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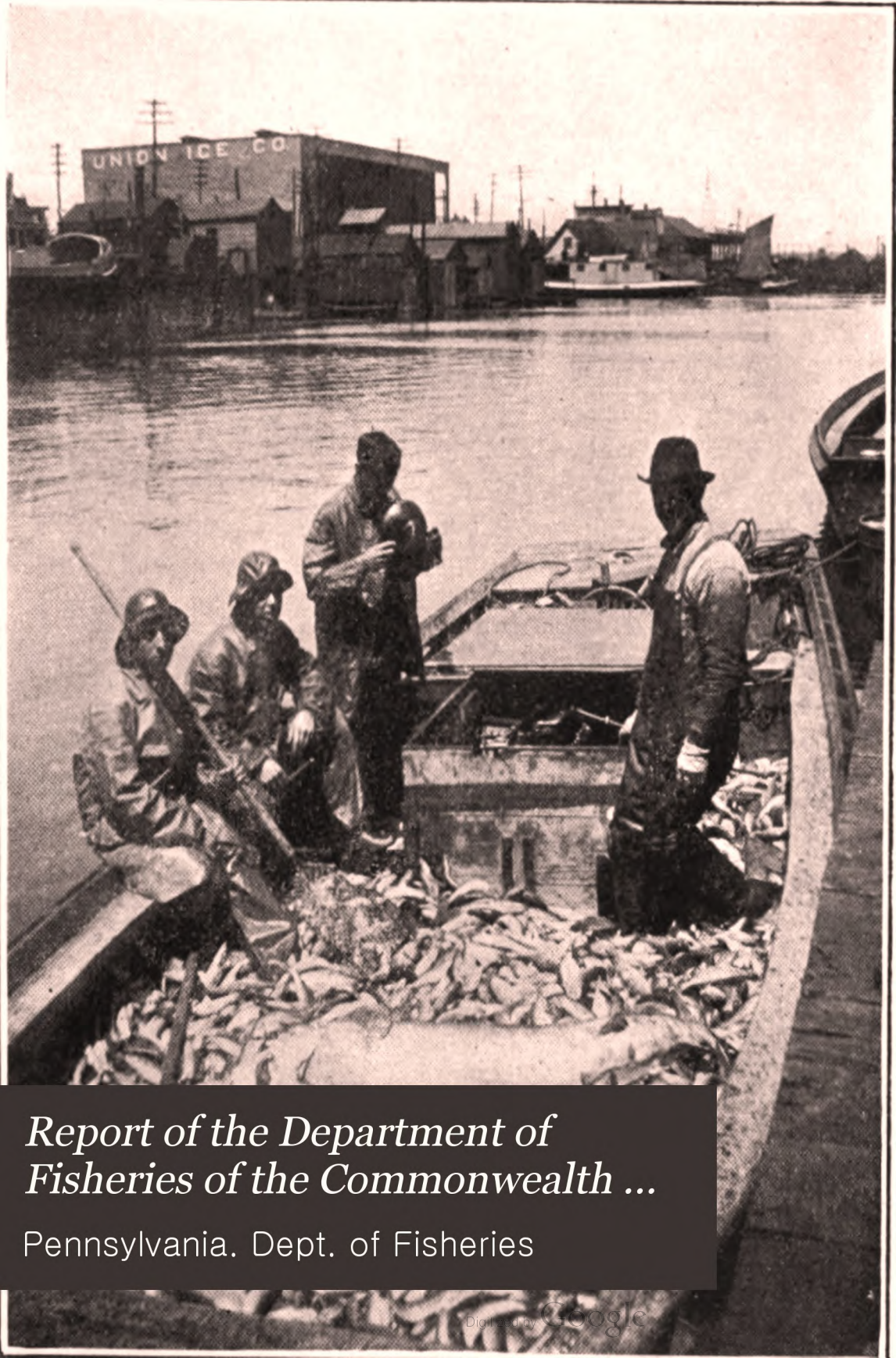

Report of the Department of Fisheries of the Commonwealth ...

Pennsylvania. Dept. of Fisheries

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Commonwealth of Pennsylvania

Report of the

Department of Fisheries

From December 1 : 1909
To November 30 : 1910

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA
1911

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DEPARTMENT OF FISHERIES OF THE COMMONWEALTH OF PENNSYLVANIA.

Commissioner of Fisheries.

WILLIAM E. MEEHAN, Office, Harrisburg.

Board of Fishery Commissioners.

WILLIAM E. MEEHAN, President.
JOHN HAMBERGER, Erie.
HENRY C. COX, Wellsboro.
ANDREW R. WHITAKER, Phoenixville.
W. A. LEISENRING, Mauch Chunk.

Superintendents of Hatcheries.

Corry Hatchery, No. 1, William Buller, Corry, Pa.
Erie Hatchery, No. 2, Philip H. Hartman, Erie, Pa.
Bellefonte Hatchery, No. 3, Harry I. Griffith, Bellefonte, R. F. D. No. 2.
Wayne County Hatchery, No. 4, Nathan R. Buller, Pleasant Mount.
Torresdale Hatchery, No. 5, Jerry R. Berkhous, Holmesburg, Philadelphia.
Erie Auxiliary, No. 6 (Union City Hatchery), Abraham G. Buller, Union City.
Spruce Creek Hatchery, No. 7, William F. Haas, Spruce Creek, Pa.
Crawford Hatchery, No. 8, W. H. Safford, Conneaut Lake, Pa.
Presque Isle Hatchery, No. 9.

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LETTER OF TRANSMITTAL.

Hon. Edwin S. Stuart, Governor of Pennsylvania, Harrisburg, Pa.

Sir: I have the honor to herewith present the report of the Department of Fisheries for the year beginning December 1, 1909, and ending November 30, 1910, the seventh report since my incumbency as Commissioner of Fisheries.

Respectfully,

W. E. MEEHAN,
Commissioner of Fisheries.

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REPORT

OF THE

BOARD OF FISHERY COMMISSION.

Honorable Edwin S. Stuart, Governor of the Commonwealth of Pennsylvania, Harrisburg, Pa.

Sir: We have the honor to herewith present a report of the operations of the Department of Fisheries from December 1, 1909, to November 30, 1910.

Reports from all parts of the State strongly indicate the beneficial results that have followed the stocking of the State waters with the vast quantity of fish propagated at the various State hatcheries. Notwithstanding the severe drought that has prevailed for three years, trout have appreciably increased in most of the streams of the State. Where water conditions permitted and in the districts regularly patrolled by the salaried wardens, black bass and other game fish were caught in greater numbers.

The Lake Erie fisheries, as usual, exhibited the greatest improvement. As indicative of the prosperous condition of the fisheries of Lake Erie it may be quoted that the number of licensed tugs operating from the port of Erie was at least one-third larger than last year. The City of Erie is now to all intents and purposes the centre of the fish industry of Lake Erie, more tugs being engaged in the fishing business than any other harbor on the Lake. There was an appreciable increase of lake herring, more properly called ciscoes, and white fish were caught in abundance throughout the year.

There was a marked increase in the catch of the shad from the Delaware River. Only the commercial fisheries on the Susquehanna River exhibited a decrease. The building of the McCalls Ferry Dam has, we believe, about wiped out the shad industry above that point. The low water, due to the drought, made the eel industry a failure from a financial standpoint.

The Department of Fisheries has reached about its limit of annual output of fish with its present facilities for hatching. A marked increase in the outputs cannot be had in the future without adding to the capacity of the Erie and Union City batteries and additional hatching houses at the Spruce Creek and Bellefonte Hatcheries. Additional hatching houses at the two stations cannot be built without additional water supplies, which can be had by purchasing nearby springs. A battery hatching house ought to be built at the Spruce

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Creek Station to supply the southwestern part of the State and the southern part as far east as Harrisburg. An additional output is also impossible without an expansion of the appropriation for fish hatching purposes. It was only with the greatest difficulty that the Department was able to keep within the appropriation made two years ago.

The total output of fish for 1910 was 1,078,991,085 as against 1,167,717,764 the previous year and as against 661,952,851 in 1908. Gratifying as these figures are they would have been about 200,000,000 greater had it not been for the terrific storm on Lake Erie early in December of last year, which put a stop to fishing and the consequent take of herring and white fish eggs for the remainder of the year.

It was during this storm that the terrible Car Ferry disaster occurred. The output was also decreased in windy, cloudy and cold weather during the spawning season of the pickerel, yellow perch and black bass. Had it not been for the yellow perch held in brood ponds of the Torresdale, Erie Auxiliary and Crawford Stations the take of yellow perch eggs this year would have been nearly 100,000,000 less. In the propagation of brook trout the Department of Fisheries has broken every one of its previous records. From the Corry, Bellefonte, Wayne and Spruce Creek Hatcheries there were hatched and distributed 13,134,900. The immensity of these figures may be the better appreciated when compared with the 12,150,000 propagated and distributed in the same time by the United States Government, and the figures are even brighter when it is noted that of that more than 12,000,000, five hundred and sixteen thousand of the United States output were eggs, 7,405,545 were fry and 4,228,461 were fingerlings, yearlings and adults. Of the output from the State hatcheries all were No. 1 fingerlings with the exception of a little over ten thousand. For a clearer understanding, under the uniform nomenclature, fry fish with the sac not absorbed and fingerlings are fish of one inch and over, but less than a year old. This comparison with the output of the United States is not made with any idea of self-glorification, because the United States Government has always held that it was policy to leave to the states the work of propagating trout and their attention more particularly to food fishes. The figures are merely cited the better to illustrate the gigantic strides which the State is making in the propagation of one of the finest of game fishes.

There was an increase of 27,823,060 yellow perch, 5,048,600 lake herring, 4,000,000 shad, 48,084,000 blue pike. There was a decrease of 78,050,000 pickerel, 9,619,700 white fish and 76,596,000 pike perch as compared with the previous year. It was the net decrease in these seven species that decreased the total output as compared with 1909. Notwithstanding a lessened output, the total is far greater than that of any other state in the same time.

The Board feels that an entirely different system of supplying water for the Crawford Hatchery should be installed. There are at present two sources of supply. One for the battery hatching house and the other for the ponds. The water for the first named is brought into the battery house from a small stream by gravity. The water for the ponds is introduced by means of a dam across Conneaut Lake outlet at the upper end of the property. Under ordinary conditions the water supply for the hatching house from the little stream is sufficient for one battery of 350 jars, but for the last two years, owing to the

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prevalence of the drought, the stream has been entirely dry in the autumn, rendering the house useless for the hatching of white fish and lake herring, and should two additional batteries be installed in this building for perch and pickerel and pike perch work in the spring there would not be sufficient water.

On account of the flatness of the ground the ponds for black bass and other warm water fishes all have to be dug beneath the surface, and these ponds are necessarily shallow. Two tiers have been constructed, and if we dug from the present dam the next set of ponds would be too shallow for fish cultural work and there would be left nearly twenty acres of unemployed land splendidly adapted for fish cultural work if another water system were installed. Besides there is an ever-present danger that the dam now built across either outlet will tear away during some big storm, in which case all the brood and young fish would be destroyed. If pipes were laid from Conneaut Lake to the hatchery the ponds now constructed could have two foot additional water flowed in without putting a spade to them, and the entire tract below could be covered with ponds from two to two and a half feet deep, which would be ample for the work. The distance from Conneaut Lake to the hatchery is a little less than one mile. One man owns all the land on the east side of Conneaut Lake Outlet Creek and he has generously offered to donate thirty feet from the creek to the hatchery for a road and the laying of these pipes. The estimated cost of doing the work would be in all about five thousand ($5,000.00) dollars, and we believe that it should be done at the earliest possible date. There is no immediate hurry for an augmented water supply for the hatching house. This will have to be done by means of an engine and pump.

The principal work at the Crawford Hatchery is the rearing of small mouth bass, a fish for which there is a demand only second to that of the brook trout, and if there was an ample water supply and the ponds constructed there could be reared at this station sufficient bass to supply the entire western end of the State, exclusive of Lake Erie.

With the lapse of time the Department realizes more clearly the gigantic problem it has to solve in the purification of the water supply in order that it may be fit to sustain fish life and fish food. While there are a number of fundamental methods of purification the operative methods are nearly as great as the number of industrial establishments. In other words, there must be variations in appliances in almost every instance. Many concerns in which operations are conducted on a huge scale it has been found impossible as yet to devise practical means to care for all the waste within a short time. In certain lines the waste disposal is a simpler matter, and in such cases the pollution has either practically all ceased or is rapidly being cared for. As far as known to the Department, for example, pollution from sawdust is a thing of the past in Pennsylvania. Abolition of pollution on the Clarion River, the foulest of all streams in the State, is waiting on the completion of sewage disposal plants at Ridgway, Johnsonburg and St. Marys. Scarcely anything has been accomplished on the Lower Allegheny or the Ohio Rivers. Pollution from Ohio and West Virginia renders any work on the Ohio River at present impossible, and the sewage from Pittsburg is hindering the purification of the industrial establishments bordering the Lower Alle-

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gheny. The Upper Allegheny River as far south as Oil City is greatly improved. Steps have been taken for the early purification of the Juniata River. There is already a decided improvement. We are glad to record that the majority of owners of industrial establishments are co-operating with the Department of Fisheries and they admit the justice of the law which requires the disposal of deleterious waste other than by emptying it into the streams.

With the exception of the Wayne Hatchery the propagating stations under the control of the Department are in admirable condition. They were all visited with the exception of Torresdale either in a body or individually. The drought seriously affected the Wayne Hatchery. The Lackawaxen Creek, which supplied the ponds, was nearly dry for the greater part of the year and what little water there was had to be diverted into the trout ponds, hence after July there was no water in any of the warm water ponds. When the severity of the drought was first felt in 1909 and in consequence of the cutting away of some extensive woodland areas above the hatchery, Commissioner Meehan felt that some precaution should be taken for a steady water supply, and with this end in view began the construction of a huge pond covering the entire tract above the hatching house, or about two acres, and also drove a deep well, which, on the installation of a pump, will yield close upon two hundred gallons of cold water. The last will be sufficient to supply the trout ponds even though the spring should again become very low and the large retaining pond will be ample to keep the bass and other warm water ponds supplied for two or three months. Limited means has prevented the completion of the large retaining pond, but by next autumn it should be in operation. The pond could also be used as a brood pond for warm water fishes.

