

REPORT

OF THE

Commissioners of Fisheries

OF

NEW JERSEY.

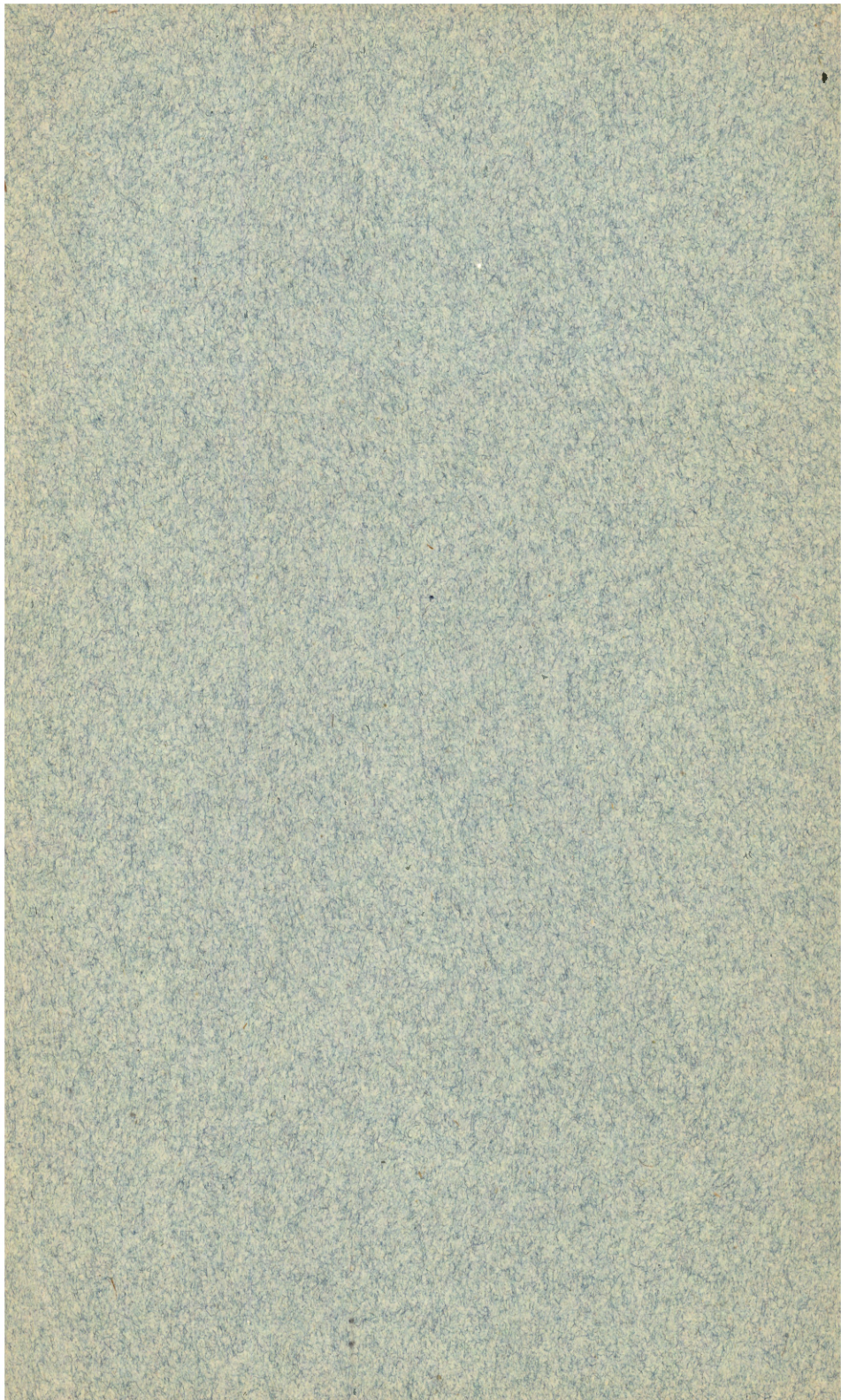
1879-1883.



TRENTON, N. J.:

JOHN E. MURPHY, BOOK AND JOB PRINTER.

1883.



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Compliments of

William Wright,

State Fish Commissioner.

Comments on

William H. Phillips

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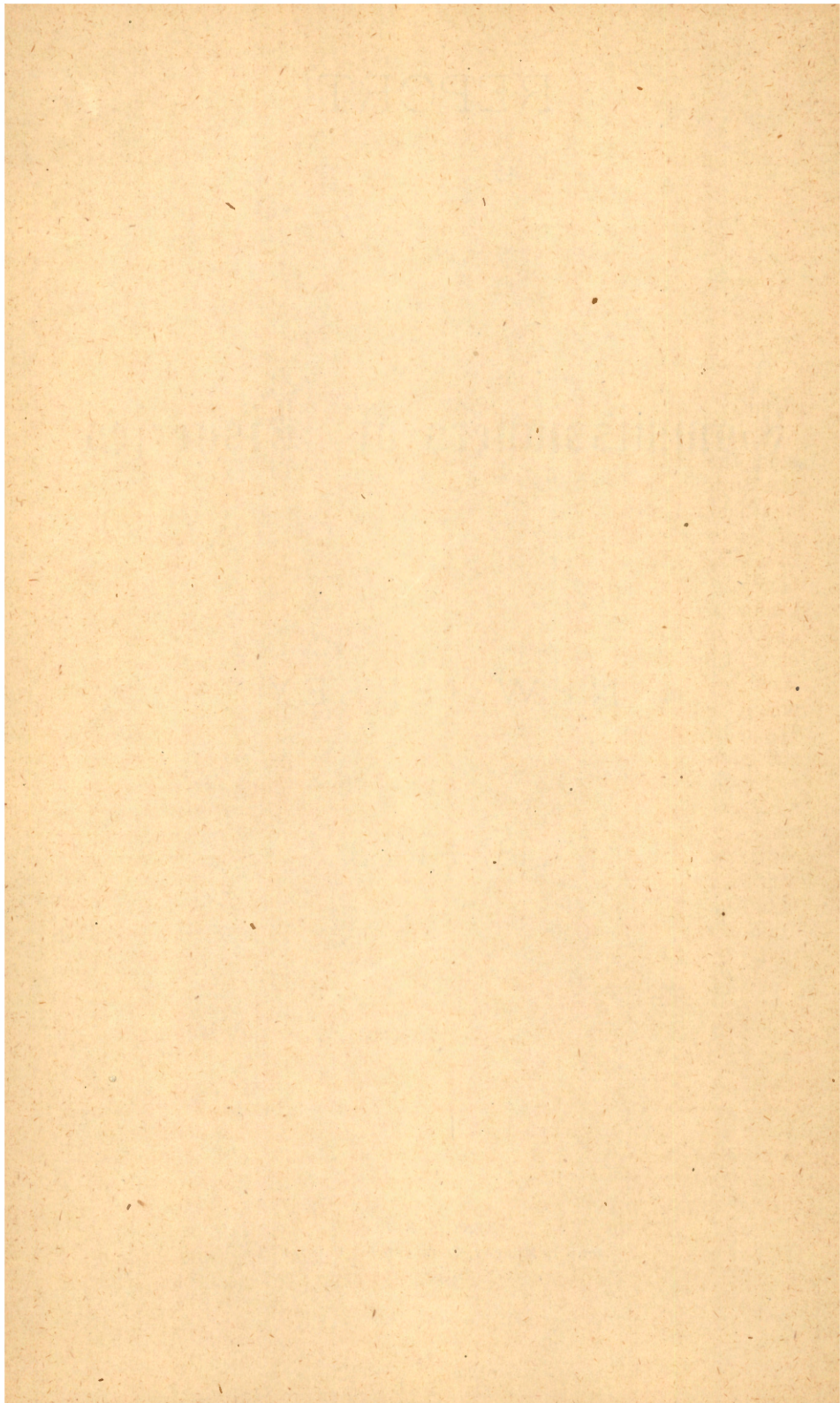
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REPORT.

April 3d, 1883.

To His Excellency George C. Ludlow, Governor of New Jersey :

SIR—Before proceeding to a detailed account of their operations since the date of their last report, the Commissioners of Fisheries of the State desire to say that since that date, the State and its important fishing interests have suffered a most serious loss, in the death of Doctor Benjamin P. Howell, of Gloucester county, the Chairman of the State Fish Commission, who died at his residence in Woodbury, October 10th, 1882. Dr. Howell had been a member of the Fish Commission of the State since its establishment, thirteen years ago, and was selected for that position because of his familiar knowledge of the resources and requirements of the State in connection with its fishing interests, and because of the activity and enthusiasm which he had always manifested in the promotion of those interests. He had made the questions of fish culture, and the advancement of the important and valuable industries connected therewith, the subject of especial study, and his interest in the subject was so deep and true that the pressing claims of private and professional life were not permitted to interfere with the constant and intelligent discharge of the arduous and unrecompensed duties imposed upon him by his appointment as Commissioner of Fisheries. His thorough familiarity with the questions which were presented for the consideration of the Commission, rendered him a most efficient member of that body. He contributed to the Commission the valuable results of long years of careful investigation, and gave his time and knowledge to the State, without thought of fame or pecuniary reward.

