine-proprietors insist that they are losing money daily, which is probably the case as their outlay is very large.

The early abundance of fishes in the river is fresh in the memory of the older residents on the Potomac, and is but the repetition of the history of the early times on many of the Atlantic rivers.

Mr. Chapman recollects the time when the seine-hauls on the shore piled the herring up from the water's edge 12 or 15 feet landward. The men walked or waded knee-deep among them, thrusting in their arms to find and select out the shad, and allowed the herring to float off at high tide. In Mr. Chapman's words, "This reckless, destructive policy has brought its results, and this year the fishery-owners have to bewail the scarcity of herring," which they would be very glad to have in abundance.

In the *Gazetteer of Virginia, published in 1835, is the statement, referring to "the immense fisheries of the Potomac," that "the number of shad frequently obtained at a haul is 4,000 and upward, and of herrings from 100,000 to 300,000. In the spring of 1832 there were taken in one seine, at one draught, a few more than 950,000, accurately counted." * * * * "The lowest prices at which these fish sell when just taken are 25 cents per thousand for herrings, and $1.50 per hundred for shad, but they generally bring higher prices, often $1.50 per thousand for the former, and from $3 to $4 per hundred for the latter. In the height of the season, a single shad, weighing from 6 to 8 pounds, is sold in the markets of the District for 6 cents. Herrings, however, are sometimes taken so plentifully that they are given away or hauled on the land as manure for want of purchasers. Some idea may be formed of the importance of these fisheries from the following statement:

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|---|---|
| Number of fisheries on the Potomac, about | 150 |
| Number of laborers required at the landing | 6,500 |
| Number of vessels employed | 450 |

*A New and Comprehensive Gazetteer of Virginia and the District of Columbia, containing, &c. * * * By Joseph Martin. To which is added, &c. * * * Charlottesville. Published by Joseph Martin. Moseley & Tompkins, Printers, 1835. p. 480.

| | |
|---|---|
| Number of men to navigate these vessels | 1,350 |
| Number of shad taken in good season, which lasts only about six weeks | 22,500,000 |
| Number of herrings under similar circumstances | 750,000,000 |
| Quantity of salt required to cure the fish, bushels | 995,000 |
| Number of barrels to contain the fish | 995,000 |

"The Potomac River can boast of the largest shad-fisheries in the United States. The advantages of the herring-fisheries she divides with some other rivers of the South, but it is equaled by none unless it be the Susquehanna."

The abundance of the rock-fish and its large size are also referred to. The record of a seine-haul is given at Sycamore Landing about 1827, where 450 were taken, averaging 60 pounds each.

The same writer refers also to the sturgeon abounding in the Potomac as far up as the foot of the first falls. A peculiar form of tackle thought to be used only on this river for taking sturgeon is described.

In Fleet's Journal, first printed in 1871, the following entry was made, under date of June 25, 1632: "We came to an anchor two leagues short of the falls, [falls of the Potomac.] This place without all question is the most pleasant and healthful place in all this country, and most convenient for habitation; the air temperate in summer, and not violent in winter. It abounds with all manner of fish. The Indian in one night commonly will catch thirty sturgeons in a place where the river is not twelve fathoms broad."

The statistics for the years 1874 and 1875 will afford an interesting comparison with the foregoing. The seine-fisheries of the Potomac, from Matthias Point northward, numbered about thirty-three seines during the shad-season of 1874. Since the time the Gazetteer was compiled, however, the drift-nets have come into the river and capture a great many shad which would otherwise find their way to the seines. A few pound-nets also have been established, and come in for a small share of the fish. Still, withal, the fishing enterprise must be considered as much diminished since the record given in the Gazetteer.

The nets in operation during shad-fishing of 1874 were at the following shores:

*Virginia:* Caywood's, Windmill Point, Tumps, Gum, Arkendale, Clifton, Freestone Point, Stony Point, High Point, White House, Ferry Landing, Jackson City.

*Maryland:* Maryland Point, Budd's Ferry, Stump Neck, Chapman's Point, Pamunkey, Gut Landing, Greenway, Bryant's Point, Moxley Point, Kent, Stick Landing.

The total for the Alexandria, Washington, and Georgetown markets for Potomac fish, as taken from the report of Mr. C. Ludington, inspector of marine products for the Washington board of health, is 1,051,587 shad; 15,006,940 herring; 340,387 hickory-jacks (*Pomolobus mediocris*); 616,791 bunches fish; and 1,650 sturgeon.