The Board of Fishery Commission made a visit and examination of the central and western hatcheries the latter part of last summer, Bellefonte, Spruce Creek, Erie, Corry, Union City and Conneaut Lake. They were very well pleased at the condition of the various hatcheries, first at the cleanliness and order in the buildings, showing the care of them by the different Superintendents. The efficiency of the Superintendents is shown by the splendid output of fish, sometimes under difficulties, such as low water and certain diseases of the fish. However, by the direction and knowledge of the Commissioner of Fisheries good work was done. A larger appropriation of money for most of them would enable the Commissioner to enlarge the output and to keep the grounds surrounding the buildings in better shape. At the hatchery at Conneaut Lake particularly much more money is desired.

There was an epidemic of goitre or enlargement of the thyroid gland among the trout at the Spruce Creek and Bellefonte Hatcheries, and, in addition, an epidemic of fungus among the fish at the Spruce Creek Hatchery. The epidemic at Bellefonte was not of a serious nature and has entirely disappeared. There was a heavy loss of brood fish at Spruce Creek. The cause of goitre at this station was, we believe, due to an insufficient water supply in the troughs of the hatching house while the fish were young and by overcrowding and overfeeding of the fish in the ponds. When the volume of water was increased, the quantity of food decreased and the number of fish to a pond lessened, there was an immediate improvement, and the goitre has almost entirely been exterminated. The fungus we believe will remain until concrete replaces the boards as sides of the ponds. The Department was compelled, for

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financial reasons, to build the ponds with wooden sides at the Spruce Creek Hatchery. The Board issued only one bulletin during the year, and this on investigations into the cause of goitre. An alarming report had been spread that goitre was cancer or the inevitable precurser of that disease. By an arrangement with the Faculty of the Western Reserve University, Cleveland, Ohio, Dr. David Marine, one of its number, came to Pennsylvania and made a close study of goitre, with the result that he found that it would not necessarily follow that goitre would develop into cancer. Quite the contrary. The result of Dr. Marine's investigations were embodied in a bulletin, which was widely distributed and which undoubtedly would do much towards allaying the causeless alarm. The Board hopes to publish another bulletin embodying investigations made by Dr. Marine the coming year.

Under the circumstances, the protective work of the Department was very satisfactory. Although allowed by law to employ thirty, the amount of money appropriated for salaries and expenses only permitted the appointment of ten with salary, with an eleventh serving without salary and giving what time he can spare from his business. These men, the specials, State Police and constables, made 280 arrests and secured 255 convictions, of which only twenty-three took appeals. The amount of fines imposed by the magistrates was $6,074.00, of which $3,877.00 have been paid into the State Treasury through the county treasurers. There is still a balance not turned in by the county treasurers, but this is being collected as rapidly as possible. When all is turned in there would still be an apparent deficit, but an examination of the tables prepared by the Chief Warden will show that there is included in the amount of fines imposed the appealed cases and the cases in which the defendants elected to go to jail in lieu of paying the fines.

The number of arrests made by the State Police and constables was fifty-three, of which forty-six were convictions. One thousand three hundred and fifty-two fines imposed and $1,150.00 collected. There were seven appeals. The violations covered a wide range, from thirty-one cases of illegal seining, twenty-seven of dynamiting, thirty-one of spearing, to Sunday fishing, of which there were only eleven cases. It was only necessary to make nine prosecutions during the year for refusal of owners to stop polluting streams. The records show a marked decrease of violations in the districts regularly patroled by the wardens. Wherever there have been increases it has been in the sections where there were no regular men. If the full number of thirty wardens could be appointed we believe the work of protection could be thoroughly carried out. The work of the special wardens is deserving of special commendation since they receive no compensation whatever and what they did was purely due to public spirit and their desire to see the fish protected. Five of the eighty-one commissioned at the request of the Fish Protective Associations and individual land owners made ten arrests, with fines aggregating $250.00, of which $130.00 was paid into the State Treasury.

At the last session of the Legislature a bill was enacted turning over to the Department of Fisheries a very large tract of land on Presque Isle Peninsula, Erie, as a fish hatchery, provided the United States Government concurred. A bill to give such concurrence was introduced into Congress, passed and signed by the President of the United States.

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There is one condition only, namely, that before any work is done by the Department of Fisheries that plans shall be submitted to and approved by the United States Board of Engineers. Nothing, of course, can be done towards the development of this new hatchery until after the Legislature has made an appropriation for the purpose.

The property is one especially fitted for fish cultural work for lake and river fishes. The tract covers nominally 800 acres, but we believe that a survey will show that it embraces at least twelve hundred. There are eight natural ponds on the property varying in length from half a mile to a mile in length and there are besides a number of swamps which with very little trouble and comparatively small expense can be turned into huge fish cultural ponds. Few people, excepting those actually engaged in fish culture, can understand the vast importance of this new hatchery.

There are a few fishes from which the eggs cannot be expressed by hand. Among them the black bass. Where eggs can be taken from fishes by the so-called artificial expression process it is possible to and the State does propagate fish by the millions and hundreds of millions and the limit is only reached when simultaneously with the financial resources of the Department. But there are no hatcheries now in the State in which black bass or any other fishes that must naturally deposit their eggs can be reared by the million. It will be possible to do so at Presque Isle when the plant is in operation. Within three years after fish hatching begins in Presque Isle, the output of black bass alone from there should be nearly if not quite half the total output of brook trout by the State and in five years should equal the present trout output.

The opportunities for fish cultural work with few species which now cannot be handled will also be very great. As the property is of such great extent and the ponds so large it will be a number of years before all the latter can be utilized and the full effect of the value of the hatchery felt. The undergrowth which covers the ground with a tangle thicket will have to be cut away, the ponds must be deepened and better communication with the Bay opened, and these and other matters and the erection of necessary buildings will require appropriations by successive legislative sessions.

Presque Isle Peninsula originally belonged to the State, but some years ago it was transferred to the United States Government for coast defense purposes. Only a small portion was actually used, but it was on account of this transfer that it was necessary for Congressional action before the Department of Fisheries could use it for fish hatching purposes, even with the approval of the Legislature.

The above is respectfully submitted.

W. E. MEEHAN, President,
JOHN HAMBERGER,
HENRY C. COX,
ANDREW R. WHITAKER,
W. A. LEISENRING.

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REPORT OF THE COMMISSIONER OF FISHERIES.

The year beginning December 1, 1909, and ending November 30, 1910, was an exceedingly busy one, with many important happenings and results both satisfactory and unsatisfactory.

Among the very important events was the approval of the Congress of the United States and the President of the transfer of a large tract of land on Presque Isle Peninsula to the Department of Fisheries as a State fish hatchery.

Another and equally important incident of the year was the greatly increased catch of fish in Lake Erie and a fair maintenance of trout in the majority of the streams despite the continued drought. Although the total output of fish was a little less than in 1908, the figures are still those to cause gratification and proves the devotion of the employes to the work of fish culture.

The only real unsatisfactory result of the year's work was a failure in the propagation of black bass against which the Department and employes were helpless.

The output of fish eggs, etc., from the field and the various hatcheries from December 1, 1909, to November 30, 1910, was 1,078,991,085 as against 1,167,717,764 the previous year. An examination of the subjoined table will show that the decrease was due principally to a falling off in the output of pickerel, pike-perch and white fish, and this notwithstanding heavy increases in the outputs of blue pike, lake herring and yellow perch.

The decrease in the pike-perch was due to the fact that nearly all the first take of eggs of that species of fish were infertile, due, it is believed by those who had the work in charge, to unfavorable weather and water conditions at the outset of the spawning season for pike-perch.

Storms on Lake Erie at the time the white fish were spawning is responsible for the decrease in the output of that fish, and windy, dark and rainy weather for the decreased take of pickerel eggs. With favorable conditions the field men were enabled to largely increase the take of blue pike, lake herring and yellow perch. Very cold weather and water destroyed most of the eggs of the black bass and thus reduced the output of that fish by the Department nearly three-fourths.

TABLE OF OUTPUTS.

Transferred Fish,	743
Gold Fish,	3,051
Large Mouth Bass,	4,025
Brook Trout Eggs,	16,016
Alewife,	50,000
Brook Trout, adults,	11,250
Silver Salmon, fingerlings and yearlings,	51,000

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Catfish, two-year olds,	30,000
Brown Trout,	116,500
Sunfish,	473,000
Catfish, fingerlings,	362,500
Small Mouth Bass, advanced fry and fings,	155,900
Frogs,	252,000
Shad,	19,000,000
Brook Trout, fingerlings,	13,134,900
White Fish,	38,250,000
Pike-Perch,	92,279,000
Lake Herring,	120,083,000
Pickerel,	226,100,000
Blue Pike,	143,750,000
Yellow Perch,	424,868,200
Total,	1,078,991,085

COMMERCIAL FISH HATCHERY INDUSTRY.

The number of licenses issued for commercial fish hatcheries during the year was nine, of which one was a new concern. Two small plants licensed in 1909 retired from business. Those licensed did a business amounting to $35,688.46. The following is a tabulated statement of the business by the nine hatcheries:

Name.	Pounds.	Number.	Value.
Dead trout for market,	41,009 9/20		$20,109 65
Trout, live, mature,		79,477	5,177 53
Brook trout, fingerlings,		186,000	6,004 00
Brook trout, advanced fry,		222,475	1,337 40
Brook trout, eyed eggs,		13,048,760	5,985 88
Black bass, fingerlings,		1,650	75 00
Total,	41,009 9/20	13,538,362	$38,689 46

An interesting feature of this table is the item of brook trout eggs. Most of these, if not all, were disposed of by the owners of the establishments to the fisheries authorities of the United States Government and states. The majority of the fingerling trout probably were for the purpose of stocking waters of other states by state authorities who have no hatcheries. The bulk of the dead trout went to New York, Pittsburg, Philadelphia and St. Louis markets.

In addition to the outputs as set forth in the table, 250,000 green eggs were given by Mr. Charles Wolters, owner of licensed hatchery No. 2, to the Department of Fisheries to be hatched and distributed in the streams of the State. Thirty thousand fingerlings were also given by the same gentleman to the State for increasing and changing the stock in the State hatcheries.

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A Morning's Catch. Lake Erie.

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An interesting feature of the commercial fish hatchery industry is the licensing of additional plants for the rearing and sale of black bass. Pennsylvania has the honor of the first establishment of that kind, it antedating by several years State or National Government bass work. While the returns are not heavy they are indicative of a future prosperous enterprise.

COMMERCIAL FISH INDUSTRY IN LAKE ERIE.

There was a very great increase in the fish industry of Lake Erie under the jurisdiction of Pennsylvania during 1910. Whether this is a healthy increase or whether it is due to over fishing remains to be seen. I fear that it is the latter, for nearly double the number of boats were engaged than in 1909 and there were at least two new fish dealing establishments located in the city of Erie. It may be nevertheless a healthy increase because the State has been increasing its output of the principal fishes caught and has been able to plant the fry to better advantage within the last three or four years.

The total catch in 1910 foots up 12,460,555 as against 10,904,617 pounds in 1909 and 6,999,051 in 1908. The price paid to the fishermen in 1910 was $458,165.96 as against $284,822.11 in 1909. The catch and money value of lake herring was as usual greater than any other species, and the value of the herring catch alone was greater than the total catch of all species of fish in the Pennsylvania part of Lake Erie in 1909. The catch weighed 7,998,999 pounds and was valued at $310,-751.69. The catch of lake herring in 1909 was 6,167,187 pounds with a value of $129,199.70, or more than 1,300,000 pounds greater. A higher price was realized.

The catch of blue pike was about the same, but the price realized was a little higher.

There was a marked falloff in the catch of white fish due, it is said, to unfavorable weather at the time the fish are supposed to run best. The following table shows the total catch of fish and the value of each during the year 1910:

Name.	Weight.	Value.
Lake herring,	7,998,999	$310,751 69
Blue pike,	4,105,848	148,674 45
White fish,	155,970	12,644 00
Catfish,	509	25 45
Yellow perch,	28,384	1,191 40
Pike perch,	7,479	593 40
Sturgeon,	11,799	1,862 68
Gray and white bass,	14,500	4,090 00
Suckers, mullets and carp,	5,087	100 87
Miscellaneous,	131,980	2,899 27
Total,	12,450,555	$482,833 21

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The following table shows the catch of the three principal species of fish, namely, blue pike, lake herring and white fish by pounds from 1903:

Name.	1903.	1905.	1906.	1907.	1908.	1909.	1910.
Blue pike, -----	1,964,000	3,215,863	1,021,206	2,159,983	2,606,357	4,196,543	4,105,848
Lake herring, -	5,033,000	3,060,250	2,696,065	1,883,963	3,816,601	6,167,187	7,908,999
White fish, -----	36,500	31,969	113,278	574,265	394,763	295,701	155,970

The following figures gives the value of the catch for each year since 1903, excepting 1904, when no records were obtainable:

1903, ...	$300,000 00
1905, ...	201,085 94
1906, ...	168,995 14
1907, ...	305,913 39
1908, ...	200,869 53
1909, ...	284,822 11
1910, ...	458,165 96

It is noteworthy at the catch of yellow perch, also appreciably increased. A heavy falloff in the catch of yellow pike is also noticed and this emphasizes the belief which I expressed in my report last year, that a large proportion of the eggs received at the Erie station from Ohio waters are in reality blue pike and not yellow pike. This is the only conclusion to be drawn unless the belief of many fishermen is true, that the Pennsylvania and New York end of Lake Erie is not as favorable for yellow pike as the Ohio end, and that the millions of fry planted as soon as they are large enough make their way to more congenial waters.

The effect of planting blue pike is plainly visible, as is also the planting of lake herring and white fish, but a glance over the table giving the catch for the last seven years does not show an increase in the catch of yellow pike in proportion to the fry planted, as is the case with the other fishes just named. It is stated that the yellow pike is markedly increasing at the upper end of the lake in Ohio waters where the United States Government is stocking very heavily, and it is quite possible that our plantings may be swelling the number.