Without transgressing the proprieties of an official document, it may be permitted to his two surviving colleagues who will sign this report, to say that by his unfailing, kindly courtesy, his sterling integrity, and the many admirable qualities of head and heart, which his years of official intercourse with them revealed, he so established himself in their regard, that, at his death, their appreciation of the loss of an efficient public official was no greater than their personal sense of the loss of a valued friend.

For some time preceding the death of Commissioner Howell, he had in preparation an elaborate report upon the shad fisheries in the Dela-

ware river, which branch of the State fishing interests was especially committed to his care, and to which he had consequently given more attention than any other member of the Commission. By reason of his death that report was never completed, and the presentation of a full report of the operations of the Commission was necessarily postponed to permit of the collection of the data requisite for the preparation of the report herewith presented, which, while it will aim to give a comprehensive view of the work of the Commission, will of necessity lack the completeness of detail and the full statistical information which would have characterized Dr. Howell's account of that branch of the work which was under his particular care.

The ordinary work of the Commission consists of a supervision of the wardens of the several counties, in the performance of their duties in enforcing the laws regulating and governing the times, seasons, and modes of taking fish; and through the judicious legislation of the past few years, supplemented by a vigorous enforcement of the laws, they have had the gratification of seeing immense benefit to our coast and river fisheries, in an annual increase in the catch of food fishes.

SHAD FISHERIES.

Much attention has been given to the enforcement of the law relative to close time, as affecting the shad fisheries on the Delaware river below Trenton. These fisheries employ more capital, provide employment for more men, and furnish a greater amount of food fish, than the fisheries of any other section of the State, and although they are not usually in active operation for more than three months in the year, they constitute an industry which is of immense importance to the citizens of the counties bordering upon the Delaware river, and which should not be omitted from the list of subjects which the Legislature deems worthy of its careful consideration. It was stated in the last report from this Commission, that the production of the shad fisheries of the State had steadily declined for some years past, and it was then believed by the Commissioners that this was attributable to excessive and indiscriminate fishing, and that the way to a restoration of the old-time productiveness of these fisheries lay through a vigorous enforcement of a close time, and the addition to the numbers of the young fish by artificial propagation. The experience of the Commission has demonstrated the truth of this proposition; but it was found that the increasing demand for this delicious article of food, a demand attributable to the enlargement of the market through increased railroad facilities, not only called for a restoration of the former productiveness of these fisheries, but also for the adoption of any possible measures for an increase of the supply. The Commissioners believed that the accomplishment

of this desirable result was within the bounds of possibility, and even of probability, and their suggestions looking to this end were promptly adopted by the Legislature, and the means were placed at their command to carry out plans which were carefully matured, and which have proved eminently successful.

The laws of the State forbid the catching of shad in the Delaware river between sunset on Saturday evening and twelve o'clock on Sunday night. There exists a popular belief that the purpose of this law is a moral one, and that its primary object is to prevent the violation of the sanctity of the Sabbath; but, beneficial as the law may be in its moral and religious aspects, it presents features of an entirely different character to the official view of the Commissioners of Fisheries. It is a well known fact, that hardly needs re-statement, that all the shad which are captured for food in the Delaware river, are taken while making their annual excursion from the sea to the head-waters of the river for the purpose of depositing their spawn. This annual migration commences in the spring as soon as the chilling effects of the melting ice and snow have passed away, and the waters of the stream have begun to feel the genial influence of the sun, and, promptly upon the first indications of the commencement of the journey of the fish toward their spawning grounds, thousands of yards of net are spread to intercept them on their way, to thwart their procreative purpose, and to turn the progenitors of their kind into articles of merchandise and delicacies for the table. The migration continues until late in August, and sometimes, in favorable weather, even into September, and in order that the procreative process may be carried on, the law wisely provides that fishing for shad, in the Delaware, shall be illegal below Trenton after the 10th of June, and above Trenton after the 15th of June, in each year. It needs no argument to show that to enforce the laws prohibiting fishing on Saturday night and Sunday during the shad-fishing season, and to prevent fishing after the lawful season has closed, requires no ordinary vigilance on the part of the wardens of the several counties bordering on the Delaware river. This has been found particularly necessary because of the fact that many of the violators of the law have been residents of the adjoining States of Pennsylvania and Delaware. The whole of the Delaware river is the dividing line between the two States, and it is considered a necessary requirement to the efficacy of all laws regulating fishing in that river, that they shall have had the concurrent approval of the Legislatures of the two States. There has been the necessary concurrent legislative action respecting the shad fisheries in the Delaware river, but it has not always been the good fortune of the Commissioners of this State, in their efforts to enforce these laws, to secure the hearty and active coöperation of the authorities of the other States named, and, as a consequence, the labor has necessarily been assumed by the Commissioners of New Jersey, while a large share

of the benefit has been enjoyed by sister States. These facts are not presented by the Commissioners in the form of a complaint, but rather that the Legislature before which this report is to be laid, may be enabled to take a practical and comprehensive view of the subject which the Commissioners essay to present to them. It will be seen, from what has been said, that but for the vigilance and efficiency of the officers intrusted with the enforcement of the law, but few fish would be allowed to reach the spawning ground, and that in a short time the annual run of fish would become so small, that the shad fishing, as an industry, would be destroyed. Fortunately for the State, its representatives have for some years past shown, by judicious legislative action, that they recognized the importance of this industry, and the State has been furthermore fortunate in securing the services of enthusiastic, vigilant and efficient wardens, who, by faithful performance of the duties imposed upon them, have not only won the warmest approval of the Commissioners, under whose direction their work has been done, but have proved themselves faithful servants of the State, and have shown an earnest devotion to the public welfare.

In view of the proximity of Camden and Gloucester counties to Philadelphia, and the difficulties attending a full enforcement of the fishing laws in those counties, it is safe to say that in no other counties of the State have the duties of warden been more arduous or more difficult of effectual performance, and it is due to Wardens Ore, of Camden, and Pierson, of Gloucester, to say that they have proved most faithful and vigilant officers.

In addition to the enforcement of the laws as to the times and modes of fishing, further efforts have been made to improve the shad fisheries by annually adding to the supply of young fish by means of artificial propagation. Large numbers of the eggs spawned in the natural way are devoured by other fishes, destroyed by other means, or, from manifold causes, fail to produce young fish, and many thousands of the fish which are hatched are destroyed before reaching maturity. The Commissioners have made large additions to the supply each year by the artificial process, and very much of the improvement in the productiveness of the shad fisheries is believed to be due to this cause. This work was commenced in the Delaware river in 1874, under the auspices of the United States Fish Commissioner, and has been carried on annually since then by the Commissioners of New Jersey. The number of young shad produced by artificial means each year, for the past four years, was from one and a half to two millions, and the expense of producing them is so small, compared with the undoubted benefit to the shad fisheries, that there can be no question of the utility and value of this work.

It has not been possible to procure perfectly accurate returns of the number of shad taken from the Delaware river each year,

although the wardens of the several counties have made every effort to procure reliable information. Many of the fishermen being residents of the States of Pennsylvania and Delaware, but little can be learned of the catch made by them. In the report of the Commission for 1878, it was stated that, from the data available, it appeared that the whole number of marketable fish taken during the three months of the fishing season was about seven hundred thousand (700,000), and that the value of this product, at the prices realized, was one hundred and seventy-five thousand dollars (\$175,000). In each of the two succeeding years there was an increase of about two hundred thousand (200,000) fish over the year before, and in 1881 the increase was so great that it is estimated that at least one million four hundred thousand (1,400,000) fish were taken. In the opinion of the Commissioners, this great increase in the value of this important industry is due to the vigilant enforcement of the laws respecting close time, and to the effects of artificial propagation. In 1882 the catch of fish was less than in the preceding year, but this was attributed by the fishermen to the fact that cold weather prevailed until long after the time that the fish usually begin to ascend the river, and, during nearly the whole of the lawful fishing season, the temperature and condition of the water were such that the fish were deterred from making their way in any great numbers to their customary spawning grounds until after the time had expired within which the law permits them to be taken. The correctness of this view received striking confirmation in the unusual numbers of adult shad which were seen making their way up the river in the latter part of June and in July, and in the extraordinary quantities of newly-hatched fish which were seen on their way to the ocean in the autumn of that year. The decrease in the number of fish caught in the spring did not seriously affect the profits of the fisheries, as the prices obtained for the fish taken were sufficient to nearly, if not quite, compensate for the diminished yield, and the labor and expense of handling and marketing them was considerably decreased. Returns have not been received as to the catch of the present season, but, so far as possible, they will be presented in a supplement to this report.