In 1875 there were seine-fisheries at—

*Virginia:* White Point; Caywood's or Foulk's Shore, fished by Joseph Caywood; Windmill Point, fished by Conrad Faunce; Tump's, by a man from Baltimore; Gum Bar, fished by Jerry Robbs; Arkendale, fished by Joseph Besley; Clifton, fished by Withers Waller & Montacure; Freestone Point, fished by Jacob Faunce; Deep Hole, fished by McCuing & Ticer; Sandy Point, fished by D. G. Henderson; High Point, fished by John Gibson heirs; Stony Point, fished by same; Ceate's Point, fished by Tucker & Hall; Cornfield or Barn Landing, fished by J. Haiser; Gunzton Hall or Tick Landing, fished by Jackson Haiser; Ferry Landing, (formerly owned by General Washington,) William Knight; Dangerfield Island, (a small seine;) Jackson City, fished by John Gibson heirs. Total, 18.

*Maryland:* Maryland Point, fished by Price Green; Budd's Ferry, by Cunningham; Stumpneck, by same; Rum Point, small seine; Chapman's Point, John H. Chapman, esq.; Pamunkey Point, S. H. Barrow; Government Landing, William H. Elliott; Green Ways, Moore, Smith & Co.; Bryan's Point, Conrad Faunce; Moxley's Point, J. H. Skidmore; Meadow Bars, a small seine; Tent Landing, James Guy; Sandy Bar, Jerry Robbs. Total, 13.

*District of Columbia:* Berry's Landing, McKewen; Stick Landing, Miller; Giesboro, Luckett. Total, 3.

Of pound-nets there were:

Nanjemoy Reach, 2 pound-nets, Rainer; season, two months in spring, three months in fall: 4 pound-nets, Lomax; season, two months in spring, three months in fall.

Curriomen, Va., 2 pound-nets, Reed; season, two months in spring, three months in fall.

Freestone Point, Va., 2 pound-nets, Stewart; season, two months; taken up before season was over.

Georgetown Channel, 1 pound-net, Frost; season, two months in spring.

Georgetown Channel, 1 pound-net, Jenkins; season, two months in spring.

Total, 12.

It is difficult to get at the number of drift-nets * and boats accurately. Many of them fish regularly and continually, and many others are very irregular and transient in their work, fishing when a little ready money is needed, when a few fish are wanted for the table, or from caprice.

On the 27th, between Washington and Pohick Bay, Mr. Goode counted 33 boats fishing. As it was during a continual cold rain it did not represent at all what would ordinarily have been engaged.

The total of the shad-season fishing on the Potomac for 1875 is 33 seines, 12 pound-nets, and a large number of drift or gill nets not counted.

* Mr. O. N. Bryan, of Charles County, Maryland, estimates the number of gill-net boats for the whole State of Maryland at 2,000.—(Marlboro Gazette, Port Tobacco, Md., November, 1875.)

The following comparative table of inspections for the Washington markets during the years 1873, 1874, and 1875, is taken from Mr. C. Ludington's comparative statement of the inspection of marine products for these years:

*Comparative table of inspections of food-fishes* in the Washington market for the years* 1873, 1874, *and* 1875.

| Years. | Inspections. | | | | | | Condemnations. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Shad. | Herring. | Tailors. | Bunches of fish. | Sturgeon. | Total pounds of fish. | Shad. | Herring. | Tailors. | Bunches of fish. | Sturgeon. |
| 1873 | 852, 900 | 3, 789, 800 | 326, 200 | 553, 761 | 496 | 8, 548, 851 | 270 | 52, 600 | ..... | 5, 153 | ... |
| 1874 | 638, 637 | 6, 567, 240 | 89, 841 | 567, 291 | 919 | 10, 827, 967 | 149 | 140 | 158 | 6, 087 | 16 |
| 1875 | 464, 215 | 1, 674, 465 | 56, 430 | 557, 203 | 1, 204 | 7, 002, 049 | 60 | 2, 125 | ..... | 8, 315 | 18 |

It is probable that the Potomac has the largest seines in use in the United States; the only ones at all approaching them in size are the large menhaden seines† of Long Island Sound and the Atlantic coasts of Massachusetts and New Jersey. The ordinary 1,000-fathom seines in use at the present time are very much the same in dimensions as those of former years; so that it is possible to obtain quite a correct comparative estimate of the fisheries of former times and the present.