PHILADELPHIA'S FISH BUSINESS.

According to the returns made by 27 dealers, Philadelphia last year consumed more than 13,579,000 pounds of fish on which was realized by the dealers over $1,000.000.00. It is certainly difficult to arrive at accurate figures for two reasons. First, in many instances dealers purchased from each other and therefore there must be more or less duplication, and, second, because a few of the dealers bungled their returns, making it difficult to ascertain whether the fish were sold

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Taking fish from a pound net. Lake Erie.

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by weight or number, and there was not time to send the returns back to be corrected. The sale of Delaware River carp as recorded does not begin to represent the number of pounds or the value of that specie of fish consumed in Philadelphia in 1910. The bulk of the trade in carp is by the small dealers who purchase the fish from the fishermen as they are returning and who either sell directly to the consumer or small retailers and who cannot well be reached. It is also impossible to separate most of the fishes caught in the Delaware River from the same species brought from other waters, hence the fish business along the Delaware River can only be taken as a whole. Neither can the sales of shad in Philadelphia, Chester, Easton and small towns along the Delaware be taken as the actual catch of that fish, since many such cases would be duplications, nor can the total fish business in Philadelphia be added to the fish business of Erie for obvious reasons.

The table shows 376,000 Delaware River shad with a value of $121,-134.00. The returns from all the dealers about 122,000 more. These were stricken off because of their probably having been already returned by the original dealers. The number, however, if added to the Delaware River shad delivered directly to dealers in Chester, Easton, Morrisville, New Hope, Stroudsburg, and the towns along the Delaware River in New Jersey will undoubtedly reach that number, and in addition large quantities of Delaware shad were sent to New York City by others than the Philadelphia dealers, hence it is reasonable to suppose that the total catch of shad in the Delaware River was about 600,000.

The following table shows the approximate weight of fish sold by the 27 dealers and the value of the same:

Name of fish.	Number.	Weight.	Total value.
Alewife or river herring,		1,208,050	9,624 13
Black bass,		388,997	94,827 18
Catfish,		406,326	38,059 75
Cisco or lake herring,		329,528	19,667 61
Pike perch (yellow pike),		30,594	2,731 92
Blue pike,		161,240	7,158 06
Lake trout,		8,025	634 75
White fish,		61,423	5,044 11
Shad from Delaware or Susquehanna river,	376,000	1,682,390	121,134 31
Shad from other sources,	204,243	672,945	70,323 08
Carp from the Delaware river of Pennsylvania and New Jersey,		5,571	367 26
Carp from other sources,		51,556	3,369 72
Yellow perch,		40,099	1,566 28
Eels,		52,306	3,895 86
Sturgeon,		105,818	14,859 93
Miscellaneous fresh water fish,		261,279	8,316 26
Miscellaneous salt water fish,		8,113,844	290,468 95
Miscellaneous fish,			338,045 00
Total,	580,243	13,579,991	$1,030,094 16

An examination of the table given above shows the extent of business in Lake Erie fishes in Philadelphia. While the bulk of the fish came from Lake Erie they were not all from the city of Erie, some were from Buffalo, Cleveland and other points in Ohio. The total weight of Lake Erie fishes sold in Philadelphia was 590,810 pounds having a total value of $35,236.45. None of the salt water fish of course are Pennsylvania product, and two-thirds of the carp came

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from Illinois and at least that amount of catfish came from Maryland or Virginia, while the bulk of the black bass came from Delaware and Maryland. The yellow perch is divided between the Delaware River, Delaware and Maryland.

EEL INDUSTRY.

The general complaint during the year was that the water was so low that the catch was not what it ought to be, yet the returns show that during the year 1910, 339,983 eels were caught weighing 149,019 pounds of a value of $13,442.74. This is in excess of the preceding year, when 186,750 eels were caught weighing 120,078 of a value of $11,153.10. There were granted during 1910, 584 licenses of which 86 licensees report they caught nothing. The largest number of licenses was from Dauphin county, 73 as against 86 the preceding year and eight were not operated. The total number of eels taken was 339,983 as against 186,750 taken in 1909. The weight of eels was 149,019 as against 120,078 taken in 1909. The total value in 1910 was $13,442.74 as against $11,153.10. This shows that while the number of eels was very largely in excess of those taken in 1909, the average weight was comparatively very much smaller. The number of suckers and mullets taken during 1910 was 13,724 weighing 7,242 pounds of a value of $420.82, and 1,763 carp weighing 4,688 pounds of a value of $241.94, making a total value of fish caught of $14,105.50 as against the value of fish taken in 1909 of $11,696.76. Of the 584 licenses granted 86 of them caught nothing. The returns show that in the northern counties of the State the eels weighed much heavier than in the lower counties, where many of them ran so small as to be almost below the title of "whip snappers."

Almost every owner of a basket complained about low water and yet the returns show that more eels were caught than in the preceding year. Quite a number of holders of licenses asked that either the eel basket law be repealed or that the space between the slats be increased, as one man said it should be one inch, so that only the large eels will be caught, and that the little ones should be allowed to get away and return a good size to be worth skinning and eating. A Lancaster county man writes that his fish basket cost him, for labor and new lumber, $6.80, and that he only caught eight pounds of eels which he sold for 80 cents, yet in the same county a man just a short distance below makes a return of 19,712 eels weighing 4,928 pounds, which he sold for $344.96. Another man reports 12,780 eels weighing 2,130 for which he got $106.50, but this shows that the eels were very small. Another man from Lancaster county reports 45 eels weighing 125 pounds for which he got $12.50. From all reports it is apparent that the space between the slats, as provided by law, is much too small. Even taking the arguments of the people who say eels are deleterious to fish life, they do not want the small ones, while those who urge that eels are a question of a food supply say too many small ones are being taken, because, as one man says, the eels should be given a chance to grow big enough to make a food supply.

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That the basket is destructive is shown by the number of letters where basket owners are honest enough to say that food fish run into the baskets and if not promptly taken out are destroyed. As an example, one man writes that he took out of his basket 26 small mouth bass and 24 wall-eyed pike or Susquehanna salmon in one night and returned them to the water. This was on rather a small stream where the wing walls covered about the whole stream and really nothing could escape. He says that he did not want to fight with his neighbors, but he knows very well that the fish basket above caught more game fish than he did and they were all taken home.

The following is the table of the catch of eels, suckers and mullets and carp, together with the value of the same:

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	Eels.			Suckers and Mullets.			Carp.			Licenses issued.	Caught nothing.
	Number.	Weight.	Value.	Number.	Weight.	Value.	Number.	Weight.	Value.		
Adams,	37	46	$3 70							5	3
Bucks,	25	70	7 00							1	
Bradford,	26,848	29,015	2,368 53	661	471	$30 14	15	34	$2 94	61	8
Bedford,	6,780	3,312	281 21	53	34	3 05	1	1	10	25	2
Berks,	16	36	7 20				1	8	96	1	
Blair,										1	1
Centre,	677	1,120	99 30	171	67	6 70				11	1
Clinton,	1,551	889	128 00	575	265	13 30	800	1,000	40 00	7	1
Clearfield,	595	292	29 67	60	28	2 05				9	2
Chester,	400	350	17 50							1	
Cameron,	597	366	39 62	133	68	4 48				8	1
Cumberland,	4,114	2,577	249 57	62	35	2 20				22	3
Columbia,	551	595	70 27	94	60	4 20	3	6	60	7	2
Dauphin,	80,971	19,766	1,781 24	3,091	821	48 31	122	235	16 59	73	8
Franklin,	62	135	10 50	2	2	10				4	1
Fulton,										1	1
Huntingdon,	11,062	4,593	253 51	107	62	4 05	24	52	4 90	26	7
Juniata,	4,278	1,579	142 85	18	10	60				15	1
Lackawanna,	1,375	1,000	100 00							2	1
Lycoming,	6,232	4,195	452 91	365	232	17 49	19	18	1 53	44	7
Lebanon,	2	6	90							1	
Luzerne,	8,742	7,791	861 32	206	149	11 76	103	307	12 75	32	7
Lancaster,	80,900	24,763	1,834 27	6,533	4,020	221 80	444	2,360	121 72	64	6
Montour,	45	100	12 50							1	
Mifflin,	27,422	7,739	820 02	148	71	3 64	162	270	20 14	19	5
Northampton,	200	255	20 56							2	
Northumberland,	23,712	16,689	1,788 14	824	440	24 49	25	103	4 85	51	4
Perry,	20,179	7,078	568 20	101	78	4 68	27	154	8 06	27	2
Potter,										1	1
Pike,	2,544	1,021	101 10	6	5	40				5	1
Snyder,	1,730	913	95 29	19	12	96				12	2
Tioga,	1,297	1,821	210 90	53	60	3 00				11	2
Union,	882	507	54 67	37	16	1 14				3	1
Wyoming,	9,739	6,845	742 93	23	13	90	1	2	10	9	1
York,	16,418	3,556	289 36	382	227	11 38	16	140	6 70	22	4
Total,	339,983	149,019	$13,442 74	13,724	7,242	$420 82	1,763	4,688	$241 94	584	86

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SHAD SEINE LICENSES.

Under the Act of May 1, 1909, licenses can be issued for the taking of shad, herring or alewife from March 1 to June 10 of each year. During 1910 forty licenses were granted and 21,186 shad with a value of $2,103.27 were taken. Under the law other food fish taken in these seines can be kept, and the value of the other fish taken was $538.46, making a total value of all the fish taken $2,641.73.

A few shad were taken in Delaware county, but none were taken in the Susquehanna River above McCall's Ferry Dam, showing that that dam blocked the migration of fish. The fishways in the dam were not completed before the close of the shad fishing of 1910. The following is the table showing the take:

County.	Number of licenses.	Shad.		Carp.		Suckers and Mullets.		Catfish.		Rock Bass.	
		Number.	Value.	Pounds.	Value.	Number.	Value.	Pounds.	Value.	Pounds.	Value.
Dauphin,	2			105	$5 25	100	$5 00				
Delaware,	8	32	$13 00	1,920	221 14	2,852	272 38	30	$2 40		
Lancaster,	19	5,339	1,579 45	101	5 06	3	03			35	$2 50
Mifflin	3			310	16 00	4	20				
Perry,	2			40	4 00						
York,	6	15,815	512 82			70	3 50				
Total,	40	21,186	$2,105 27	2,476	$251 45	3,029	$281 11	30	$2 40	35	$2 50

FINANCIAL STATEMENT.

The following is a statement of the receipts and expenditures of the Department of Fisheries for the year ending November 30, 1910:

HATCHERIES.				
Received from State Treasurer,	$40,295 06			
Balance on hand from Lake Erie licenses,	91 56			
Balance on hand from fines,	503 22			
		$40,889 84		
Paid for hatcheries,			$40,295 06	
Balance on hand,				$594 78
WARDENS.				
Received from State Treasurer,	$11,610 74			
Balance on hand from eel licenses,	49 23			
		$11,659 97		
Paid for wardens,			$11,610 74	
Balance on hand,				$49 23

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CONTINGENT FUND.				
Received from State Treasurer,	$1,000 00			
Paid for incidental expenses,			$927 37	
Balance on hand Dec. 1, 1910,				$72 63
EXPENSES OF FISHERIES COMMISSION.				
Received from State Treasurer,	$1,204 83			
Paid for expenses,			$1,204 83	
COUNSEL FEES AND COURT EXPENSES.				
Received from State Treasurer,	$1,025 07			
Paid for fees and expenses,			$1,025 07	
OPERATION OF COMMODORE PERRY.				
Received from State Treasurer,	$3,298 23			
Paid for operation,			$3,298 23	
COMPLETING HATCHERIES.				
Received from State Treasurer,	$44 88			
Paid for work,			$44 88	
FIELD WORK.				
Received from State Treasurer,	$2,985 02			
Paid for field work,			$2,985 02	
PURCHASE OF GROUND.				
Received from State Treasurer,	$2,510 23			
Building dock, etc.,			$2,510 23	
ERECTION OF FISHWAYS.				
Received from State Treasurer,	$33 90			
Paid for repairs at Clark's Ferry dam,			$33 90	

During the year there were receipts from various sources as follows, the same paid into the State Treasury daily in accordance with the statute:

Fines for violations of the fish law,	$5,245 20
Licenses for eel baskets,	535 00
Lake Erie licenses,	2,315 00
Licenses for commercial hatcheries,	100 00
Licenses for shad seines,	77 90
Confiscated fish and devices sold,	4 00
Total,	$8,277 10

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ITEMIZED EXPENSES OF HATCHERIES.

The following is the itemized account of the expenses of the various hatcheries for the year ending November 30, 1910.

	Salaries.	Labor.	Travel.	Material.	Food.	Incidentals.	Water rent.	Total.
Bellefonte,	$3,407 00	$54 00	$433 94	$182 45	$1,452 78	$191 93	----------	$5,722 10
Corry,	3,140 25	444 95	512 65	811 77	998 86	224 74	----------	6,133 22
Crawford,	2,760 46	63 13	402 01	333 04	161 92	502 32	----------	4,222 88
Erie,	1,845 00	381 52	392 61	211 96	----------	*451 15	$400 00	3,682 44
Erie auxiliary,	2,725 00	59 40	294 94	291 36	89 36	259 74	----------	3,719 80
Spruce Creek,	2,746 51	86 85	676 50	1,210 30	826 41	514 12	----------	6,060 69
Torresdale,	2,375 00	283 94	783 52	293 95	85 94	*1,153 58	----------	4,975 93
Wayne,	2,400 00	174 84	526 16	729 76	342 39	*1,604 85	----------	5,778 00
Total,	$21,399 22	$1,548 63	$4,022 53	$4,064 59	$3,957 66	$4,902 43	$400 00	$40,295 06

Note.—In the incidental expenses for Erie is included $400 paid for eggs.
In the incidental expenses for Torresdale is included $269.26 for eggs and $531.57 for electric lights.
In the incidental expenses for Wayne Hatchery is included $1,089.22 for the artesian well.

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PERMITS GRANTED.