In 1881 one hundred thousand (100,000) young shad, hatched in the Delaware river, were deposited in the Raritan river, at New Brunswick, and artificial propagation has been carried on each year for the improvement of the shad fisheries in the Hackensack river. These fisheries are of less magnitude than those of the Delaware, but they yield annually considerable numbers of fish, and are of so much importance to the citizens living near them that they cannot wisely be neglected. In the Hackensack river the propagation of shad for the past three years has been carried on by Mr. George Ricardo, warden of Bergen county, and his efforts toward the produc-

tion of young fish have been singularly successful. He reports the number hatched in 1880 and 1881 as about one million three hundred thousand (1,300,000). Sufficient time has not yet elapsed to determine the effect of his operations upon the results in adult fish.

In 1882 and 1883 the Legislature failed to make the usual appropriation for carrying on the work of artificial propagation, but a small sum remained at the disposal of the Commission, which would have been devoted to this purpose last year, but that the condition of the river during the hatching season was such, by reason of a constant succession of slight freshets, as to render operations impracticable. The whole number of young shad produced by artificial propagation under the direction of the Commission, and added to the waters of the State, since the last report, was not less than six and a half millions (6,500,000), and, allowing for a large percentage of loss, it is obvious that such an addition to the natural increase cannot fail to have a marked effect upon the yield of adult fish. The results have been, in the opinion of the Commissioners, so beneficial that they hope the work will receive further encouragement from the Legislature.

SALMON.

The operations of the present and former Commissions, in connection with the attempts to stock the Delaware with salmon, were set forth with considerable detail in our last report. Efforts had been made by the United States Fish Commission, for some years previous to the appointment of the present New Jersey Commission, to stock the Delaware with this most valuable fish, and Professor Spencer F. Baird, United States Fish Commissioner, was deeply impressed with the possibility of accomplishing this desirable result. In his efforts in this direction he has had the coöperation of the Commission of this State since the earliest attempts, and the benefits to flow from success were, in the opinion of the Commissioners, so great that they have given much time and attention to the matter, in the hope of seeing salmon fisheries established on the Delaware, and an important and valuable addition thus made to the industries of the State.

It may not be out of place to quote a portion of what was said in the last report, as to the history of what had then been done in this connection.

"A few eggs had been hatched and the fry liberated in the Delaware, by private enterprise, in the years 1871 and 1872, but the operations of 1873 were the first with which the Commissioners of this State had any connection. In that year five thousand (5,000) Rhine salmon fry, and eighteen thousand (18,000) Penobscot salmon fry were placed in a tributary of the Delaware, and in each succeeding year an increased number of young fish have been liberated in

that stream and its tributaries; the whole number up to the date of the appointment of the present Commissioners having been, so far as has been ascertained, eight hundred and seventy-eight thousand and five hundred (878,500). All of the eggs from which these fish were produced, were furnished by the United States Fish Commission, and a large majority of them were California salmon eggs from the United States Fishery, in California, established for the purpose of taking the ova and furnishing them to the several States to be hatched and distributed. They are furnished to the Commissioners free of cost, excepting the expense of carriage, and are hatched and distributed at the expense of the State. No attempt has been made to capture any adult salmon which may have returned to our river, and it was not expected that they would make their re-appearance until four or five years after they were placed in the stream. In the spring and summer of 1877, however, six or seven fish were taken in shad nets at different points on the river. They were medium-sized fish, averaging about ten pounds, but had evidently been to the sea and had returned to the river to deposit their eggs. This was deemed highly encouraging, and the next season was looked forward to with much anxiety, by those who were interested in fish culture, and who appreciated the immense importance of the success of the efforts to establish this valuable fish in the rivers of the State.

"During the shad-fishing season which closed below Trenton, June 10th, and above Trenton, June 15th, 1878, a number of salmon were taken by shad fishermen at different points on the Delaware. It has been impossible to procure information of all that were taken, but a sufficient number were reported to warrant the assertion that from fifty to one hundred were taken before June 10th. All of those reported to the Commissioners were larger fish than any of those taken in the preceding year, and ranged, in weight, from twelve to twenty-nine pounds; only two or three weighing less than fifteen pounds. After the shad season closed and the nets were taken from the river, there was nothing to interrupt the progress of the salmon from the sea to the head-waters of the stream, and doubtless many passed up and deposited their eggs, since the Commissioners are informed of a number of large ones having been seen at different points in the river between Trenton and Port Jervis."

In view of these facts, and of the belief of eminent practical fish culturists that the enterprise would prove successful, the Commission continued to accept the shipments of impregnated ova, furnished by the United States Commission, and to hatch the eggs and deposit the young fish at suitable points in the Delaware river. Up to the date of the last report, there had been received from the United States Commission, eggs which had produced one million two hundred and three thousand and five hundred (1,203,500) young salmon, all of which were planted in the waters of this State, and nearly all of

them in the Delaware river and its tributaries. Since that date the following plants have been made:

In the year 1879.....	222,200
" " 1880.....	590,512
" " 1881.....	171,072
" " 1882.....	137,416
Total.....	1,121,200

A portion of the eggs from which these fish were produced, were from California salmon, taken at the United States Government establishment in California, and a portion were from Atlantic salmon, taken from rivers on the eastern coast. They were all furnished free of charge by the United States Commission, and were hatched and distributed at the expense of the State. The entire number of young fish planted since the beginning of the experiment, under the direction of the present and former New Jersey Commissions, was, as nearly as can be ascertained, two million three hundred and sixty-four thousand and seven hundred (2,364,700), and from the indications of 1879, there was abundant reason to believe that the effects of these operations would be seen in an annually increasing run of salmon. But the experiences of that year were not repeated. In the following year, very few adult fish were taken, and in 1881 none were authentically reported to the Commissioners, but for these two years the plantings were continued. In 1882, they were discontinued, notwithstanding the offers of the United States Commissioner to continue the annual shipments of impregnated ova. Prof. Baird, in correspondence with the State Commission, expressed himself in favor of a continuation of the work, and as strongly of the opinion that it would yet prove successful. It is now being carried on, we believe, under his auspices, by the Fish Commissioners of Pennsylvania, but in view of the meagre results which had been attained, and the uncertainty as to the future, the Commissioners of this State did not feel justified in continuing the annual expenditure involved in hatching and distributing the fish.

It would be idle, or at least profitless, to speculate upon the causes which operated to render these efforts unsuccessful. The well known instinct which impels anadromous fishes to seek, at the spawning season, the head-waters of the streams in which they originated, was relied upon to bring an annual run of salmon into the rivers of the State, and many theories have been advanced in explanation of the failure of the habit in this case, but these theories are necessarily not capable of being reduced to a certainty. In the opinion of the Commissioners, the most probable explanation is, that in the late summer and early autumn, the waters of the Delaware are usually very low, and of a higher temperature than that of rivers to which

the salmon is indigenous, and for this reason the fish have been deterred from ascending the stream, and have sought more congenial spawning grounds.

BROOK TROUT.

The efforts of the Commission to restore the partially depleted trout streams of the State have been continued, and have met with a cheering measure of success. It is not deemed necessary to enter into any extended argument to show the desirability of such restoration. Many of the smaller streams of the State are natural trout streams, and formerly yielded an abundant supply of this delicious food fish; but through excessive fishing and other preventable causes, they had become partially depleted, and brook trout were on the verge of disappearance from our streams. The action of the Commissioners in their attempts to increase the supply, and to protect the streams against unlawful and barbarous fishing, have met with warm encouragement, and have been ably seconded by many citizens of the State.

No efforts have been made to establish these fish in waters in which they were unknown before, but the efforts of the Commissioners have been wholly directed to an increase of the yearly supply in natural trout streams.

It was necessary, in the case of trout, to either purchase from fish culturists the young fry of suitable age for distribution, or to purchase impregnated ova and hatch the fish. The latter plan has been most generally adopted as the least expensive and, in other respects, the most satisfactory. At the date of the last report it was estimated that two hundred thousand (200,000) young trout were being fed and cared for in the hatching-house, awaiting their arrival at a suitable age for distribution. These were distributed in the spring of 1879, and in the years 1880 and 1881 further purchases of ova and further distributions were made.