A large number of the seines referred to above are of 1,000 fathoms length. The one at Stony Point, owned by the Gibson heirs, is 1,600 fathoms long,‡ and lines and seine together measure four and two-

* In explanation of the names and terms used in the table, the shad is the ordinary *Alosa sapidissima;* the herring, the Alewife of the north (*Pomolobus pseudoharengus*); the Tailor, sometimes called Hickory-shad (*Pomolobus mediocris*); the Sturgeon, the ordinary *Acipenser brevirostris;* the bunches of fish include white perch (*Morone Americana*); yellow perch (*Perca flavescens*); the bull-heads (*Amiurus atrarius*); the catfish (*Amiurus albidus*); the pickerel (*Esox reticulatus*); and several species of *Centrarchidæ, Catostomidæ,* &c.

† The menhaden seines in present use are generally "purse-seines."

‡ *Description of Stony Point Seine.*—Wings: 140 meshes deep, 3-inch meshes. Back, 100 fathoms long, 225 meshes deep, 2¼-inch meshes. Entire length of seine, 1,600 fathoms. Lines: Land-end, 7 coils rope (150 fathoms to a coil.) Boat-end, 11 coils rope. An auxiliary line extends to the under side of the bag known as the "quarter-line." As the bag approaches shore it is from time to time drawn upon to relieve the strain upon the wings. No leads are used, the heavy bottom line (3-inch rope) keeping the net down sufficiently, and even this is sometimes supplied with block-runners to keep it from sinking into the mud. Cork line, 2-inch rope, 4 corks to a fathom on the wings; 6 corks to a fathom on the back. Boat, 65 feet long; 11 feet beam; round-bottomed; 30 oars.

Engine at land end, 8 horse-power; engine at boat end, 14 horse-power. The boat-line is shifted from time to time to sheaves set in the beach as the brails are drawn together, or the current drifts the seine down stream.

Men: Two seine captains, 5 assistants, 2 engineers, 4 net-menders, (white); 60 seine-haulers, 3 cooks, (negroes.)

One lighter scow, 30 tons burden. A tug, chartered for the season, tows two lighters and a schooner. A third lighter is necessary, as an empty one is left when the loaded one is taken away. The yearly expenditure is from $12,000 to $15,000 on this fishery.

thirds miles. In each haul of the seine over 1,200 acres of bottom are swept by the bottom line and the larger portion of the fishes in this area dragged on shore. Two hauls are made each day of twenty-four hours; one on each ebb-tide.

In 1873, while on a visit to some of the larger fisheries, I saw 2,316 shad and about 25,000 herring taken at one haul. I was told at the time that 4,000 shad were taken two years before.

Nearly all of the seine fishermen stated that this season they were losing more and more money the longer they fished. Instead of counting the shad by thousands, 200 was quite above the average haul for the large seines. It was apprehended that some of the proprietors would become bankrupt.

The decrease of fishing by seines is made evident by the desertion of many of the once most famous shores of the river. Opossum Nose, Cockwit Point, Marshall Hall, White House, Urban's, Scone's Gut, Smith's Point, Indian Head, Craney Island, and others, have been abandoned within fifteen years.

The abandonment of fishery-shores is to be attributed to the failures to make profitable captures for a period of years. These have arisen from a reduction of the numbers of the fishes, primarily; and, also, from variation in the run-ways of the fishes because of changes in the bed of the river (as at Craney Island) and of the obstacles to their ascent, principally the drift-nets and the pound-net leaders. The large rental which certain owners have demanded has also left certain shores idle.

The cause of the dearth of fish must be largely owing to over-fishing; the immense exhausting sweeps of the great seines; the continual drifting of the gill-nets, almost invisible to the fishes in the roily water, yet reaching across the channels often three-quarters of a mile and from the surface to the bed of the river; and of late years the pound-nets, fencing off long stretches of the run-ways of the fishes, until it is scarcely an exaggeration to say that not a gallon of the water of the river flows into Chesapeake Bay without being strained through the meshes of some net. The skim-nets used in the vicinity of the Great Falls are of small consequence in the reduction, as the total of their catch is inconsiderable.

It is the custom, without exception, in all fishing-localities to hear the different net interests attribute the decrease of fishes to the abuses of nets different from their own. The Potomac is not unlike other regions in this particular.

The drift-netters accuse the large seines, and the seine-owners inveigh against the drift-nets and pound-nets, and ask for laws and regulations to control and prohibit them.

A special point of complaint, is the incursion of "foreign fishermen" upon the fishing-grounds. During the last two seasons a considerable number of drift-netters have come upon the Potomac during the shad season, from Pennsylvania and farther north. The presence of these men seems to the resident fishermen and proprietors to be an intrusion and an outrage, and their strongest desire is for a law removing them.

On the sea-coast and the great lakes, fishermen migrate from point to point during the season wherever fish are to be found, regardless of boundary-lines within the United States, and no interference with them is thought of except with regard to shores held in deed or lease. On the Atlantic-coast rivers the disposition has been to reserve the waters more exclusively for the people of the State.