During the year permits were granted under the provisions of the Act of May 1, 1909, for the following purposes:

Use explosives for scientific purposes,	18
Close fishway on account of low water,	1
Use nets for taking aquatic life for scientific purposes,	10
Use nets for taking fish for propagation purposes,	2
Permits to transplant fish to more suitable waters,	7
Permit to net carp as a destructive fish,	1
To clean pond and save fish the private property of the owner,	1
Total,	40

APPLICATIONS FOR FISH.

The following applications for the various species of fish were received during the year:

Pickerel,	540
Brook Trout,	3,159
Brown Trout,	16
Black Bass, small mouth,	621
Yellow Perch,	405
Wall-eyed Pike,	303
Sunfish,	170
Catfish,	311
Frogs,	135
Rock Bass,	5
Total,	5,665

CORRY HATCHERY.

The reconstruction of the Corry Hatchery was continued during the year. Its completion can easily be accomplished, at least as far as the old grounds are concerned, within the next year. The reconstruction was necessary. It is the oldest hatchery in the possession of the State.

The original ponds were located and dug haphazard, and the banks supported by boards. These in time rotted away and the surrounding ground being of a mucky character began to fall into the ponds.

When the Department of Fisheries took over the hatchery from the Fish Commission everything was in a dilapidated condition. The number one hatching house had its roof and sill plates so rotted that

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it was in imminent danger of falling. The floor of the number two house was unsafe to walk on. The hatching troughs were in the last stages of decay.

The barn was unfit for stock or hay, and the Superintendent's house was in very bad condition. As there was no special appropriation for reconstruction, the work could only be done gradually with what funds that could be spared from the regular hatchery appropriation and a small sum, about $2,000, which had accumulated from the collection from fines.

With this last mentioned sum I built a neat new Superintendent's dwelling, a new barn was constructed, the hatching house overhauled and practically rebuilt and the trout ponds, one after the other, remodeled with concrete sides.

The improvement by the reconstruction of the ponds is shown by a comparison of the output for the years 1904 and 1910. The first year's output, while the ponds were nearly all in a dilapidated condition, was 4,062,500. The output in 1910 was 5,639,700 and the last output was with the addition of only one pond. In these figures I have taken no account of the output of brown trout in 1910, which increase the output by 116,500.

The additional pond mentioned although of very large size did not contribute any to the output since it contained only old fish transferred from other ponds.

In addition to the reconstruction of the old pond, the large pond just mentioned, started in 1909, was completed and nearly twelve hundred feet of pipe laid to convey spring water from another source beyong the State property. The pipe was laid, by permission of the owner of the neighboring property and the spring water freely given by still another property owner.

The pond is designed to accommodate only female trout of three years old and over, thus allowing the smaller ponds to be utilized for younger fish.

By its construction the new pond will enable an increase of the output within the next two years of at least 2,000,000 fish.

ERIE HATCHERY.

The entire work of the Erie Hatchery is dependent on the field. The property at Second and Sassafrass is only large enough to hold the hatching house and dwelling house for the Superintendent. There is no room for any ponds. The hatching house itself was built in the seventies and by the action of moisture the building is rotted and is not large enough to meet the needs of the Lake Erie work even with the addition of the Erie Auxiliary at Union City and the Crawford Hatchery at Conneaut Lake. The hatching house should be torn down and another building nearly double the size erected in its place. At present there is only room for two batteries with a total capacity of five hundred and forty jars and tanks insufficient to care for the fry that can be hatched from that number of jars. The new house should have battery capacity for fifteen hundred jars and ample tank room. The new building could be erected I believe without adding to the land area.

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BELLEFONTE HATCHERY.

The Bellefonte Hatchery started in 1903 is now one of the largest trout hatcheries in the country. It has two hatching houses of large size and sixty-five ponds all devoted to trout. The fish in the ponds are in fine health and this year yielded 6,500,000 eggs, certainly the greatest number of trout eggs ever taken in any hatchery in this State excepting those operated for the market. The take of eggs was much larger than could be accommodated in the hatching houses so 2,850,000 were sent to Spruce Creek and Wayne Hatcheries. If the two large springs which supply the hatching houses had been flowing their normal amount of water there could have been retained probably one million more eggs than was the case, but the two springs have felt the severity of the dry weather and are reduced to half their normal flow. There is, however, an abundant supply from the creek for operating all the ponds and also plenty spring water to care for about four million fish in the hatching houses.

Ever since the establishment of the Bellefonte Hatchery I have been giving the greatest attention to the development of the plant and it has reached a point where five or six ponds will complete the section where the hatching house stands. All the ponds were constructed with a view of permanency with concrete sides and sluices and with a perfect drainage system. Trees have been planted abundantly and are beginning to give shade and the place presents a parklike appearance.

A year ago rudimentary goitre found its way among the fish, but by vigorous work the Assistant Superintendent got rid of the disease.

In taking eggs this autumn there was put into practice a new method suggested by me by which a larger percentage of eggs were impregnated and much time saved. The regular practice has been, after the milt has been expressed over the eggs to set the pan aside for twenty minutes to a half hour and then they were washed and a little later placed upon the trays for hatching. Knowing that milt after being exposed to the air or get into water die within three minutes, I could see no advantage of waiting twenty minutes to a half hour and had experiments conducted at the Spruce Creek Hatchery with a view of testing the efficiency of a five minute interval. It proved entirely successful and was carried out throughout the entire spawning period at Bellefonte with a very small loss of eggs.

Unless our calculations are wrong in March, 1912, we should be able to take eggs of the silver salmon at the Bellefonte Hatchery. They will complete their third year next March. I am somewhat disappointed in the small growth they made in comparison with the second year. In their wild state they ought to average, from what I have heard, fully four inches larger than they are in the ponds.

A number of improvements are needed next year among them the installation of a better system of cutting food, an ice house and a fence.

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WAYNE COUNTY HATCHERY.

The drought almost completely put the Wayne County Fish Hatchery out of business. The drought has been felt in Wayne county for three years with unexampled severity, drying up creeks and springs and the water on the Wayne Hatchery was not exempt. The spring which supplies the trout hatching house and ponds fell in July to about seven gallons a minute, while the Lackawaxen, which has its rise about three miles above, fell to a point that all the water of the creek would easily pass through a three-inch pipe. Had it not been for the eggs from the field and trout eggs from other hatcheries there would have been no output from the Wayne station in 1910 of any account.

The trout in the ponds were so weak in the autumn of 1909 that the eggs could not be safely taken from them, and all the warm water ponds during the summer had to be emptied so as to run what little water there was through the trout ponds and keep the trout alive. Eggs could not be taken from the trout this autumn either.

There is a deep well which was driven in the ground last year, but as it is not an artesian, we have been unable to use the water for lack of funds to put in a pumping plant. When a pumping plant is installed there will be two hundred gallons of water to add to the spring which is not likely to resume its normal flow for a year or two, even if the weather conditions improve. Through the field work the Superintendent of the hatchery was enabled to turn out 449,786,500 fish of various kinds.

TORRESDALE HATCHERY.

The Torresdale Hatchery, established in 1904, may be considered as a complete plant so far as ponds and the like are concerned. A new hatching house more in keeping with the character of the property is desirable though not necessary.

Having built all the ponds the Superintendent spent much time in beautifying the grounds and the place is beginning to assume a park-like appearance, attracting thousands of visitors. Torresdale is largely a field station, propagation of shad, yellow perch and pickerel being conducted on a large scale. The output of all fish from the Torresdale Hatchery in 1910 was 133,215,225.

A permanent wharf is badly needed at this station. The State controls about three acres of land in front of the hatchery which is only submerged by high tide, and it is, therefore, only possible to bring light draft boats to the shore when the tide is up. A temporary wharf is put up in the spring and taken down in the autumn, but a permanent wharf would be useful to the Department and a great convenience to visitors.

The great speed with which the Torresdale Hatchery has been brought to completion has been due, to a large extent, to the Honorable Henry Clay, the Director of Public Safety of the city of Phila-

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delphia, who has permitted gangs of House of Correction labor to be used for building ponds and grading, and I desire here to extend my hearty thanks both to him and his Honor the Mayor of Philadelphia.

The Superintendent of the Torresdale Hatchery is a skillful fish culturist and he has especially distinguished himself by his expertness in the propagation of catfish, considered by fish culturists throughout the country as an exceedingly difficult fish to handle.

ERIE AUXILIARY.

A visitor to the Erie Auxiliary would certainly be surprised to learn that the plant has only been in existence since 1905. One section, embracing about four acres, is entirely completed, the grounds tastefully graded, sodded and planted with trees. The Erie Auxiliary is exclusively for warm water fishes, with the exception of lake trout, and, as its name implies, the station is intended as an assistant auxiliary in the propagation of fish for Lake Erie. There was turned out from that station last year 160,874,000 fish, namely, lake herring, wall-eyed pike, chain pickerel and yellow perch.

It is intended, whenever the appropriation will permit it, to rear blue pike there also. The battery house on the station has a capacity for 1,050 jars, although at present it is only equipped with 350. The bass work at the Erie Auxiliary was not successful owing to the cold weather and low temperature of the water. A vast quantity of Lake Erie sunfish was hatched at this station, but owing to the exceptionally early winter only one thousand adults were shipped, and the fingerlings will have to be held until spring.

CRAWFORD HATCHERY.

The Crawford Hatchery was started in 1907 and one section is now filled with ponds and most of the ground is graded that can be until concrete walls are built in the Conneaut Lake outlet to prevent the cutting away of the banks.

Although there is an abundant water supply for this hatchery the means of utilizing it are inadequate owing to the flatness of the ground. Until a direct connection is made by pipes with Conneaut Lake we cannot hope to utilize the water on this hatchery to the best advantage.

There is at this hatchery the largest and finest bass pond owned by the State, and by the care and skill of the Superintendent, notwithstanding the cold weather, he was enabled to hatch and distribute 100,900 of this very valuable game fish.

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SPRUCE CREEK HATCHERY.

Of all the hatching stations Spruce Creek probably affords the best facilities for a huge trout cultural plant. One spring has a normal flow of over 1,500 gallons of water a minute. Several small springs yield about 200 more. One other spring can be utilized which yields at least 200 gallons a minute, and there are three other springs in the immediate neighborhood that can be obtained at a small cost which will add another thousand gallons at least to the supply.

Although not started until 1908, the Spruce Creek Hatchery is assuming a very creditable appearance. There are more than two dozen ponds and a large hatching house, the former well supplied with brood fish.

In addition to trout there is ample room and good water for the propagation of bass, yellow perch and catfish, but lack of funds has prevented partly thus far taking up this work at the Spruce Creek station and partly it was deemed expedient to complete the section devoted to trout.

PRESQUE ISLE HATCHERY.

Congress having approved a bill turning over the greater part of Presque Isle Peninsula to the Department of Fisheries and receiving the signature of the President of the United States, the huge tract of land covering about 1,200 acres will come into the possession of the State as soon as plans have been drawn and approved by the United States engineer corps. Nothing of course can be done in this respect until after the first of next June when the new appropriation becomes available. Thus the second step in the acquisition of what will undoubtedly be the largest fish hatchery in the world and one which will be unique as well has been taken. It will require many years of hard work to transform what is now a tangled wilderness into a hatchery and a spot which will be a credit to the State and the country.

The hatchery will be unique because of the size of the ponds and the character of the work done therein. There are eight natural ponds on the tract and when they are put in proper shape for fish cultural work the results cannot be otherwise than startling. There are few men in the United States who are capable of acting as Superintendent of this new plant, but I believe that I have been fortunate enough in securing the one man who will best carry out the plans which I have in mind.

There is a small area fronting on Presque Isle Bay that was leased a number of years ago by the National Government to a Yachting Club. The lease expired last June and the National Government notified the club that the lease could not be renewed owing to the fact that the property had been turned over to Pennsylvania. The continued presence of a Yacht Club for a few years would be beneficial than otherwise, but I doubt whether under the phrasing of the Act of Congress or my powers as Commissioner of Fisheries the club could be allowed to remain. On the borders of Misery Bay, which is an in-

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dentation of Presque Isle Bay, there are several boat houses and house boats. These will be notified to move as soon as actual possession has been obtained by the Department.

FIELD WORK.

That branch of the Department's labors known as field work is yearly assuming greater importance. The results therefrom now greatly exceed those from breeding fish in the hatcheries. Fully nine-tenths of the outputs from the different hatching stations are from eggs gathered in the field. Indeed the Erie Hatchery is entirely sustained from that source and two others, Wayne and Torresdale, are almost wholly dependent on the field. As a matter of fact all of the stations, with the exception of Corry, Bellefonte and Spruce Creek, receive supplies in that manner. All of the pike-perch eggs, blue pike, white fish, lake herring, more properly cisco, shad and pickerel eggs are gathered from the field, as are also more than half the yellow perch eggs.

Large and valuable as is the supply of eggs gathered from the field the number is exceedingly small compared with what could and ought to be the take. It is possible to gather and hatch and plant more yellow perch alone than the present huge yearly output of all species of fish from the hatcheries. It is almost possible to do the same thing with the blue pike and at least half of the total output could be gathered of white fish and lake herring. The only bar to the performance of such work is insufficient funds.

The gathering of white fish of lake herring and blue pike eggs is restricted to Lake Erie, but there are several fishing grounds on that lake that this Department has been unable to touch for lack of funds. Until last year there has been only $2,000 a year available for field work and this permitted restricted work only in Lake Erie, about eight or ten ponds in Wayne county and a portion of the Delaware River.

After the close of the last session of the Legislature there became available $2,500 a year. With this sum I was enabled last year to extend the work on Lake Erie and gather eggs from Port Stanley in Canada and from white fish impounded and taken from nets of Pennsylvania fishermen. This year, by special permit of the Canadian authorities, I can take white fish eggs from Port Maitland and Nanticoke, and herring eggs from those two points and Port Stanley and Port Dover, Canada.