The following statement shows the numbers distributed to the waters of the several counties in each year :

IN THE YEAR 1879.

To Warren County.....	9,200
Hunterdon County.....	10,000
Camden County.....	5,000
Sussex County.....	64,600
Somerset County.....	10,000
Essex County.....	3,000
Morris County.....	29,500
Passaic County.....	14,000
Monmouth County.....	9,000
Bergen County.....	4,000
Middlesex County.....	2,500
Union County.....	9,000

IN THE YEAR 1880.

To Morris County.....	45,500
Sussex County.....	65,000
Warren County.....	5,000
Camden County.....	2,500
Monmouth County.....	6,000
Bergen County.....	10,000
Somerset County.....	5,000
Union County.....	3,000
Passaic County.....	7,000
Mercer County.....	1,500
Essex County.....	3,000

IN THE YEAR 1881.

To Morris County.....	10,000
Sussex County.....	35,000
Warren County.....	8,000
Monmouth County.....	3,000
Bergen County.....	10,000
Somerset County.....	10,000
Passaic County.....	10,000
Hunterdon County.....	7,500

Total distribution of brook trout from 1879 to
1881, inclusive..... 416,800

The distribution of these fish was made under the auspices of gentlemen residing in the several counties, who not only kindly volunteered to aid the Commissioners in selecting the most suitable places of deposit, but who in many instances permitted the fish to be consigned to them, and personally aided the messengers of the Commission in the actual planting of the fish. It would make too long a list to mention by name the gentlemen to whom the Commissioners are indebted for valuable counsel and assistance, but they are one and all entitled to the thanks of the Commission, not only for the services rendered, but also for the encouragement and support which their interest in the work gave to the Commissioners.

There is every reason to believe that the anticipations based upon this branch of the operations of the Commission will be more than realized. Notwithstanding the short time which has elapsed since these waters were stocked, reports from many sections show that the productiveness of the streams has been restored, and, when the planted fish have had more time to increase by natural processes, there can be no doubt that the benefits of the plantings already made will be fully manifested and will be felt for years to come. It is to be hoped that these benefits may not be missed through lack of legislative protection, or through want of judicious enforcement of the protectory laws.

BLACK BASS.

Probably no subject connected with fish culture has been of more interest to the people of New Jersey within the past few years than

the establishment of black bass in the waters of the State. But about twelve years have passed since this valuable fish was first introduced to our waters, and in that time he has taken a leading position among the food fishes of the State.

Indeed it may be said that of our fresh water fishes there is none which, for purposes of sport or food, can pretend to compete with the black bass. It hardly needs to be said here that this fish is a prolific breeder, of rapid growth, delicious as a table fish, thriving well in almost any of our ponds and streams, furnishing the finest sport to those who seek him merely as a game fish, and abundant, cheap and wholesome food to those who seek him for a more substantial purpose. The Commissioners have been fully convinced of the desirability of a general distribution of this fish throughout the State, and a very considerable portion of the appropriations placed at their disposal has been devoted to this purpose.

It may be necessary to explain that the operations in connection with the distribution of black bass are essentially different from those connected with the fishes referred to in the foregoing pages. Artificial propagation is not practicable in the case of the black bass, as in the cases of the salmon and trout. In the latter cases the fish are produced from the egg, in hatching-troughs entirely under the control of the operator, and are deposited, while in a state of infancy, in the waters to be stocked. But black bass are allowed to spawn and hatch in the natural way, and the fish required for stocking purposes are taken from their native waters when they have nearly or quite reached the spawning age. For this reason the difficulty and expense of procuring and transporting them are greatly increased, and plantings of but a few hundred can be made, as against thousands of those fishes of which it is practicable to use the fry. But, as the bass are more nearly of a propagating age, they sooner begin to reproduce their kind, and the results of the plantings are much more quickly apparent than in the case of the younger fish.

The annual work of the Commission in the distribution of bass is substantially confined to the months of September and October, for the reason that before September their safe transportation is difficult because of the heat, and after October it is not easy to procure them in sufficient numbers to carry on the work successfully and economically. Since the date of the last report the Commissioners have distributed, to suitable waters in the State, twenty-two thousand four hundred and twenty (22,420) black bass, the number distributed in each year having been as follows :

In 1879.....	14,960
1880.....	3,415
1881.....	4,045
Total.....	<u>22,420</u>

In 1882 the Legislature made no appropriation for this purpose, and the collection and distribution of black bass was discontinued.

In making the distribution of these fish the Commission endeavored to grant every application received from localities in which the waters were believed to be suitable, and the following statement shows the counties from which applications were received, and the number of fish distributed to each :

To Atlantic County.....	400
Bergen County.....	60
Burlington County.....	1,350
Camden County.....	1,265
Cumberland County.....	1,385
Essex County.....	1,600
Gloucester County.....	1,990
Hunterdon County.....	800
Middlesex County.....	550
Mercer County.....	1,200
Monmouth County.....	3,250
Morris County.....	1,900
Ocean County.....	1,500
Passaic County.....	600
Salem County.....	970
Somerset County.....	1,100
Sussex County.....	400
Union County.....	1,300
Warren County.....	800
Total number distributed.....	<u>22,420</u>

Some idea of the time and labor involved in these operations may be formed when it is remembered that nearly every one of these twenty-two thousand fish were taken with hook and line by persons employed for this purpose by the Commissioners; that they were carefully kept in "live boxes" until arrangements could be made for their transportation; that in nearly every case the places of deposit were distant from the railroad stations, and to avoid delay and the consequent danger of loss of the fish, the most accurate arrangements must be made to secure means of transportation by wagon at the end of the railroad journey; that each shipment must be in charge of a skilled messenger, who could give the fish the proper care while on the way, and that many times the heat of the weather rendered it necessary to carry a supply of ice to reduce the temperature of the water in the cans in which the fish were conveyed. The Commissioners are indebted to the several railroad companies of the State, for the privilege of sending cans of fish in baggage cars on passenger trains, and for free transportation of fish. They also owe much to the courtesy of railroad officials and employes, who, almost without exception, have exerted themselves to facilitate the transfer of fish, and in many ways have rendered valuable aid toward the necessary rapid transit of the living and perishable freight.

The results of this work of the Commission are so well known that it seems hardly necessary to expatiate upon them here. From nearly every county in the State, the most gratifying reports have been received, and short as has been the time allowed for the planted fish to stock their new homes, there are now many lakes and streams densely populated with black bass, and furnishing annually hundreds of pounds of cheap and nutritious food which, before this distribution took place, produced only the meaner sorts of fish, which furnish no sport to the angler, and are hardly to be classed among the food fishes.

LAND-LOCKED SALMON.

The efforts to establish this valuable fish in some of the colder lakes in the northern part of the State, have been continued, the eggs having been furnished free of charge by the United States Fish Commission. There are but few localities in the State suitable for these fish, and the plantings have naturally and properly been confined to these localities.

The deposits since the last report have been as follows :

IN THE YEAR 1879.	
In Sussex County.....	3,000
Warren County.....	4,000
Bergen County.....	9,400
Morris County.....	17,000
IN THE YEAR 1880.	
In Sussex County.....	19,318
IN THE YEAR 1881.	
In Sussex County.....	21,200
IN THE YEAR 1882.	
In Passaic County.....	5,000
Sussex County.....	14,274
Total number deposited from 1879 to 1882, inclusive.....	93,192

Time enough has not elapsed since the deposits of these fish to show their full results; but from the fish which have been taken, and the observations which have been made, the Commissioners are encouraged to hope that the work will prove an entire success. This is greatly to be hoped, as no more valuable addition than this could be made to our game and food fishes.

SMELT.

The smelt fisheries of the State are of minor importance, in an industrial point of view, but they furnish annually a moderate supply

of a most delicious and much sought for table delicacy. The principal fisheries are on the Hackensack and Raritan rivers, and within the past few years the annual run of fish has notably declined, especially in the Raritan river. In 1881, the warden of Bergen county reported that the "smelt fishing had been very good, one party taking as high as seven hundred pounds in one night," but this was an exceptional season. Many attempts have been made to increase the production of the smelt fisheries by artificial propagation, and it has been found to be entirely practicable to procure impregnated ova and hatch the fish, but, on account of their infinitesimal size, it has proved difficult to confine and care for the fry until they are of a suitable age to be liberated in the stream.

Mr. George Ricardo, Fish Warden of Bergen county, has probably more nearly succeeded in overcoming the difficulties in the way of smelt propagation than any other experimenter, and, by a device of his own, he has been able to add many millions of young fish to the supply in the Hackensack river. Mr. Ricardo is an enthusiastic fish culturist, and his ingenious efforts to restore the productiveness of the smelt fisheries, as well as his services in the artificial propagation of shad in the Hackensack river, are worthy of the highest praise. There is but little doubt that these efforts will result in a largely increased annual run of smelt in that river.