A strong feeling has at once arisen against the pound-nets. It is very curious to observe the entire coincidence there is in the history of the introduction of nets, and the rivalry of interest in different localities. From Lake Champlain, the several great lakes, and the larger rivers we have pretty complete reports of the history of their fisheries.

In all of these localities, in their first settlement, there is evidence of a seemingly inexhaustible abundance of the fishes; the nets necessary for the capture of large quantities being small and easily contrived. As the country became populated an increased demand for the fish grew up, and professional fishermen introduced large nets, and great quantities were taken and sold at low prices, and frequently used for manure. After a few years the supply became diminished, and resort was then had to legislation. The laws enacted were usually good ones, but were rarely enforced.

The history of Jefferson County, Lake Ontario, by F. B. Hough, M. D., affords an example of the rivalry of nets.

At Chaumont Bay the first net-fishing began in 1808. Scoop-nets or scaff-nets were first used. These were flat nets 12 feet square, stretched by two long bows, the ends of which were attached to the corners of the net, and, arched up high above it, crossed each other at the middle. At the point of intersection of the bows, the end of a pole was fastened and reached up to a long pole or sweep, which was balanced over a crotched stick either set into the bank, or a slight pier built out into the water. Later the same contrivance was used from the deck of a scow. The mode of fishing was to force the net down into the water until it lay upon the bottom, and when the fish swam over it to suddenly raise it, the balancing-pole relieving the fisherman from the weight of the net and fish. Mr. Hough, from records which he had seen, stated that as many as 300 fish were taken in a single night.

Seines were soon after introduced, from the Hudson River, and the fish being plentiful no opposition was made. They were from twenty to one hundred rods long. The products of a haul were said to be as high as 75 barrels of white-fish, and the average 6 or 7 barrels. With the multiplication of seines there was a sufficient reduction of the fish to arouse the animosity of the people against the gill-nets when they were introduced several years later. In time, however, they came to be an accepted thing, and when, about fourteen or fifteen years ago, pound-nets were introduced, the whole feeling of the people was brought to bear against them.

Throughout the great lakes, where the gill-net interest and pound-net interest are nearly divided, each inveighs against the other, and shows the advantages pertaining to its own system in relation to preserving the stock of fish in the waters, and in most instances (there have been favorable exceptions, however) a move for legislation for fishery laws, emanating from fishermen, will be found to bear unjustly on a certain class of nets, while the rival interest is not interfered with.

These facts are given to show that the complaints coming from the net interests are calculated to misguide, and that efficient, just, and enlightened legislation should base its conclusions on a more impartial, disinterested investigation of the matter.

There is little doubt that the great occasion for decrease in the Potomac is over-fishing, and in this all kinds of nets are more or less involved. Added to this, impurities carried into the river from drainage have some minor influence,* the disturbance of the fish, especially the shad from its well-known timidity, by the plashing of steamer-wheels; and the continual obstructions it encounters from the nets.

In those causes are the true reasons for decrease. The remedies are what shall influence these by way of restriction or prohibition. The latter has not usually worked to good advantage, as it has occasioned too strong an opposition and is rather un-American in spirit.

The true policy in a law would be to strike at abuses in all nets, and nothing can be more to the purpose in the protection of anadromous fishes, such as the salmon, shad, and alewife, than a "close-season" law prohibiting all fishing during a portion of each week—from Friday night to Monday morning, or such other time as may be considered necessary. Regulations of the length of nets and the size of mesh are also valuable measures.

The great reason for failure in the effect of fishery-laws has not been their character, but the fact that they were not enforced. This has been the almost universal history of the laws except in Canada, Scandinavia, and portions of Russia. It has been notably so throughout the United States.

A suggestion which has impressed me strongly with relation to the fisheries of the Potomac I hesitate to propose, as it is so opposed to the judgment of all who have taken fishery-laws under consideration, and among these I recognize many whose opinions I have reason to treat with great respect, as they have studied this question with earnestness and fairness, and have arrived at their conclusions from a considerable range of observation and thought.

The proposition I desire to make must be premised by the condition that suitable laws be enacted and efficient means be provided for their

*It is quite possible that the abundance of the shad in the Georgetown channel has been lessened because of the drainage from the gas-works at G street, although the amount of drainage into so large a stream as the Potomac is soon dissipated, and does not influence very far down the stream.

enforcement. How this may be done I will discuss further on. A careful consideration of the subject of the Potomac fisheries as we may anticipate it through years to come induces me to recommend that pound-nets be encouraged in preference to all others. There are a few important reasons why, under proper control, they will work more advantageously for the welfare of the fisheries than seines or gill-nets.