Unfortunately the condition of the appropriation will only permit the taking of white fish and herring eggs at the two first named places in addition to those from the fishermen in Pennsylvania waters. I have also made arrangements with New York State by which we expect to gather lake trout eggs from Lake Erie off Dunkirk. Arrangements hitherto existing between this Department and the United States Bureau of Fisheries for obtaining white fish eggs from Ohio waters have been continued. By the terms of the arrangement the United States Bureau of Fisheries gathers all the white fish eggs from Lake Erie west of Pennsylvania and Pennsylvania pays the pro rata cost for a proportionate share of eggs.

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Gathering perch eggs.

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The autumn work will entirely exhaust the appropriation, hence no field work in northeastern Pennsylvania can be done next spring and the work on Lake Erie and the Delaware River cannot be extended beyond that which it is possible for the employes of the hatcheries to accomplish. Relatively speaking the cost of carrying on field work is smaller than the operation of the hatcheries, apart from the period when eggs are being incubated and the operation of the field stations is less than those in which trout are produced.

The entire cost of field work is confined to gathering the eggs, hatching them and their distribution. In view of the great importance of this branch of the work, I feel that the appropriation for the next two years should be doubled at least. Such an increase would not add a thousand dollars a year to the present cost of hatching.

The field work in northeastern Pennsylvania last spring, while it was productive of a large output of both yellow perch and pickerel, was accompanied by many disagreeable circumstances and difficulties. Perch and pickerel eggs can only be gathered in quantity and with certainty when the surface of the lakes are still and there is bright sunshine. During almost the entire spawning season for these two fish last spring there were prevailing winds or rain, snow or cloudy weather. At times the men could not work more than two hours a day. Under favorable circumstances two men can gather from one hundred to a hundred and fifty quarts of eggs daily, but I question whether they averaged over fifty quarts a day the spring of 1910.

The bass work in the field was nearly a total failure. It is known to fish culturists that bass cease cleaning nests and halt spawning when the water temperature falls below 55 degrees; that eggs already deposited will be killed when the temperature falls below 50, and that bass fry or fish with the sac still attached will die when the water temperature goes below 45. A few days after the spawning of the small mouth bass began there came a spell of cold weather lasting from May 25 until June 12. Within three days the water temperature fell below 50 and all the bass eggs in the lakes of northeastern Pennsylvania remaining unhatched were killed. At the end of ten or twelve days the water still remaining cold most of the bass having nests of hatched fish deserted them and fully 75 per cent. of the young fish were devoured by other fishes.

I took personal charge of three lakes during the bass season, two of which were operated almost daily at least twice, the third being several miles away was only visited three times. There were more than 150 nests on the two first mentioned lakes and these should have produced under ordinary circumstances at least 250,000 young small mouth bass. The take was 52,000. One of the other men had two lakes in charge. In one the bass never spawned. In the other there were about 200 nests and only 3,000 young fish were secured. The eggs on the remainder either were killed by the cold water or the young fish devoured by other fishes through the parent bass deserting them. These two instances illustrate the conditions which prevailed in all the lakes in northeastern Pennsylvania.

There are a number of lakes in Wayne, Susquehanna and other counties in northeastern Pennsylvania, the titles of which are in the Commonwealth of Pennsylvania. These lakes should be turned over to the Department of Fisheries as auxiliary breeding places with public fishing permitted during the open season under regulations by

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the Department. If this were done field work could be carried on better and less cost and at the same time soon result in much better fishing. Under existing conditions when we take eggs from a pond or lake owned by private individuals the Department must return a large proportion of fish hatched from eggs taken from some other body of water. The proportion returned is larger than there is any real necessity for, but under the circumstances it must be done to satisfy the owners.

SHIPPING CANS FOR TRANSPORTING FISH.

When I became Commissioner the facilities for shipping fish rapidly were very meagre and unsatisfactory. There were less than 300 shipping cans stored in the three hatcheries, Erie, Corry and Allentown, and these were of many patterns and purchased evidently without considering their perfect adaptability to the work. They were ordinary milk cans holding from 30 to 40 quarts of water each. At that time the total output of trout yearly was only between three millions and four millions, and it required from the middle of March to the middle of June to dispose of the stock in the hatcheries. The cans in use were large, cumbersome and so heavy that from one to two men were required to load them on the cars when full of water and fish.

On studying the matter and experimenting I found that cans of 20 quarts capacity and of what are known as the Philadelphia or Baltimore patterns would carry as many trout successfully for the same distance as the squattier and larger cans of from 30 to 40 quarts capacity, and I adopted the smaller size, having the bottoms convex instead of concave so that the fish would scatter rather than huddle in the middle. These cans weighed only 70 pounds each when filled with water and one man could carry two when filled for a short distance and one man could with ease lift one from the railroad platform to the baggage car.

Having ascertained this, I then began installing cans in large numbers and as rapidly as possible in all the hatcheries until now the eight stations have an aggregate of more than 2,500. About 600 more are desirable to thoroughly equip the existing hatcheries, after which it will only be necessary to replenish cans which may be worn out or lost through railroad wrecks. By adding cans in this manner to the stock the Department is enabled to distribute yearly between 10,000,00 and 11,000,000 of trout in less than six weeks where it used to require three months to distribute less than four millions. This naturally means the saving of many hundred dollars as well as more prompt delivery. It also enables the Department to promptly send out vast quantities of fish propagated by the battery system, like yellow perch, pickerel, pike-perch and the like.

In order to insure the return of cans to the proper hatchery, the cans belonging to each station have a distinctive color and a range of numbers. A record is kept of the number of each can sent to an applicant, and in a paper which the applicant receives before shipment, he binds himself to return the cans promptly or pay for them. Less than

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Getting perch eggs ready for shipment.

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a dozen cans were lost during the year and of these six were traced to having been destroyed by wrecks. The others were lost by the railroad companies. As the railroad companies transport the fish free and return the empty cans without cost, no record is kept by the railroad company of the numbers and the Department can hardly ask the railroad companies to stand the cost.

FISH CAR.

The fish car "Pennsylvania" belonging to the Department of Fisheries needs painting and some repairs. It was only used once by the Department during the year. It should be used regularly for the transportation of fish from the hatcheries to the applicants, but two of the largest railroad companies insist on making a charge of 20 cents a mile each way every time it is used, hence as there is no direct appropriation for the purpose the car must remain unused in the car barn at the Bellefonte Hatchery.

Before very long it will be necessary to have an item in the general appropriation bill to operate the car.

The output of fish by the Department is now so large that the baggage cars on which the fish are shipped are frequently taxed to their full capacity. Several times last spring it was only by overcrowding the cans that the Superintendent of the Union City Hatchery was enabled to transport his output of lake herring to Erie, and that despite the fact that the limit of cans allowed by the company was carried on every train daily, and on two or three occasions it was necessary, although the risk was great, to retain some of the hatch in the tanks for twenty-four hours longer than should have been.

The fish car can easily carry 350 cans and for a short distance 450 or even 500 cans might be placed aboard. If the output from the different hatcheries increase materially in the next two years the baggage cars of the available trains will be inadequate. Not only ought the car "Pennsylvania," now owned by the Department, be used, but there should be two more built and operated. One to take care of the Lake Erie or northwestern section of the State, one to transport the fish from the northeastern and eastern part and one from the central and southern portion of the State. When not in use the cars could be located at Conneaut Lake, Crawford county, Herrick Centre, in Susquehanna county, and Bellefonte, Centre county. With three cars in operation the cost of transportation of fish by the Department of Fisheries would be materially lessened, just as the cost of transportation has been largely decreased and a much larger distribution made in a shorter space of time by the Department's adding a large number of shipping cans to its stock.

THE COMMODORE PERRY.

The Department's steam tug on Lake Erie, the Commodore Perry, has become as necessary as the telephone is to the average business man. By means of the vessel illegal fishing in Presque Isle Bay and

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the lake proper within the jurisdiction of Pennsylvania, has practically been stopped. Stealing from licensed pound-nets has, through the vigilance of the captain and crew of the Commodore Perry, virtually become a thing of the past. It is not merely as a patrol boat that the Commodore Perry is of extraordinary value to the Department. By its possession our hatchery force at Erie can visit the pound-nets daily and secure fish for propagating purposes without any trouble, whereas prior to its going into commission it was necessary to hire boats at irregular intervals, and then the facilities for bringing the fish to the wharves safely were meagre and unsatisfactory. It also does away with the necessity of the Department regularly employing tugs for planting white fish, lake herring, yellow and blue pike, and it is also used extensively and to good purpose in conveying spawntakers with the spawn to the hatcheries from even distant points, Canada for example.

Apart from these excellent purposes the Commodore Perry has become known far beyond Lake Erie as an invaluable instrument in the cause of humanity. One of the staunchest boats of its type on Lake Erie, its intrepid captain and crew venture out into storms, fatal to less staunch vessels, for the purpose of rescuing life and property. In this connection the deeds of the captain and crew of the Commodore Perry have on more than one occasion reached the heights of heroism, even among those whose livelihood are dependent on successfully navigating the tumultuous waters of Lake Erie, and on one occasion earned for the captain and crew the official thanks of the Councils and Mayor of the city of Erie and of Conneaut, Ohio.

The Commodore Perry is a credit to its builders, and is far superior to the original contract requirements. It makes a mile and a half an hour greater speed than the contract called for, and the cost for repairs has been comparatively light. It was only necessary to put the vessel into dock twice during the year, and then for minor repairs only. Owing to the advancement in salaries to captains and crews on all steam tugs on Lake Erie it will be necessary to slightly increase the appropriation for the maintenance of the Commodore Perry for the next two years. Eight thousand was the amount appropriated two years ago; ten thousand is needed for the next two years.

A NEW BOAT HOUSE AT ERIE.

An item in the appropriation bill for 1909 authorized the extension of the Erie Hatchery property and the construction of a boat house for the accommodation of the Commodore Perry and the apparatus used by the boat. About half the five thousand dollars thus appropriated was expended on the hatchery extension. A site for the boat house was selected at the foot of State street in what is known as the West Basin. On the shore was a strip of land owned by the city of Erie; on it was a dilapidated looking frame building. By an ordinance of the Councils of Erie this piece of ground was turned over to the Department of Fisheries, the building condemned and torn down by the city. A foundation supplied, the place of a dock seventy feet

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long and forty feet wide was built diagonally into the basin and on this constructed a neat two-story frame building. It would have been impossible to have done all this with the money available, only that the City Councils of Erie made a gift to the Department of several hundred cartloads of stone that had been used for paving the streets, but torn up to make way for modern paving.

As it is, the State has secured a property for $2,500 that is easily worth $1,000 more than it cost. Unfortunately, through the lapse of time, the West Basin is filling and there is only water enough, at normal times, to float the Commodore Perry safely along side of the boat house. When, by reason of winds or other causes, the water in the basin falls, and this is not uncommon, it is difficult to tie the boat up and sometimes impossible. Not merely on this account, but for the sake of the numerous other crafts that must use this basin an appropriation ought to be made to deepen it. I am informed that the cost would be very small.

THE DROUGHT.

The drought which prevailed throughout the greater part of Pennsylvania in 1908-09 was not altogether broken the last year. While not as widespread as in the first two years it prevailed with great severity in many sections. It was very severe in the northeastern part of the State, notably Susquehanna and Wayne Counties. There, many of the streams were at the close of the Department year practically dry in the upper reaches. A striking example is the Lackawaxen in Wayne county, a stream which was in the past relied upon to supply all the ponds of the Wayne Hatchery, with the exception of its pond for trout. Under normal weather conditions the stream from its source for about four miles would more than fill a twelve-inch pipe. At the present time a two-inch pipe would easily carry all the water. Even deep springs have dried. The hatchery spring, which was ample to supply twelve or fifteen ponds and fill a four-inch pipe, will not to-day fill a one-inch pipe. It is needless to say that the upper waters of the Lackawaxen, formerly one of the best trout streams in Pennsylvania, is now nearly barren of trout, and the same may be said of many other streams in Wayne and Susquehanna.

The drought was also severe in portions of the western part of the State. Fortunately most of the streams contained warm water fish and enough remained in pools to sustain life. Sufficient rain fell in the northern counties to prevent the destruction of the trout streams although dry weather prevailed there also. Many of the streams in the central part of Pennsylvania are much lower than normal, but have not reached danger point.

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THE GAME FISHING SEASON.

Reports from all parts of the State concerning the character of the fishing for game fish was of the most encouraging character. Notwithstanding the prolonged drought the season was unusually good excepting in a few localities here and there trout streams were reported too low and non-fishable, but generally the catch of trout was reported as better than in previous years. The bass fishing, according to statements made, surpassed any of the previous ten years. In the Lower Susquehanna only was the pike perch, or Susquehanna salmon, fishing reported as poor and even in that section there were some fine catches.

Lake fishing was exceptionally good, black bass and pickerel being reported plentiful in the lakes of the northeastern part of Pennsylvania. More than the usual number of muscalonge were said to have been caught in the western Pennsylvania lakes. From the opening of the season until about the first of September the bass fishing in Conneaut Lake was unquestionably poor and many anglers became convinced that the lake was about fished out of this game fish, but there was a decided improvement after the beginning of September.

There is a condition prevailing on Conneaut Lake, and a number of other similar bodies in the State that operates against good catches while those conditions prevail. It is not generally known, but is a fact nevertheless, that fish in lakes, especially those as small as are in Pennsylvania, where steamboats or motor boats are used regularly and in numbers, the game fish become what may be known as boat shy, that is to say, so frightened by the disturbance that the boats make that they go into the very deep water and at the bottom or refuse to feed. As soon as the boats cease operating the fish return to their usual haunts and eat. I was supplied with conclusive proof of this on Lake Winola in Wyoming county. This is one of the three or four largest lakes in the State and has been bountifully stocked with black bass and rock bass. The lake is bordered thickly with summer cottages and there are also two large hotels. Several large motor boats, almost large enough for steam, and dozens of small motor boats ply over all parts of the lake from early in the morning until about nine or ten o'clock at night. It is unusual to catch any bass of either specie during these hours excepting in parts of the lake not frequented by the motor boats. After dark, when the number of boats decrease or cease altogether, both fish are caught in great numbers. During a visit I caught more large black bass and more rock bass in a single evening with an artificial fly than I succeeded in capturing in two days of daylight, and other anglers at the same time had the same experience. If further evidence were needed for the truth of this, last March and early April I received many letters from anglers in western Pennsylvania that Conneaut Lake was about fished out of all species of game fish. At the same time the Superintendent of the State Hatchery at Conneaut Lake was daily taking in trap-nets dozens of pike perch and muscalonge for breeding purposes, and on one occasion there were 2,500 blue gilled sunfish in the head of the trap.