WHITE FISH.

In our last report, it was stated that there had been received from the United States Fish Commissioner, one hundred thousand (100,000) white-fish eggs, which had been hatched and were then awaiting distribution. Half of these were to be hatched for Hon. Abram S. Hewitt, and to be deposited in waters in the northern part of the State, to be designated by him, and the remainder were to be at the disposal of the State Commissioners. These eggs produced eighty thousand (80,000) young fish, which, in January, 1879, were deposited as follows:

In Shepherd's Pond, Bergen County.....	40,000
Lake Hopatcong, Morris County.....	40,000

In the winter of 1881-2, a further shipment of white-fish eggs was received from the United States Fish Commission, which were hatched and the fry deposited in February, 1882, as follows:

In Shepherd's Pond, Bergen County, and in Greenwood Lake, Passaic County.....	89,046
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No reports have been received of the taking of any adult fish as the result of these plantings, but sufficient time has not elapsed for them to fully establish themselves.

CARP.

Within a few years past many of the waters of the State, unsuited to the production of the more valuable class of fishes, have been stocked with German carp. These fish are said to thrive well in small and shallow ponds, of which there are many in the central part of the State, and in waters suited to them it is claimed they grow rapidly. As the distribution has been made entirely under the direction of the United States Fish Commissioner at Washington, the attention of the Commissioners of this State has not been particularly called to the subject, and they have no statistics to present concerning the plantings, and no information as to the results.

COAST FISHERIES.

The annual production of fish upon the Atlantic coast of New Jersey and in the bays along that coast, is of vast importance, and the value of any measures which can be adopted to protect and improve these fisheries can not be exaggerated. In 1878, an act was passed limiting and regulating seine fishing in the waters lying between the coast line and the main land of the counties of Ocean, Burlington, Atlantic and Cape May. There are many thousands of acres covered by these waters, and immense numbers of food fishes annually find their way into them through the inlets leading from the sea. These fish come there both in search of food and of spawning grounds, and their capture not only furnishes employment to thousands of people, but also supplies food for the tables of the yearly increasing population along the coast.

Many of the people of that region depend almost wholly upon fishing with hook and line for their subsistence, and without the passage and enforcement of laws to protect them in this, they are at the mercy of those who sweep the fishing grounds with seines, and in a few hours deprive hundreds of their neighbors of days and weeks of remunerative occupation. Many visitors are attracted to our sea-side resorts mainly by the fishing, and many of our citizens support themselves and their families by furnishing boats and fishing appliances to these visitors, as well as by furnishing the daily table supply of fish for the thousands of sea-side visitors. It sometimes happens that, in a single night, by a few sweeps of a seine the fishing is destroyed or irretrievably damaged for the remainder of the season. The legislation of 1878 was designed to prevent this and, also, to stop the wanton destruction, occasioned by the catching of enormous quantities of small, unmarketable fish which are necessarily wasted. Naturally, there was much opposition to these laws on the part of those who engaged in seine fishing, but the wardens, acting under

the advice of the State Commissioners, avoided conflicts with the fishermen as much as possible, and rather sought to demonstrate to them that the protectory and restrictive legislation was for their own benefit. By this means, the opposition was gradually overcome, and many of those who formerly followed the destructive method of fishing with seines, have found the other and lawful methods more profitable, while the annual catch of fish in these waters has been enormously increased. This has not only had the effect of adding to the supply of food, and of furnishing employment to a largely increased number of persons as fishermen, but it has enhanced the attractiveness of our sea-side resorts, and had a direct tendency toward the increase of our summer sea-side population, and so added much to the wealth and prosperity of that portion of the State.

For some years past, much complaint has been heard from our coast fishermen, of the excessive catch of menhaden, for the manufacture of oil and fertilizers. These fish visit our shore in immense numbers annually, and while they are of little value as human food, they furnish the chief subsistence of some of the valuable kinds of food fishes, and so offer the attraction which brings these within reach of our fishermen. Many establishments have been erected along the coast of other States for the purpose of manufacturing oil and fertilizers from menhaden, and from these factories are sent out vessels along the New Jersey coast, fitted out with purse nets and other appliances, with which many millions of menhaden are taken every year within sight of our shores. It is believed that this enormous destruction has produced a scarcity of fish food, and so caused a decline in the numbers of more valuable fishes by lessening the attraction to our shore, and also that many of these more valuable fishes are captured in the menhaden nets and destroyed. Sundry efforts have been made to remedy this evil by legislation, and at the session of 1882 an act was passed designed to prohibit the wholesale destruction of menhaden, but it was found that the waters in which this fishing was carried on, although washing our shores, were not within the jurisdiction of the State, and that the power to apply the remedy rested not in the State Legislature, but in the Congress of the United States. A bill to prohibit fishing for menhaden with purse nets within a certain distance from the shore was introduced in the United States Senate by the Hon. William J. Sewell, United States Senator from this State, and effected the appointment of a Commission to inquire into the whole subject, with a view to remedial legislation. The Commissioners of this State are not informed of the results of the inquiries of that Commission.

VIOLATIONS OF THE LAW.

The actual violations of the fishing laws of the State decrease in frequency each year. There is, of course, some impatience manifested

at the restrictions and prohibitions which the law imposes, and there have been numerous attempts made to evade the vigilance of the wardens, but this vigilance has in the main served to prevent any such extensive infringement of the laws as would work serious damage to the fishing interests of the State. In the cases of the violations of the laws for the protection of the shad fisheries, the law provides for the capture and confiscation of the nets and other apparatus used illegally, and this law has been promptly enforced in a sufficient number of cases to deter would-be violators from risking their property. Moreover, there is a growing sentiment throughout the State, and indeed throughout the civilized world, in opposition to indiscriminate fishing, and there are few intelligent people who do not realize the wisdom of the adoption of measures to prevent the destruction and promote the increase of this most important factor of the world's supply of daily food. Hence the laws regulating the times and modes of taking fish are more respected and more easily enforced than they were a few years ago.

The most important violation of law with which the Commissioners have had to deal consists of a practice in vogue in the upper waters of the Delaware of building racks or "fish baskets," as they are called, which are erected for the capture of eels and rock fish as they make their way to the sea in the autumn. These racks, in many cases, extend over the whole width of the river, and the young shad descending to the sea run into them and are destroyed in immense numbers. Many of these structures have been destroyed, under the direction of the Commissioners, but, as it is not practicable to maintain a constant watch along the whole of the upper portion of the river, the racks are soon reconstructed and the work of destruction goes on. As the Delaware is the dividing line between two States, this evil cannot be wholly remedied, nor even to any great extent abated, without concurrent action with this State on the part of the Pennsylvania Legislature, and the hearty coöperation of the Fish Commissioners of the two States.

EXPENDITURES.

The ordinary expenses of protecting the fishing interests of the State consist of the annual compensation of the wardens of the several counties, and the expense of the appliances necessarily used by them in the discharge of their duties. Until within two years, it has been the custom of the Legislature, for some years past, to make an annual appropriation, to be expended by the Commissioners in "defraying the cost of procuring, hatching and distributing valuable food fishes to stock the rivers, streams, lakes and ponds of the State, and for such other purposes as they deem advisable in carrying on the work of restoring and increasing the fish production of the waters of the State." No appropriations for this purpose have been

made since 1881, and the work of the Commissioners in this direction has been such as could be carried on with the balance remaining unexpended of former appropriations.