A purpose that must not be lost sight of in the ardor for the conservation of the stocks of fishes in the waters is the productiveness of the fisheries. They are one of the resources of income in the industries and productions of a State favored with a water area or coast, and should be made to produce to whatever extent they can without endangering future supplies.

In manufacturing industries and agriculture a great deal of attention is paid to the reduction of cost of production and improvement in machinery, and the same thing should be applied to the fisheries.

The pound-net, where it has been employed on the lakes in white-fish and lake-herring fisheries; on the coast in the scup, blue-fish, sea-bass, squeteague, and tautog fisheries; on the Atlantic rivers and bays in the salmon and the shad fisheries, more especially of the Connecticut River and Bay, has been found to cost very much less, in its current expenses, than the seine. The items in which it saves expenditure are its great reduction of the labor-force, its saving of the time lost between hauls by the seine, and the great saving of wear and tear that a stationary net has when compared with hauling seines.

The Stony Point seine investment* would establish at least 30 first-class pound-nets fully equipped for work, and instead of two steam-engines and crew of 75 men, 30 men would be an ample force to attend them and work fewer hours than the seine-crews have to. The twine of these large seines would not have to be thrown away, but would nearly all come into use in making up the pounds.

That many pound-nets properly placed and efficiently attended should certainly yield much more than the seine.†

The pound-net has also the advantage that the fish remain alive until it is desirable to take them out and move them to the market, and come upon the stalls in the freshest, best condition. In either seine or gill-net this is not the case.

Some advantage might also be claimed that the eggs of a spawning-fish would be preserved, and with the light specific gravity of the shad-

* I have estimated the investment for the steam-engines, the lines and twine of this seine at $25,000, which is well within the original cost; estimating a good ordinary pound-net at $800, 30 of them could be erected for this amount.

† The fishermen of the Potomac at present have but little confidence in the pound-net as a means of capture for the shad. In the bay and lower end of the Connecticut River they are constructed so as to capture shad very successfully; in fact, quite too much so in the estimation of the people of the upper portion of the river. There is no reason to believe the Potomac shad should differ from the Connecticut ones in the particular of entering a pound-net.

eggs, would float out of the net and have some chance for development and the production of young fish.

Another important advantage would be that as a stationary net the only portion of the bottom on which eggs might be deposited that would be disturbed, would be the 30 feet square of the bottom of the movable pot, and even this would be slight. A contrast very favorable to the pound-net is with the 1,200 or more acres swept by the seine referred to, twice in twenty-four hours, and the continual trailing of the drift-nets over miles of the bottom of the river.

The objections that have been advanced against the pound-nets on the lakes and sea-coast are the following: First, that by extending the leaders for long distances, often for miles, they fence off the run-ways of the fishes and guide entire shoals of fishes into the pot or trap portion; second, that by employing small meshes in the pot or trap, young and immature fishes are captured in large numbers, and the stock of fishes in the lakes thereby reduced uselessly and in an anticipatory manner, as the future stocks of fishes which depend on the progeny of these are of course prevented. These are the objections to pound-nets, and they are final and sufficient to condemn them for all waters if these features are necessarily attendant with their use.

The abuses, it will be seen, are the extension of the leader to unreasonable lengths, and the use of a mesh so small that immature fishes are destroyed in large numbers.

The Potomac has the advantage of the old pound-net regions in that the interest is as yet very small, and a good code of laws for their regulation can be enacted by the States interested without the opposition of a wealthy and determined body of net-proprietors, as has been the case on the sea-coast, Connecticut River, and the lakes. For the enforcement of laws after they have been established, no better system could be employed than that which controls the oyster-fisheries of Maryland. The extension of the duties of a fishing-police force, with properly-equipped vessels, to the oyster-dredgings, fisheries, and the nets, would place the whole matter under efficient control, and whatever regulations as to close-season, size of mesh, length of nets, and even number and character of fisheries, if there should be legislation in this particular, could be efficiently controlled.

I have to acknowledge my indebtedness to my companions during the trip for many suggestions and ideas developed in our conferences on board of the Triana.

Admiral Goldsborough, of the navy-yard, placed all facilities possible for the success of our trip, in equipping the steamer, and Captain Cook, commanding the Triana, rendered us every advantage possible to facilitate our inquiries.

I am, yours, respectfully,

JAMES W. MILNER.

Prof. S. F. BAIRD,

*United States Commissioner of Fish and Fisheries.*