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TROUT WORK.

Some of the States have either entirely abandoned the rearing of trout for propagation purposes or carry only a small stock. They give as a reason that they can buy the eggs cheaper from Commercial Hatcheries. Others have abandoned the work because of the frequency of disease and their inability to combat it. My experience does not convince me that trout eggs can be purchased cheaper than the State can produce them from its own fish.

Our take of eggs this year, for example, will exceed thirteen million and should yield us about twelve million fish for distribution. The cost of operating the three hatcheries in which these eggs are produced is in the neighborhood of eighteen thousand dollars. The cost per thousand would, therefore, be about a dollar and a half. The trout hatchery where the eggs were purchased would have to be maintained throughout the year, and I question whether the cost would be much less than in our own hatchery. The cost of twelve million eggs, which averages sixty cents a thousand, must therefore be added to the cost of operating the hatcheries. This would make the cost per thousand over two dollars.

With the exception of thyroid trouble at the Spruce Creek Hatchery we have not been troubled with disease, hence we do not have that excuse for not taking our own eggs.

In taking thirteen million eggs this year we have completely filled all the trout hatching houses of the Department, the first time that this has been done from our own eggs. We had thirteen million eggs last year, but at least three million were surplus given the State by commercial hatcheries. If our fish continue in good health we will take more than thirteen million eggs next year, in which case it will either be necessary to have additional hatching houses built, or present the eggs to the United States Government. An additional hatching house should be built however at the Spruce Creek Station, a house having a capacity for at least five million fish.

TROUT STREAM DECISIONS.

An important section of the Act of May 1, 1909, reads as follows: "That for the purposes of this act, any stream or water, or part thereof, within this Commonwealth, in which charr or trout are commonly fished for and caught, whether through the stocking of the stream or whether native to such stream or water, or part thereof, shall be deemed water or streams inhabited by trout. In case of a conflict of statement on this point as to any stream or water the matter shall be investigated by the Board of Fishery Commission and its decision shall be final."

It is almost invariably the fact that the lower part of trout streams of twenty-five miles or more in length contain few or no trout, excepting perhaps for the first week or two in the season or just off the

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mouths of small trout streams emptying therein. Under an opinion rendered by the Attorney General the laws governing the uses of devices in streams inhabited by trout cover the entire length unless the Board of Fishery Commission should decide otherwise. Naturally, people living in the neighborhood of such streams who do not make a practice of fishing for trout, but who do want to fish for eels and suckers, desire to use in such streams the devices which are lawful in waters which do not contain trout.

Consequently numerous petitions were sent to the Department to investigate certain streams and decide whether or not portions could be declared streams not inhabited by trout. In response to the petitions the Board, during the year 1909, investigated four streams: Penn's creek, which flows through Centre, Union, Mifflin and Snyder counties Lycoming creek, which flows partly through Lycoming county, and Loyalsock creek partly through Lycoming county, and Standing Stone creek in Huntingdon county.

The Board met at convenient points, having previously published in the newspapers the fact of their coming, and sitting as a Board, heard testimony and rendered decisions accordingly. The witnesses were not sworn. It is perhaps unfortunate that the majority of those who desire to have portions of the stream opened, in giving testimony, unconsciously, perhaps, color their statements to show that trout do not exist in the section they desire open. On the other hand many sportsmen who wish the stream kept closed for exclusive rod and line fishing, are apt to unintentionally exaggerate the number and good character of the trout fishing throughout the entire length of the stream.

In my varied experiences I only find two instances in which all parties were unanimous. In the case of Lycoming creek, for example, those who desired to use spears, outlines and fish baskets were emphatic in their declaration that trout did not exist in any number for several miles above a point in which it was emphatically declared that trout did exist. On the other hand, there were sections of the stream where sportsmen unquestionably overestimated the number of trout caught. Hence an investigation under the provisions of section 28 is anything but a pleasant task.

I believe, however, that the decisions which were rendered this year have been approved by the majority, although, as may be expected there has been some dissatisfaction on both sides. Attempts were made to have the Board of Fishery Commission reopen the case of Penn's creek, Lycoming and Loyalsock creeks, but this the Board was unable to do because of the phraseology of section 28, which declares that the decision shall be final. In the cases where investigation is made it would be better if those testifying would exhibit more charity towards each other and consider more carefully their statements, although I believe that those who make them feel that they are adhering closely to facts.

The investigation with respect to Penn's creek was held at Bellefonte December 16, 1909, and after hearing the testimony the following decree was handed down: "And now the Board of Fishery Commission, at a meeting held in Bellefonte December 16th, having heard the testimony of persons having knowledge of the subject, decides and decrees that Penn's creek is a stream inhabited by trout, from its source in Centre county to and including the breast of the dam known

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as Grove's and Halfpenny Dam in Union county below Milliron. And that the remainder of Penn's creek, from below the dam known as Grove's and Halfpenny Dam to where it empties into the Susquehanna River at Selinsgrove Junction, is decided and decreed to be a stream not inhabited by trout.

The above decree is given in accordance with the provisions of section 28, of the Act of May 1, 1909, P. L. 252, W. E. Meehan, President of the Board of Fishery Commission."

The investigation into the character of Lycoming and Loyalsock creeks was heard at Williamsport August 9, 1910, and after hearing the testimony, the following decree was handed down with respect to Lycoming creek: "A petition having been forwarded to the Department of Fisheries to open a portion of Lycoming creek in the county of Lycoming to other devices than rod and line, on the ground that said portion is not a stream inhabited by trout, the Board of Fishery Commission, in accordance with section 28 of the Act of May 1, 1909, made an investigation. Many citizens appeared before the Board at a meeting in Williamsport held August 9, 1910, as to their knowledge of conditions existing in Lycoming creek. The testimony having been carefully studied the Board of Fishery Commission now does declare and decree that Lycoming creek in Lycoming county, Commonwealth of Pennsylvania, is not a stream inhabited by trout from an imaginary line across the stream beginning with the right bank of Hoagland's run near Cogan Station, to the mouth of said stream where it empties into the Susquehanna River. That Lycoming creek, from the imaginary line of said right bank of Hoagland's run to the source of the stream be and is hereby declared a stream inhabited by trout.

W. E. MEEHAN,
Commissioner of Fisheries."

The decree concerning Lycoming creek reads as follows: "In response to a petition of citizens of Lycoming county that Loyalsock creek is not a trout stream for its entire length, the Board of Fishery Commission made an investigation Tuesday, August 9, 1910. It called before it citizens at a meeting held at the Park Hotel, Williamsport. As an outcome of the testimony there given, the Board of Fishery Commission has rendered a decision set forth in the following decree:

"It is declared and decreed that Loyalsock creek from the line of the left bank of Little Bear creek to the source, together with the branches thereof, to be and are streams inhabited by trout, commonly known as trout streams, and that Loyalsock creek from the line of the left Bank of Little Bear creek to its mouth and entrance into the Susquehanna River to be and is not a stream inhabited by trout.

For the Board of Fishery Commission,
W. E. MEEHAN,
Commissioner of Fisheries."

The decree concerning Standing Stone creek reads as follows: "In response to a petition of citizens of Huntingdon county that Standing Stone creek is not a trout stream for its entire length, the Board of Fishery Commission made an investigation Thursday, August 11, 1910. It called before it citizens at a meeting held at the Liester House, Huntingdon. As an outcome of the testimony there given, the Board of Fishery Commission has rendered a decision set forth in the following decree:

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"It is declared and decreed that Standing Stone creek, beginning four hundred feet below Cornprobst's mill dam to its junction with the Juniata River in Huntingdon county, is declared to be a stream not inhabited by trout.

For the Board of Fishery Commission,
W. E. MEEHAN,
Commissioner of Fisheries."

There are a number of other streams concerning which petitions have been received, but unfortunately the appropriation covering the expenses of the Board of Fishery Commission is so nearly exhausted that they cannot be considered until after the beginning of the next fiscal year.

FISH AS AN ECONOMIC QUESTION.

A few years ago the fish cultural work of Pennsylvania was supposed to be almost entirely for the benefit of the sportsmen, and apart from the work on Lake Erie little attention was paid to what are commonly called the commoner fishes, many of which are for food purposes. This I felt to be all wrong. I believe it to be the duty of the State to propagate and increase any species of fish which may be useful for food. Believing this, as rapidly as I could equip ponds in the hatcheries I began the propagation of fish like the catfish, Lake Erie sunfish and yellow perch, and for the last year or two have experimented with the propagation of the sucker.

The announcement of the last experimental work provoked some derision and perhaps in certain quarters dissatisfaction because of the prevailing opinion that it is a destructive fish, especially in trout streams. It is declared to be destructive because it is alleged to be a pronounced spawn-eater. The charge is probably true. It is also true that many thousand people in Pennsylvania esteem the fish and consider it both good and wholesome food during the spring months. Because it might be proposed to propagate the sucker does not necessarily follow that they be planted in trout streams. There are many creeks in southern Pennsylvania, notably in Lancaster, Delaware and contiguous counties, where there are no trout and where little else than suckers would thrive. Through the use of destructive devices many of these streams are almost depleted of suckers and I feel that they should be replenished.

The fish work of the State is an economic one and fishes desired by the masses should be propagated, in my estimation, on as large a scale as the higher class game fish for the sportsmen, or the higher class food fish for the lakes and rivers.

There was some surprise when I undertook the propagation of the catfish, but time has shown the wisdom of the work. The facilities at the various hatcheries for propagating catfish are totally inadequate to the demand. This year it was impossible to fill all the applications although the output is materially larger than last year.

I believe that every body of water in Pennsylvania should be stocked bountifully with some specie of fish in order that there may be fish food for everybody who desires it. It is a well recognized fact

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that with the increase of population natural propagation cannot maintain the fish in the waters and that what is called artificial propagation must be relied upon to keep up and increase the stock. It is impossible for me to do this with the present capacity of hatcheries. More ground is necessary, more ponds, and even additional hatchery. A hatchery for bass, catfish and even where suckers can be propagated should be established in the eastern part of the State, preferably in Bucks county, where there are good railroad facilities for quick and wide distribution. I recommend therefore that in order to extend this class of work an additional appropriation be made to the hatchery account and also for the establishment of an additional hatchery in the eastern part of Pennsylvania on condition that the citizens of Bucks county, or the county in which the hatchery is located, shall furnish a site approved by me.

SILVER SALMON.

Experiments by the Department with the silver salmon with a view of ascertaining its adaptability to our waters have been conducted for three years and the fourth is being entered upon. About one hundred thousand eggs have been received annually from the State of Washington through the United States Bureau of Fisheries. All but about ten thousand hatched fish were each year placed in the Lackawaxen, the Equenunk and the Dyberry, where they were uniformly reported to have done well.

In the autumn, according to the habits of the salmon, they left these streams for the Delaware River and from thence to the Atlantic Ocean, consequently there is no means of knowing how they are faring or how many will return to the Delaware River for spawning purposes until 1912. Experiments with those which were retained, however, lead to the hope that a fair percentage will survive and return to the Delaware River at maturity for the purpose of spawning. The first lot of fish saved and cared for in one of the trout hatcheries will reach maturity in 1912, and if they survive until that time should spawn. At present there seems no reason to doubt their living until they perform that function.

The loss by death in the first three years of their life has been nominal, the total number being not more than two thousand. They are in fine health. From the first, the young salmon took kindly to the spring water ponds of the Bellefonte Hatchery. They fed voraciously and grew rapidly. The second year the growth was not nearly as rapid, and, after making a close inspection, I became convinced the reason was that too many fish were being crowded into a single pond. There were four ponds and they averaged two thousand fish to a pond. I was further convinced in my belief of the overcrowding from the fact that some slight evidence of thyroid began to appear. That this could not have been due to overfeeding with unnatural foods was evident by the fact that the fish were quite lean. I therefore had the fish thinned and spread into six ponds and also increased the amount

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of food. In a few weeks the symptoms of incipient thyroid had disappeared and the fish began to take on a normal plumpness and showed evidence of quicker growth.

Last April when they began their third year they averaged ten inches in length. The maximum size seemed to be about twelve inches and the minimum about eight inches. I see little reason why, if, in the coming spring we reduce the number of fish per pond and perhaps slightly increase the amount of food, by the end of four years they should not average fifteen to eighteen inches and yield eggs which can be fertilized. At present I feel that there is but one chance that the eggs, when the fish reach maturity, may not be uniformly fertilized. It is a well-known fact among fish culturists that very often when a fish is removed from its native waters to other environments there is not only a tendency to sterility, both with the male and female fish themselves, but also with the eggs. We find, for example, in the hatcheries in Pennsylvania that fully 50 per cent. of the females of the rainbow trout are barren and fully that many males have unfertile milt. Usually, however, there is the same average of fertilization of the eggs that are taken as there are of brook trout, but sometimes there is a falling off in the average of fertilization. It may be when the silver salmon reach maturity it will be found that either a large portion will be barren yearly or produce unfertile eggs. If half of them produce eggs that can be fertilized and hatched our experiments thus far indicate that we will have a fish worthy to be planted in some of our colder water lakes as a superior substitute to the lake trout. I say a superior substitute, because the silver salmon in our hatcheries are surface feeders while the lake trout, naturally a bottom feeder, comes to the surface in the hatchery ponds with reluctance and more often takes the food as it sinks to the bot tom. More or less surface feeding in the hatcheries is obligatory on the part of the fish, but with the silver salmon there is no hesitation. They not only feed from the surface with avidity, but they are con stantly leaping, a thing which the lake trout never does, and the leaps of the silver salmon are remarkable for their vigor and height. Fingerlings and yearlings will easily clear the water a foot or more and the three year olds will jump out of the water from two to three feet. If they continue these habits and will exist in our spring water lakes they ought to take the fly as readily as a brook trout.