The following statement shows the amount appropriated and the amount expended in each year covered by this report :

1879.	
To Balance on hand at date of last report.....	\$604 56
Amount of appropriation for 1879, received from State Treasurer	5,000 00
	<u>\$5,604 56</u>
By Amount paid for expenses of procuring, hatching and distributing fish and fish fry.....	\$2,701 32
Amount paid for rent of hatching-house, attendance and appliances.....	600 00
Freight on California salmon eggs, furnished by United States Fish Commission.....	232 50
Expenses of procuring special report on bay and shore fisheries.....	150 00
Expenses of Commission.....	215 75
	<u>3,899 57</u>
Balance on hand.....	\$1,704 99

1880.	
To Balance on hand from 1879.....	\$1,704 99
Amount of appropriation of 1880, received from State Treasurer	5,000 00
	<u>\$6,704 99</u>
By Amount paid for procuring, hatching and distributing fish and fish fry.....	\$3,671 83
Amount paid for rent of hatching-house, attendance and appliances.....	600 00
Freight on salmon eggs furnished by United States Commission	139 50
Books, stationery, subscriptions, &c.....	105 00
Expenses of Commission.....	219 75
	<u>4,736 08</u>
Balance on hand.....	\$1,968 91

1881.	
To Balance from 1880.....	\$1,968 91
Amount received from State Treasurer for account of appropriation of 1881.....	3,000 00
	<u>\$4,968 91</u>
By Amount paid for procuring, hatching and distributing fish and fish fry.....	\$2,412 31
Amount paid for rent of hatching-house, attendance and appliances.....	600 00
Amount paid for trout eggs.....	337 50
Amount paid for procuring statistics of shore and menhaden fishing.....	80 00
Amount paid for expenses of Commission.....	168 68
	<u>3,598 49</u>
Balance.....	\$1,370 42

1882 and 1883.	
To Balance from 1881.....	\$1,370 42
Balance of appropriation of 1881, received from State Treasurer.....	1,000 00
	<u>\$2,370 42</u>
By Amount paid for procuring, hatching and distributing fish and fish fry.....	\$823 12
Amount paid for rent of hatching-house, attendance and appliances.....	500 00
Amount paid for procuring returns and statistics of menhaden fishing.....	24 00
Amount paid for expenses of Commission.....	115 26
	<u>1,462 38</u>
Balance now on hand.....	\$908 04

In concluding this report, the Commissioners desire to call attention to the great and growing importance of the industries connected with the collection and production of this important ingredient in the food of the human race. This is not the place for statistics as to the annual consumption of this class of food, but statistical works on this subject are within easy reach of every interested inquirer, and they furnish the most astounding facts as to the extent to which man is dependent upon sea and river for an annual supply, reaching to many hundred millions of pounds, of cheap and nutritious food.

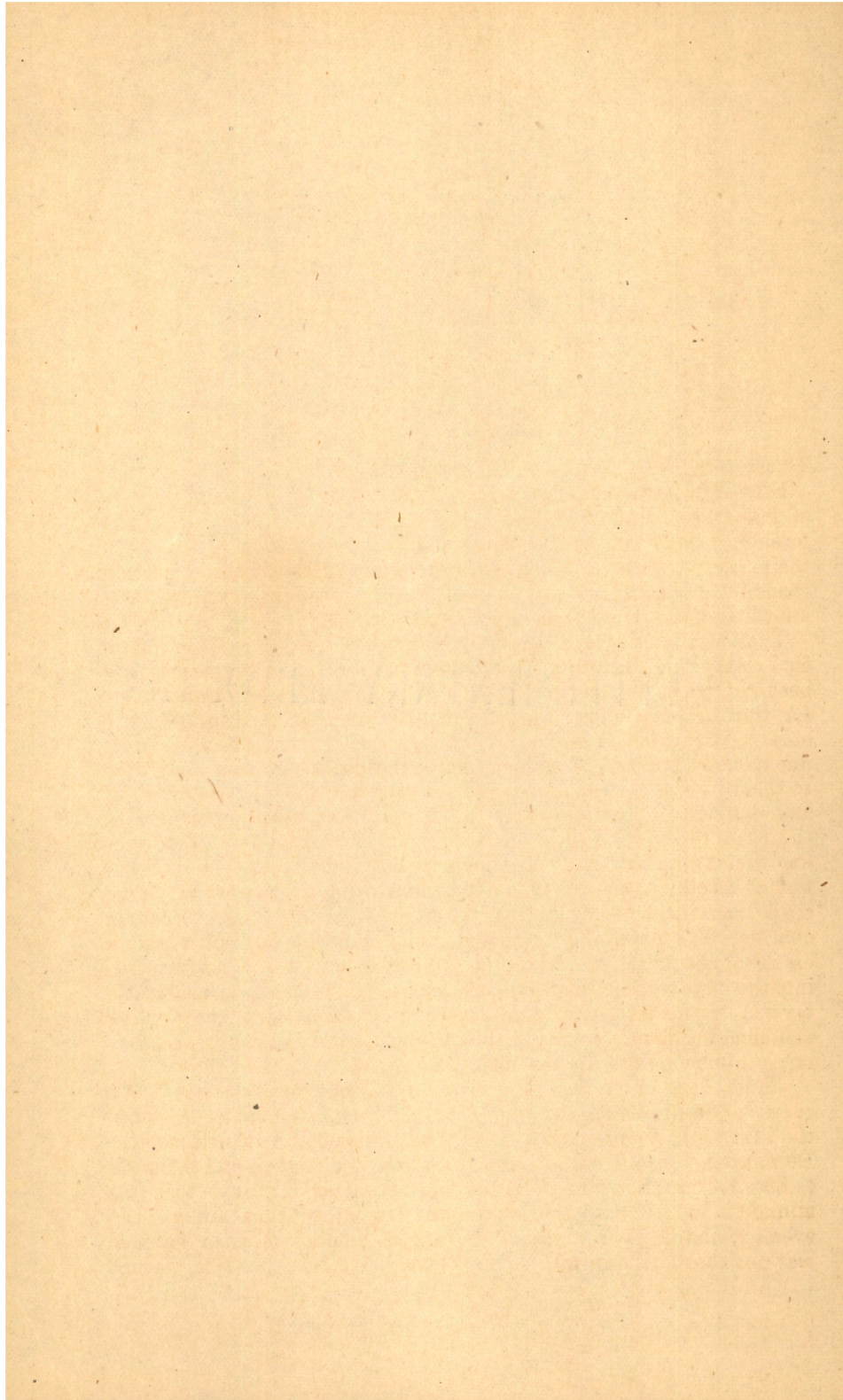
The International Fisheries Exhibits, held at Berlin and at London within a few years past, show that the interest of the world in this connection is on the increase rather than on the decline, and the reports from other States in the Union show a yearly increasing appreciation of the importance of this subject. Progress in this direction is to be observed on every hand, and New Jersey should not be neglectful of either her necessities or her opportunities. It has been said before, but will bear repeating, that few States in the Union possess equal natural fishing facilities with ours. Bounded on both sides by magnificent rivers, which furnish homes for many varieties of fish of local habits, and forming natural runways for migratory fishes; the southern portion of the State skirted by the waters of the ocean and the bay, which teem with an endless variety of sea fishes; the State intersected in every direction by tributaries of one or the other of the great rivers which lie on either side of us; the northern part of the State abounding in clear, cold lakes, to and from which run innumerable mountain streams, it may be questioned if another State can be found having within its boundaries so great a proportion of water suited to the production of the more valuable and desirable kinds of both permanent and migratory food fishes. Thousands of our citizens find employment in the capture of these fishes, and their labor furnishes food to many thousands more, while the existence of an abundance of fish in our waters presents an attraction to the people of other States, through which many thousands of dollars are annually expended in the State which would not

otherwise reach our people, and other industries and employments than fishing are thereby supported and advanced. Probably no portion of the public expenditure yields a greater return to the people of the State than that spent in promoting and protecting the fishing interests, and the Commissioners strongly commend these interests to the fostering care of the Legislature.

Respectfully submitted,

R. S. JENKINS,
E. J. ANDERSON,
THEODORE MORFORD,
Commissioners.

SUPPLEMENTARY REPORT.



SUPPLEMENTARY REPORT.

October 31st, 1883.

To His Excellency George C. Ludlow, Governor :

SIR—The term of office of the present Board of Commissioners of Fisheries commenced April 3d, 1883, and as a supplement to the foregoing report they respectfully submit the following statement of their transactions since that date, together with such information concerning the fishing interests of the State as have come to their knowledge, either from official or other sources.

The operations of the Commission in respect to the propagation of food fishes and restocking the waters of the State have necessarily been restricted by reason of the fact that no appropriation was made for this purpose by the Legislature either in 1882 or 1883, and the only funds at the command of the Commission consisted of a small unexpended balance of former appropriations which was paid over to them by their predecessors. This sum was too small to admit of any extensive operations, and in view of the great importance of the shad fisheries of the Delaware river, it was determined to confine the expenditure and the efforts in the direction of fish propagation to a continuance of the work of increasing the supply of young shad. Mr. R. B. Reading, of Hunterdon county, was placed in charge of this work, and conducted the operations near Bull's Island, on the Delaware river, from June 15th to July 21st. Notwithstanding the unfavorable condition of the water during a considerable portion of the time, the results were most satisfactory, the catch of ripe shad being very good and the number of eggs taken exceptionally large in view of the limited facilities.

Under date of August 21st, 1883, Mr. Reading reports: "We commenced operations on the 15th of June, and continued until the 21st of July, during which time we hatched and turned into the Delaware river, one million eight hundred and eighty-five thousand (1,885,000) young shad. In making estimates I always took the minimum rather than the maximum number of eggs taken in an evening, and I have no doubt the actual number of shad hatched was not short of two millions (2,000,000). * * * Had we had

a longer time to keep up the operations, I could have reported a much greater number, but I think we did well."