If it proves that a large portion of the fish are barren or that a large portion of the eggs cannot be properly fertilized, it will be unfortunate, but where fish can be hatched and they survive and return to the Delaware it will still pay the State to enter into is propogation but it would have to be done on a huge scale in order to make the Delaware River a salmon stream.

It is to be regretted that thus far no place has been found where Atlantic salmon eggs can be gathered in large quantities and brought into Pennsylvania, or that to date the fish has defied all efforts of domestication, because experiments made have clearly proven it possible to establish the Atlantic salmon in the Delaware River if young fish to the amount of a million or more could be planted yearly. As eggs cannot be obtained and as no way has been found to domesticate the Atlantic salmon the prospects of being able to establish the silver salmon of the Pacific are very bright.

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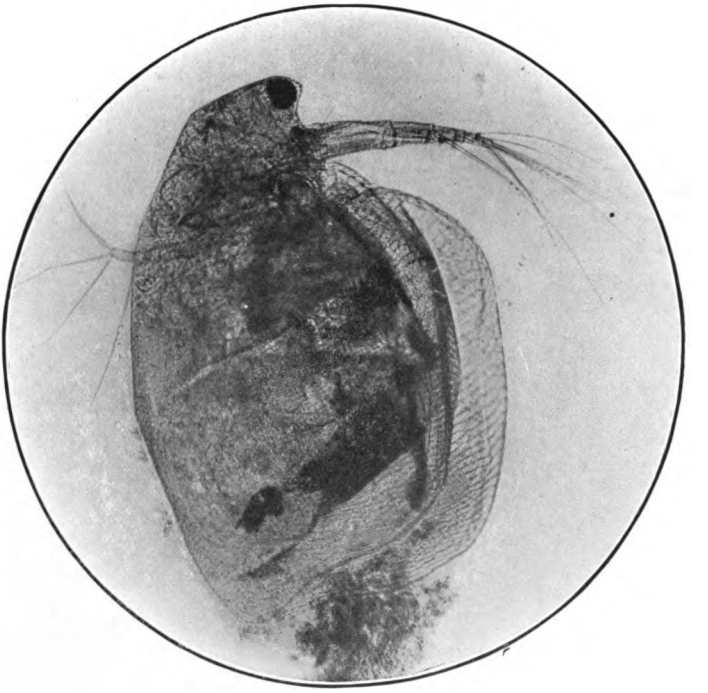

Daphnia. (Magnified 64 diameters.)

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While not as fine a fish either for sport or the table as the Atlantic salmon the silver salmon is not to be despised. It ranks in quality next to the Quinnat, and ranks, I understand, high in the annual outputs of the canneries of the Great Northwest. It reaches a maximum weight of twenty-four pounds with an average weight of from eight to twelve, and it is moreover an exceedingly beautiful fish, especially the male, which is silver and crimson with intensely black cross-markings.

In order to study the fish more thoroughly I am carrying several thousand in the Spruce Creek Hatchery. They are now one year old and I am glad to say are doing quite as well as those at Bellefonte. In order to test the ability of the fish to exist in lakes I have placed a thousand fingerlings in a spring water reservoir at Hazleton, where they will be under the observation of the caretaker.

FOOD FOR FISH.

One of the grave questions now to be faced is the question of fish food for the game fishes. Minnow life under the unrestricted fishing and the voracity of the fish, have become so scarce that it is a question whether the Department shall not begin to propagate the bait fish for food and at the same time urge the Legislature to restrict the methods of taking the bait fish.

Among the most important of the food for game fish is the daphnia, a microscopic crustacea that grows in the water plants, and is almost the main food for the tiny bass. Ice floods some years ago carried out the water plants in the Susquehanna River, and the bass promptly disappeared in any quantity because there was no food for the little ones to take the place of the larger ones which were caught. Carp, in a manner, were also responsible for the destruction of plants in the water as they are to a large extent vegetarians and live upon the roots of the plants.

It therefore became necessary in the increase of fish life to increase the fish food, and the minnow problem is one that must be faced and at the same time the problem of feeding such game fish as the young bass that live upon the microscopic crustacea that grow in the weeds.

As remarked above, the most important of these is the daphnia, and I am extremely obliged to Mr. W. W. Rogers, of Beverly, New Jersey, a well-known miscroscopist, for the life history of the daphnia. The daphnia itself is so small that it is well represented by the mark of a point of a blunt lead pencil upon a paper and the microscopic reproduction that is here given is increased sixty-four diameters or 4,096 times the area of the original creature.

A BRIEF HISTORY OF THE DAPHNIA.

The daphnia is one of the most numerous members of the entomostraca, which is a subdivision of the crustacea, so it is therefore a diminutive relative of the crab and lobster.

The entomostraca is divided into several families, and the daphnia belongs to the branchiopoda, which means gill footed, as its breathing organs are affixed to its feet.

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The feet have other uses besides locomotion, for they enable the little animal to obtain a supply of air from the water for the aeration of its colorless blood, and also they produce currents in the water that bring food to its mouth.

Even when the animal is still, certain of these legs keep up an incessant motion in order that it may be constantly supplied with air.

There are several species of daphnia, and all may be recognized by the presence of a sharp spine on the posterior angle of the carapace in which the little creature is enclosed, and this spine is never situated on the lower angle. It varies in position and length in different individuals, and in very old specimens it may be entirely absent.

The shell is oval and slightly flattened and underneath it can be opened and closed to a limited extent like a bivalve shell, so that the legs can be entirely withdrawn within the case.

There are two pair of antennae, one pair small and inconspicuous, and the other large and branching, the ends being furnished with feathery plumes which assist the animal in swimming.

The feet are flattened and usually in rapid motion.

The heart is a transparent organ placed near the head and pulsates rapidly.

In some specimens I have noticed the heart to be very finely striated, the striae radiating from a central spot. I have not seen this recorded, and I would be very glad to know if any other miscroscopists have noticed these markings.

The daphnia possesses only a single dark colored eye, but it is large and conspicuous, composed of several ocelli and is capable of considerable independent motion.

This little entomostracan is very common and abundant in ponds, ditches and quiet streams, coming to the surface at early morn and evening and in cloudy weather, but seeking the bottom to escape the sun's rays and the heat of the day.

It swims by a succession of short springs in a peculiar jerky manner, by which it may be easily recognized, and a number of these tiny creatures in a small aquarium present a very pretty spectacle as they alternately rise and fall in the water.

In the heat of summer when many ponds and small streams dry completely up, the daphnia and others of his family would perish but for their wonderful tenacity of life when dessicated. As the water evaporates they bury themselves in the mud, close up their shells tightly to retain their moisture and await a fresh supply of water. They cannot, of course, be completely dried out, but they can exist in mud that contains merely a trace of moisture. The eggs, however, are still more tenacious of life, as they will become fertile when moistened, after having been for a long period in a condition of fine dust. During its existence the daphnia changes its shell or carapace frequently, like the larger crustaceans, and like them also it can renew a limb with a new shell if it has been so unfortunate as to lose one.

Undoubtedly the most interesting point in its life history is its manner of reproduction, for a single impregnation of the female suffices not only to fertilize the existing ripe eggs in the ovary, but also all others subsequently produced by the same female, and which are produced at long intervals. The eggs are deposited in a cavity between the back of the animal and its shell, where the young undergo their early development, and when cast out when the animal changes its skin, very closely resemble the parent.

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At the approach of winter the eggs are deposited in a saddle shaped receptacle called the ephippium formed within the shell. This is cast off with the skin, from which it soon becomes detached, when it usually floats on the water with its burden of eggs, protecting them from the cold until they are hatched out by the returning warmth of spring. These winter or ephippial eggs are probably the result of a true sexual process and the young produced from them appear to have the same power of continuing the species by agamic or nonsexual reproduction as the young developed under ordinary circumstances.

Small though the daphnia may be it plays a most important role in the economy of nature, and its importance is due to its small size and immense numbers. It feeds on decaying vegetable and animal matter that exists in a state of very fine division that is ignored by larger animals, and its services as a scavenger can hardly be overestimated as it assists in keeping our waters habitable for the many varieties of fish that exist in them, and in addition the daphnia is one of the most important articles of diet for many of our best fresh water fishes.

HOW TO PLANT FISH.

Undoubtedly a large proportion of fish applied for and received by individuals are improperly planted. Sometimes despite close scrutiny of all applications received, it happens that they are for wrong waters. Such planting is certain to be of little avail.

By far the greatest mistakes, however, are made in the method of planting where the water conditions are favorable for the fish applied for. Nevertheless I am satisfied that those who are interested in planting fish are absorbing the education which I am trying to disseminate.

The organization of Fish Protective Association and Camps of the United Sportsman are making the work much easier. We hear less and less of the old familiar cry, that fish should be retained in the hatcheries until they are several inches long and so be better able to take care of themselves than the "fry" which are distributed.

The people are coming more and more to realize that it is not the size of the fish sent to applicants that determines results, but how, when and where they are planted. Object lessons are also more convincing than speech and the people are having object lessons, with respect to the successful planting of what are commonly called fish fry. The fisheries of Lake Erie have been restored, by planting myriads of tiny white fish, lake herring and pike-perch which are only two or three days old, when they are made to shift for themselves.

Noted trout streams in which the fish have diminished in numbers now yield sport greater than for a quarter of a century after having been persistently stocked by hatchery trout of from one to two inches long and which were only three months old.

Lakes which had no yellow perch five or six years ago are now abundantly furnished with this species, planted when they were so young and small that some of the applicants could not see them and

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thought they were being supplied with water only; but this water fortunately they planted according to directions in the full faith that the Department knew what it was about.

These are the directions which I give for planting fish received from the State hatcheries:

Brook trout should be received by the applicant as early in the spring as it is possible for him to convey the cans to the stream, so that it will be unnecessary for the Superintendent of the hatchery to put ice in the cans.

When received early the fish can be planted immediately, because the water in the creek is apt to be of lower temperature than the water in the cans, and this, in ninety-nine cases out of a hundred is favorable. If ice is used and the water in the cans is colder than in the creek it requires nearly twelve hours' work to bring the temperature nearly even and render it safe to plant the fish. If fish are planted in June or even the latter part of May, icing of the cans becomes necessary and if fish are transplanted from ice water to the warmer water of the creek they will sicken, many of them die and the remainder become weak that the majority will fall an easy prey to their many enemies.

Never plant fish received from the State in a stream from which it is expected to catch them and for which they were asked, if it is possible to avoid doing so. If they are planted in the main stream, the major part of them will certainly be devoured by older fishes.

Take the young to small streams, tributary to the main stream. It does not matter how small the stream run may be, provided there is a never failing flow of water.

Do not empty the contents of the cans in the spring run, but scatter carefully along the whole length in half dozens or dozens or less.

Spring runs are even better than the headwaters for planting.

Sometimes there are no spring runs. In such instances, the little fish should be taken, if possible, to the headwaters and scattered. If it is not feasible, then plant the little fish in twos and threes, in the main brook among eddies close to the shore where there are weeds or other acquatic plants. It can be readily understood that if fish are planted in ones and twos under such conditions the chances are there will be a larger percentage survive.

Where there are spring runs and planting is made annually, two cans of fish should be sufficient for about one mile of stream, unless the number of enemies which frequent the streams is more than usual. It is seldom necessary to plant more than three cans or 3,000 fish in the same distance.

If the fish on being received have to be carried some distance to the creek, and it appears necessary to change the water, under no circumstance use pump water as that is fatal; but use creek water even if a little ice must be used; but if ice is used be careful that the water temperature does not fall 50 degrees. Aerate the water by dipping it from the cans with a dipper and pouring it back from a height of about two feet.

Small Mouth Bass.—If the small mouth bass received are very small, that is to say only half inch long, and they are for a lake, put the cans in a boat, row to the middle of the lake and while one man rows slowly, pour the contents gradually overboard. If possible to avoid it, do not plant them along the shore because it is frequented by sunfish and yellow perch, which will prey upon them. If they must

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be planted along the shore scatter them along in twos and threes among the brush and if they are about two inches long plant them in ones and twos along the shore. If the bass are for a river scatter along the shore among brush or weeds.

Yellow Perch and Pickerel.—Dip the water from the cans and pour it into the lake or river among the aquatic plants at intervals of from five to six feet.

Sunfish and Catfish.—Scatter along the shore the same as would be done with two inch black bass.

Pike-perch should be taken to a pool in the river and emptied from the can into the swift water at the head so that the little fish will be widely scattered. They will sink to the bottom or hide among the stones.

If the above instructions are followed carefully the applicants will be be astonished and gratified at the good results of their labor.

THYROID DISEASES IN TROUT.

A little more than a year ago, in consequence of the publication of an abridgement of a report issued by the faculty of a cancer laboratory in another state to the effect that goitre, or enlargement of the thyroid in trout, was cancer, there was every evidence of a popular scare. Goitre has been a familiar disease among trout in confinement for many years, but until its publication it was generally regarded as harmless. It was quite prevalent in one of the commercial hatcheries of the State, and also in a hatchery belonging to a private preserve. Occasionally it appeared in our own hatcheries and suddenly a majority of the fish in the Spruce Creek Hatchery were affected with the disease.

I arranged with a distinguished pathologist of the Western Reserve University, Cleveland, Ohio, to study goitre with a view of determining to what extent it would effect human beings and what relationship, if any, it bore to cancer. Dr. David Marine, the pathologist referred to, spent several months at the hatchery of the private preserve and also every facility was given him to study it at Spruce Creek.

About the beginning of the year his investigations had proceeded to a point which seemed to clearly indicate that while it was possible for goitre to develop into cancer, that the disease was not cancer and would not necessarily develop into that dread disease. Moreover, that fish afflicted with that disease, if it were eaten by human beings, would produce no injurious results.

The investigations of Dr. Marine and his colleague, Dr. C. H. Lenhart, were of such importance that they were published in a bulletin by the Department. One feature of Dr. Marine's investigations showed that where trout when affected with enlargement of the thyroid were placed in an open stream they recovered, and if the same fish were afterwards replaced in its original environments the disease would reappear though not necessarily in an aggravated form. This indicated very strongly that the disease was simply goitre and could not possibly be cancer, since the latter, as far as known, is not capable of spontaneous cure.