The usual vigilance has been exercised by the wardens on the Delaware, and they have been very successful in enforcing the law as to the Saturday night and Sunday close time, but for which the shad fisheries would soon be irretrievably damaged, if not entirely destroyed. But few arrests have been made, as the constant policing of the river from sunset on Saturday, till 12 o'clock on Sunday night, has had the effect of preventing any extensive violations of the law, although very many attempts have been made and frustrated. The regular fishermen recognize the importance of this close time, and not only make no attempt to violate the law, but render the officers all possible assistance in its enforcement. Warden Pierson, of Gloucester county, reports: "The fishermen, one and all, told me that but for the enforcement of this law they might as well stop fishing, as one-half of the fish caught by them was on Monday after the river had been kept clear for thirty hours."

Efforts have been made to procure full statistics of the number of shad taken during the season, but this has not been found possible, since many of the nets are "gill" nets, fished by persons living in Pennsylvania, who are not readily accessible for the purpose of procuring records of their catch. Of the operations below Trenton, which close on the 10th of June, the following extracts from the reports of wardens will serve to convey an idea:

Warden Hill, of Mercer county, reports that in his district the number of shad taken by both shore and gill nets was seventeen thousand and two hundred (17,200), and the number of herring, five hundred and twenty thousand (520,000).

Warden Ore, of Camden, reports that in his district there were shad nets in operation of an aggregate length of seventeen thousand seven hundred and forty (17,740) fathoms (106,440 feet), employing two hundred and seventy-six men, and that the number of shad taken during the season was ninety-nine thousand (99,000).

Warden Pierson, of Gloucester, was unable to procure statistics of the catch of fish, but the enormous number taken may be inferred from his statement that in addition to the shore fisheries in his district there were one hundred and fifty-two gill nets operated, and that the aggregate length of the nets in operation during the season was seventy-eight thousand three hundred and thirty (78,330) fathoms (469,980 feet), and the number of persons employed was six hundred and ninety-one (691). He estimates the average number of shad taken by each gill net, to be three thousand (3,000), which would give four hundred and fifty-six thousand (456,000) taken in this manner alone. The number taken by the shore nets he was unable to ascertain, but a proportionate catch would make the total number taken in the district about six hundred and twenty thousand

(620,000). He further says: "The number of nets fished in the county is fully twenty per cent. more than last year, and fully one hundred per cent. more than five years ago, which shows that the fishing interest has not declined in this county."

From Salem county, Warden Hannah reports the catch of shad in his district for the season as three hundred and eighty-three thousand (383,000); and Warden Lawrence reports the catch in his district as three hundred thousand (300,000), making a total of six hundred and eighty-three thousand (683,000) in the county.

Warden Logue, of Cumberland county, does not report the number of shad taken, but states that seventeen (17) nets were fished, which varied from five hundred (500) fathoms (3,000 feet) to eight hundred (800) fathoms (4,800 feet) in length. "The season at that point in the river," he states, "was short, but the prices obtained by the fishermen were good, sales being principally for local consumption, and made at from thirty to thirty-five cents."

No returns have been received from Burlington county, but the average season's catch in that district is not far from one hundred thousand (100,000) shad, and there is no reason to believe that the last season showed any great variation in the yield.

From the shad fisheries above Trenton no data have been received as to the season's catch. There are many short nets fished from the shore, but these fisheries have greatly declined in importance within the past few years, because of the immense increase in the number of nets operated in the lower portions of the river. Indeed many of the fisheries which a few years ago were profitable investments are now only operated on Mondays and Tuesdays of each week during the season, the enforcement of the Saturday night and Sunday close time in the lower portions of the river permitting a sufficient number of shad to ascend the river to furnish a limited local supply above tide-water without seriously lessening the number of spawning fish.

The figures presented, although incomplete, are sufficient to show the importance of this industry, and the Commissioners are of the opinion that an annual appropriation for the purpose of increasing the supply of young shad can be judiciously and advantageously expended, and that the beneficial results flowing from such expenditure in the past can be continued and extended.

During the shad fishing season great numbers of herring are taken in the Delaware below Trenton (the head of tide-water), but the wardens have not generally returned the numbers of these fish taken in their respective districts.

Warden Hill, of Mercer county, reports the catch in his district as five hundred and twenty thousand (520,000); Warden Ore, of Camden county, reports the number taken in the territory under his charge as four hundred and thirty thousand (430,000), and Warden Hannah, of Salem county, reports one hundred and twenty thousand (120,000).

Doubtless this is a small portion of the whole number taken, but the Commissioners are not in possession of the data necessary to give an estimate of the annual value of the catch. Enough is known, however, to show that these fisheries furnish every year many hundred thousand pounds of cheap and nutritious food, and that, although these fish are classed among the less valuable food fishes, the regulation of their capture, viewed both as an industry and as a means of adding to the food supply, presents features worthy the attention of the Legislature.

The same may be said of the sturgeon fisheries of the Delaware. This fish is not classed among the delicacies, but there are few persons who have not given especial attention to the subject who have any idea of the extent to which the sturgeon contributes to the food supply.

Warden Hannah, of Salem county, in his report to the Commissioners for 1883, says :

"The sturgeon fishing interest in our county, so far as capital invested and money realized are concerned, is becoming, and in fact now is, nearly if not quite equal to the shad fishing interest. There are ten different firms engaged in the business, employing three hundred (300) men, one hundred (100) large skiffs and as many nets, a large canning establishment, one large ice house and a large fertilizer factory. From the best information I can obtain, there has not been less than seventy-five thousand dollars (\$75,000) taken by the sturgeon fishermen in the past season."

Warden Logue, of Cumberland county, in his report, says :

"The sturgeon fishing has overshadowed every other kind of fishing in this part of the Delaware river and bay. About eleven (11) vessels were engaged in it this year, with eighty or ninety nets. * * * The fishing for sturgeon in the Delaware begins at Bower's Beach, about the first of April. Probably twenty nets were there this spring. Three weeks later a move is made to Bayside, which is the headquarters for the Delaware bay sturgeon fishing. About eleven firms gather here in the season. The total catch this year was from eight to ten thousand. Some of the meat goes to Philadelphia and some to Pennsgrove, but the most of it goes to New York. The roe is canned for export to Europe, and the refuse is converted into a fertilizer which gives a very high analysis and has a very ready sale."

In the Camden county district about three hundred sturgeon were taken, but the bulk of this fishing is below that point.

Warden Hannah, of Salem county, says of sturgeon :

"These fish are becoming less plentiful each year, no doubt because of the constant fishing for them from early in the spring until late in the month of August, there being no law to protect the fish during their spawning season, which is supposed to commence in the month of

June. Taking into consideration the large amount of revenue and the quantity of cheap food derived from the catching of sturgeon, I think it would be wisdom on the part of the State to enact some law for the protection of this fish by fixing a close time from the 20th of June to the 20th of March. In fact, if there are not some steps taken by the State in that direction, the time will come, in the very near future, when the sturgeon will be among the things that were, the revenue now derived will be cut off, and a very large amount of cheap food lost to the masses."

The Commissioners heartily endorse these views, and hope that the Legislature may not fail to appreciate the suggestions of the wardens, whose duties bring them into immediate contact with the fishermen, and whose views on these subjects are eminently worthy of consideration.

The returns from all parts of the State show the good results of the distribution of black bass, which was continued so long as the necessary appropriations of the Legislature justified. For want of funds no distributions have been made in the past six months, but there are still many ponds and streams which could be advantageously stocked, and the adaptability of our waters to the growth and multiplication of this valuable fish is such as to encourage their general distribution throughout the State.

Warden Ohl, of Union county, reports that a number of ponds which had been stocked, and in which fish were abundant, have been depleted by the dams having been carried away by the great freshet of September, 1882. In some cases he has succeeded in recapturing considerable numbers of the fish from the waters into which they were thus carried, and replacing them in the ponds after the dams were rebuilt, but the greater portion of the fish have been carried into the Raritan river, and the ponds after the repairs of the dams are comparatively destitute of fish. It would be an act of wisdom to restock these ponds, as well as to continue the work of stocking ponds in many other parts of the State which have not hitherto received attention.

The change in the law made at the session of 1882, permitting black bass to be taken on and after June 1st, instead of on and after July 1st, is believed to be detrimental to the increase of these fish.

Warden Gregory, of Morris county, in his report dated June 14th, 1883, says:

"I am convinced that the bass are still spawning up to the present time, as I have caught and opened female bass which were at least half full of eggs, and I have noticed a great many nests with the male and female fish on them; and I am sorry to say that I have seen sportsmen (?) catching and taking to the railroad strings of bass, that they acknowledge they had taken from the beds."

There is no doubt that many bass do not spawn until during the month of June, and the law permitting them to be taken in that month must result in the destruction of large quantities of spawn and seriously interfere with the multiplication of the fish.

No further action has been taken toward furnishing brook trout for restocking the depleted trout streams, but the reports from those stocked within the past few years are most encouraging and demonstrate the success of the efforts to restore their productiveness.

The continued enforcement of the laws regulating seine fishing in the waters and bays of the Atlantic coast of the State have furnished additional evidence of the wisdom of those laws in the increased yield of fish, the employment of a much greater number of men, and the production of a cheaper and more constant supply of fish to consumers along the shore.

Warden Westcott, of Cape May county, in his report for 1883, says:

"The fishing with hook and line has been the best it has been for some years past, and, in fact, it has been improving ever since the passage of the law, and I think the people of our county, as a rule, are pleased with it."

Warden Rider, of Atlantic county, says:

"The magnitude of the fishing interest of Atlantic county, it is difficult to estimate, owing to the large and varying population of its watering places. One dealer in Atlantic City told me that he sold as high as six tons of fresh fish per week. When seine fishing was permitted the market had to be supplied with fresh fish from New York and other points, and the price was eighteen to twenty cents per pound. Now the market is supplied with better and fresher fish at six to eight cents per pound. And where fifty men formerly made a living fishing with seines, five hundred now find regular and profitable employment fishing with hook and line."

Warden French, of Burlington county, (having charge of the Atlantic side of the county,) bears similar testimony to the wisdom and efficacy of the laws. The district under his charge embraces probably more fishing territory than any other district in the State, and his report on the fishing interests, and upon his operations connected therewith, is so full and interesting that the Commissioners have thought best to present the following copious extracts from it. He says:

"In presenting this annual report of my operations as Fish Warden of the southern portion of the county of Burlington, for the year ending September 1st, 1883, I desire to express my gratification at the growing interest and respect by the people of this section of the State in and for the benefits of protection given by

the laws enacted and enforced by the State for the protection of the fishing interests. People who have not visited this section, or who have not sailed over it on a fishing trip, can have but a faint idea of the interest or variety of the fish caught here. Under the present law, fishing with set-nets in the Mullica river is prohibited except from November 1st to April 1st. Until this year, since 1878, it was prohibited from April 1st to December 1st.

“Rock fish or striped bass and perch are caught here by these set-nets, in water from eighteen to thirty-six feet in depth, as they run up toward the springs in cold and return to the bay in warm weather. In the months of April and May they go up stream near the fresh and shallow waters to spawn. Haul seines, until this year, were permitted to fish in the Mullica river from September 1st to June 1st, and interfered in September and October with hook and line fishing, and in April and May, at times, tons of spawn fish were caught, and countless millions of the young thereby destroyed. The enactment of the law of last winter preventing the use of any class of nets in the Mullica river, except between November 1st and April 1st, together with the enforcement of the law preventing the use of nets or seines with less than a three-inch mesh, (an old law that has been violated almost since its passage by using nets of two and one-half or two and three-quarters inch mesh, and thereby destroying large quantities of small fish, worthless for market,) will tend more to replenish the supply of fish in these waters than all the laws heretofore enacted for the protection of the winter varieties. In the months of April and May, weak fish, herring, flounders, rock fish, perch, and, in most seasons, shad are caught in the Great bay or at the mouth of the river, where it is not prohibited by law. During the months of June, July, August, September and October, the following varieties of fish are caught with hook and line in the bay and rivers: weak fish, perch, flounders, blue mackerel, sea bass, black fish, porgies, barb or king fish, spot, eels, rock fish, and, near the inlets, sheepshead. The run of fish for the past season has been up to the average of the four or five past years, with the exception, perhaps, of weak fish. In the year 1877, the year before the passage of the laws for the benefit of the fishing interests of this section, it was almost a waste of time to attempt to fish with a hook and line for pleasure or profit in these waters. In fact, on account of the numerous pounds set in the running ways of the fish, it was almost impossible to get a mess with a haul seine. Upon the passage of the act the pound stakes were all pulled up at once. A few parties attempted to defy the law by night or stormy weather fishing, but one by one they have been trapped, their nets sold, and the owners made to suffer the penalties of the law, until they have come to the conclusion that ‘the way of the transgressor is hard.’ So that from the condition of affairs of 1877, we come to that of 1883: those who

would violate the law dare not on account of the great risk, while the majority of the opponents of the law at the beginning have become its friends.

"It affords me great pleasure to be able to state that I know of no evidence to convict, and scarcely a suspicion, that within the territory over which it is my duty to see the laws observed, of a case of its violation during the past year. This satisfactory state of affairs has been brought about by frequently patrolling in boats, day and night, those places where those who would violate the laws would go for safety, and by securing the services of those favorable to the enforcement of the law; also the services of boatmen and baymen whose business calls them to the vicinity of the fishing grounds, paying them for their services and offering more reward for the apprehension of the violators or the evidence to convict them than I myself should be able to obtain if they were caught or convicted.

"While I have felt that the pay for these services is not commensurate with the duties properly performed, it has been a source of pleasure and satisfaction to realize the benefits of the laws to self and people as to promises of the results, when the experiment was about to be tried or the laws enacted."

The gratifying improvement in the coast fishing interests indicated by these reports has been brought about by the vigilance of the wardens, combined with the constant efforts of both Commissioners and wardens to avoid as much as possible conflicts with the fishermen, and to convince the latter that they were serving their own best interests in observing the law and in lending their aid to the authorities to secure its universal observance.

The laws for the government and regulation of the bay and coast fisheries are by no means perfect yet, but the experiments which have been tried within a few years past with a view to the improvement of these fisheries have been so successful as to give to those most directly interested a new view of the question of legislative action respecting their pursuits, and to almost entirely do away with the opposition which a few years ago was sure to be aroused by any legislative attempt to interfere with the promiscuous and indiscriminate capture of fish.

The complaints referred to in the report to which this is supplementary, as to the wholesale destruction of menhaden on our coast, have continued, and have engaged the attention of the Commissioners. In the summer of 1883, the Commission appointed by the United States Senate to inquire into this subject visited this State in search of information and statistics. At the request of your Excellency and of United States Senator Sewell, the Commissioners of this State met the Senate Commission, and interested themselves to furnish all available testimony on the subject. Many citizens of the

State also met them, and bore testimony to the injury to our fishing interests resulting from the present practice.

The result of the investigations of the Commission is not known to the Commissioners of this State, but it is understood that at the coming session of Congress Senator Sewell will again urge the passage of a bill for the regulation of menhaden fishing, and for the protection of our coast fisheries.

The financial operations of the Commissioners during the time covered by this report have been limited for the reason already mentioned, that no appropriation for fish propagation was at their disposal.

The following statement shows their receipts and expenditures :

RECEIPTS.	
Amount of Balance of Appropriations received from former Board.....	\$908 04
EXPENDITURES.	
By amount paid for hatching and distributing shad fry.....	\$470 20
Expenses paid for watchmen.....	45 00
Expenses of Commissioners.....	83 50
	598 70
Balance now on hand.....	\$309 34

In view of the great and growing importance of the shad fishing interests, and of the valuable results to be derived from a further distribution of black bass, the Commissioners desire to urge the wisdom of such an appropriation as will admit of the continuation of the efforts to increase the supply of these fish, and also to continue the efforts to improve the smelt fisheries of the Hackensack river. It is beyond question, that money judiciously expended for these purposes yields an abundant return, and the amount annually required is so insignificant in comparison with the benefits to be derived from its expenditure, that the Commissioners feel no hesitation in recommending that a small portion of the public money be devoted to this purpose.

Doubtless at the coming session sundry acts and amendments to acts affecting the fishing industries of the State will be presented to the Legislature for action.

The Commissioners indulge the hope that these may not be lost sight of amid the multifarious matters which will engage the attention of the Legislature, but that in each case the subject may receive careful consideration, and that the result may be such legislation as will promote and protect those interests, the value and importance of which the Commissioners have endeavored to set forth.

The Commissioners, in conclusion, acknowledge their indebtedness

to Major E. J. Anderson, for aid and advice in the performance of their duties, which he always willingly afforded them. Major Anderson's thorough knowledge of fish culture and great experience made this advice of great use and value.

Respectfully submitted,

THEODORE MORFORD,
R. S. JENKINS,
WM. WRIGHT,

Commissioners.