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Goitre, scientifically known as thyroid carcinoma, is characterized by the abnormal and extensive growth of thyroid tissue leading to the formation of possible tumors, which may appear in the region below the base of the tongue or dorsally in the floor of the mouth and pharnyx between the first and third gill arches. Secondary growths are frequently to be seen in the gills and at the anterior extremity of the lower jaws.

So far as it is definitely known at present, this severe degree of the disease is confined to carnivorous fish reared in captivity. Its spread has been parallel with the recent great development in fish culture and the artificial rearing of the large numbers of game fish, especially the trout and salmon.

As far as investigations have gone there are three factors of major importance to produce the disease: Overfeeding with unnatural foods, overcrowding and a diminished water supply. To this may be added another and almost nearly important cause, filthy ponds.

As may be supposed, the disease, even though it be not cancer, is of sufficient gravity to render it important that investigations as to its character, method of cure, and prevention be carried much further. It is important because where goitre becomes prevalent in a pond, especially when the fish are very young, their vitality is likely to be lowered, producing fungus and death. For this reason, Drs. Marine and Lenhart have continued their investigations throughout the present year, and I hope to be able to issue another bulletin in the spring. I am glad to say that the investigations this year bore out those of the previous year which pointed to the disease having no immediate connection with cancer, and that a fish afflicted with goitre need not necessarily contract cancer any more than a human being who would receive a bruise on the breast.

Dr. Marine's investigations, which pointed to the cause of the disease, were amply borne out by our experience at the Spruce Creek Hatchery. There had been unquestionably overfeeding of the fish at that station, although at the time there was an abundant water supply and the bottoms of the ponds were kept scrupulously clean of foeces or other organic matter that might foul the water. On reducing the food supply, that is to say, on giving the fish a little less than they could eat, there was almost an immediate improvement and by May nearly all traces of the disease had disappeared. This autumn, in consequence of a diminished water supply from the spring owing to the drought, there was a mild recurrence of thyroid disease, but not sufficient to cause an alarming loss. The Superintendent, on noting the reappearance, reduced the number of fish per pond and there was an immediate decrease in the disease.

Goitre appeared in a very mild form in some of the ponds at Bellefonte. There was no visible tumor, but there was a slight inflammation in the throat of a number of the fish. This was also traced to overfeeding, and in one instance to overcrowding. A correction of these two have restored the fish to normal health.

I regard this study of goitre as one of the most important features of the work of the Department during the year, especially since the effect was to allay what promised to be a scare of widespread proportions and which might have caused the public to avoid one of its most healthful food supplies.

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McCALLS FERRY DAM.

The corporation which succeeded to the original ownership of the dam at McCalls Ferry completed that huge structure last summer and its power plant is now in operation. The corporation complied with the decree of the Dauphin County Court and completed simultaneously with the dam the fishways ordered in by me. At the outset I ordered the construction of four fishways of the regulation size. Subsequently I reduced the number to two, but more than doubled the size of each fishway. By the change there was a greater pool surface in each compartment and quieter water, rendering it easier for fish to ascend. Owing to the great height of the dam it was impossible to construct an effective fishway with the outlet at the toe of the dam, and I was therefore compelled to make what is known as an external fishway with the lower entrance between two hundred and fifty and three hundred feet below the breast of the dam. It was this fact also which weighed with me in making two fishways each about nine feet wide instead of four fishways each four feet wide. The greater width permits a greater volume of water to flow from the fishways and thus more easily attract the attention of the fish working their way up the river.

There is not the slightest doubt that the fishways at McCalls Ferry Dam will be effective for all species of game fish and for all species of food fish with the possible exception of shad and herring. Whether these two last named will ascend the fishways cannot be determined until next spring. I must admit that I have very little hope that shad will pass up through these fishways in numbers sufficient to make shad fishing above McCalls Ferry Dam profitable. My lack of hope is based on the well-known timid character of the shad. The fish is so timid that it will avoid anything which looks like a trap, even shadows often scare them. I have seen schools halt at the shadow cast by a bridge until some more courageous than its companions ventures into it, when the others will follow. The opening of a fishway, no matter how carefully constructed, has more or less the appearance of a trap, and if the shad will enter freely those at McCalls Ferry Dam they will do more than in any other form of fishway yet devised. The particular pattern built at McCalls Ferry Dam is new for structures of that height, though it is a reasonably successful operation in Clarks Ferry Dam, but the Clarks Ferry Dam is less than ten feet high.

It has been feared by some that the McCalls Ferry Dam will put an end to the eel industry. This fear, however, is a sentiment that is groundless as this species of fish has no fear whatever of a fishway. It is possible that the entrance being some distance below the breast there will be not quite as many ascend, but even this I doubt.

When shad ascend a river they do so for the sole purpose of spawning and it is rare that they take any food while in fresh water. It is a curious fact, however, that wherever their upper passage is blocked by a dam they will take the hook and rise to flies. For the first time in the history of the Susquehanna River shad were caught last spring below the McCalls Ferry Dam by casting with a trolling spoon and

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by the use of bait, so if net fishing should become a thing of the past above McCalls Ferry Dam there will be at least sport for the angler below.

FISHERY LEGISLATION BETWEEN PENNSYLVANIA, NEW JERSEY AND NEW YORK.

At the last session of the Legislature, through the efforts of a special commission, concurrent laws governing the fisheries of the Delaware River were enacted by the States of New Jersey and Pennsylvania between Marcus Hook and Port Jervis. An effort was made to enact identical legislation between the States of Pennsylvania and New York above Port Jervis. The bills were agreed upon, but through a misconception on the part of some of the members of the Legislature as to the concurrent nature of the bill, a number of amendments were made, which had New York passed the bill, which some of the officers had prepared in connection with our commission, the Pennsylvania act would have been inoperative. Fortunately, as it happened the bill prepared by the New York authorities did not pass its Legislature and on my representations and recommendations Your excellency vetoed the bill. The concurrent legislation is as important as ever and the special commission continued by the last Legislature is now in correspondence with the New York authorities with a view of drafting concurrent bills for action at the coming session of the Legislature.

The legislation between Pennsylvania and New Jersey is in the main very satisfactory, but there is one clause in the New Jersey and Pennsylvania act relating to the Delaware River below Trenton Falls which for a time threatened to cause confusion. As originally drawn, the concurrent bills forbade fishing for sturgeon after a certain date. This provision was obnoxious to a number of the fishermen and they induced the New Jersey authorities to strike out the close season clause. Pennsylvania was advised, but through an oversight the change was not made, hence the position was that New Jersey law declared no close season while Pennsylvania law did. Fortunately, as under the treaty between the states, made before the adoption of the Federal Constitution, laws governing the fishes of the Delaware River must be concurrent. The effect was to nullify the Pennsylvania provision of close season, so it is believed.

The law regulating the fishing in the Delaware River above Trenton Falls was accepted with general satisfaction by the fishermen excepting for that portion between Trenton and Scudder's Falls. There the water conditions, while it is above the limit of tide, were such that gill nets could be used as effectively without being fastened as in tide water, and the New Jersey authorities are anxious to have the provisions of the act relating to the lower river extended to Scudder's Falls. To this I can see little objection, and doubtless the matter will be considered by the commissions of the two states.

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INTERNATIONAL CONTROL OF BOUNDARY WATERS.

As might be expected, strong opposition was developed to the regulations proposed by the special commission appointed by the United States and Great Britain for the government of the fisheries in waters forming a boundary line between the United States and the British Possessions in North America. The opposition was powerful enough to prevent acceptance by the Canadian Parliament and action in Washington. The commissioners again met and the first provisions were modified or changed, and while opposition has been reduced there is still a strong feeling against the regulations being put into effect. They are supposed to become effective in January, 1911, but from what I can learn it is doubtful whether effective action will be taken by both Governments by that time.

It is seriously doubted by many whether the United States has the authority to enact fishery legislation in waters which are and have been under the control of the several states. Pennsylvania, Ohio and New York are supposed to have jurisdiction over the fisheries to the Canadian line and have invariably exercised the right to enact legislation and enforce it. The United States has only exercised jurisdiction over navigation.

The United States claims the right of jurisdiction by virtue of an opinion given by the Attorney General during the Cleveland administration, but it is held that the opinion was rendered not under the full text of the treaty between the United States and England, but on phrases in said treaty.

While there are many who hold that the United States Government has no right to enact fishery regulations for any part of the Great Lakes there are more who insist that at most the regulations cannot lawfully extend between what is known as the three-mile limit. Apart from the question whether the United States Government can lawfully exercise the authority it proposes, I believe there is no doubt, that the fisheries would be benefited by the United States taking charge and enacting legislation.

If all the states bordering on the several Great Lakes enacted uniform legislation, especially on the lines enacted by Pennsylvania and Ohio, I might hold a different opinion, but the legislation is not uniform and it is almost impossible to secure such legislation and it is only by uniformity that the best results can be achieved. National legislation would of necessity be uniform.

In case the national regulations go into effect all state laws necessarily become inoperative excepting those which are not covered by the international regulations. This is provided for in the international regulations proposed.

FISHWAYS AND SCREENS.

A few complaints were made to the Department during the year of raceways without screens, and where the complaints were found to be justified, screens were ordered to be placed therein. The law

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which orders the construction of this device for protecting fish from waterwheels is admirable for raceways from the large streams, but is inadequate to meet the needs of raceways from creeks. Under the law the minimum space which may be ordered is one inch. Small fish can readily pass between such spaces. Eels can easily work their way through, and thus both small fish and eels are often killed by small turbines. It is difficult, however, to suggest other legislation since spaces less than one inch in races from large waters would result in unwarranted trouble to mill owners.

There was but one application made during the year for the construction of a fishway in a dam built before the passage of an act requiring fishways, and the cost of which therefore would have to be borne by the State. An examination of the dam satisfied me that the cost would exceed the amount of money available under the appropriation, and I was compelled therefore to decline the application. No fishways were ordered because there was no notice of the construction of any new dams brought to my attention.

FISH EXHIBIT AT CONNEAUT LAKE.

Believing as I do in the educational value of live fish exhibits I cheerfully agreed to furnish specimens for exhibit at the annual Agricultural Fair at Conneaut Lake. The exhibit which was held there in 1909 attracted so much attention that the fair officials decided this year to enlarge and provided thirty-four tanks besides paying all the expenses of transporting the fish and the extra caretakers. The tanks were filled with nearly three dozen species indigenous to Lake Erie and Conneaut Lake, as well as a good exhibit of trout and goldfish. Excepting that the tanks were smaller and grouped rather too compactly the exhibit at Conneaut Lake was better than that which the State had at the St. Louis Exposition.

The exhibit was a revelation to thousands of people who had no idea of the size and character of some of the Pennsylvania fishes. There were thirty-pound catfish, fifteen-pound muscalongs, huge carp, lake trout weighing fifteen pounds, besides many and some of the most beautiful smaller fishes found in the State waters. Crowds besieged the place from the opening to the closing of the building each day and at times there were so many people that guards were compelled to line them up and keep them moving.

I believe it would be to the best advantage of the State if the Department could make exhibits of live fish at all county fairs.

FOR AN AQUARIUM AT PHILADELPHIA.

I have been for many years an advocate of the establishment in Philadelphia of a public aquarium similar to that which is now in operation in New York City at Battery Park, and at least as extensive as those in Washington and Detroit. The educational value of such an institution in Philadelphia was generally admitted, but for various reasons the project failed of materialization.

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Two years ago, only the objection to a proposed site prevented the establishment of at least the nucleus of an aquarium. Influential members of the City Council were prepared to support an appropriation of $20,000 for the project and the only spot available with such a sum was the Commercial Museum. Many objected to this site and insisted that it should be somewhere in Fairmount Park, which was unquestionably the place for it. At that time it was believed that a site could not be chosen in Fairmount Park with an appropriation of $20,000 so the movement was halted again. This year the matter was again revived by the Pennsylvania Fish and Game Protective Association, the old Water Works in Fairmount Park proposed. At the request of a number of people interested I examined the building and find it to be admirably suited with great possibilities.

The Mayor of Philadelphia, the Hon. John E. Reyburn, is enthusiastic for the establishment of an aquarium, as are also the leading members of both branches of Councils. The prospects are therefore bright for an early start for an aquarium in Philadelphia.

Under a joint resolution of the Legislature of Pennsylvania, tanks which were used to exhibit fish at St. Louis have been turned over to the City of Philadelphia for aquarium purposes, and the Commissioner of Fisheries authorized to supply fish for the exhibit.

It is a fact that an exhibit of live fish will attract greater crowds of people than an exhibit of live, warm-blooded animals. The aquarium in New York City attracts several hundred thousand more people a year than the Zoological Gardens in the Bronx. Small exhibit of live fish by the Department at the annual Agricultural Fair, Exposition Park, Conneaut Lake, last August attracted larger crowds than any other exhibit of the show. It frequently became necessary for guards to keep the people in line and moving slowly along the line of aquarium in order to prevent jams and allow everybody to see the exhibit.

I believe that the aquarium, if it is established in Philadelphia, should be free to the public and under the direction of some organization like the Pennsylvania Fish and Game Protective Association maintained by the city. The aquarium in New York City and the Zoological Gardens in the Bronx, the American Museum of Natural History and certain other educational and scientific institutions are so maintained in New York City and are most successful.

AMERICAN FISHERIES SOCIETY.

The American Fisheries Society is a semi-official body composed of the Commissioners of the National and State governments and prominent American fish culturists. It meets annually at some point in the United States and its proceedings are of such value that it is customary for me to have the Superintendents of the hatcheries attend when a meeting place is within reasonable distance. This year the meeting was held in New York City, twice at the New York Aquarium and once at the American Museum of Natural History. The information gleaned by the Superintendents at this meeting will give a distinct advance to fish culture in Pennsylvania.

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The next annual meeting will be held in St. Louis, Mo., out of courtesy to the Secretary of Commerce and Labor of the United States Government. The organization has done me the honor of selecting me to preside on that occasion.

OUR RELATION WITH OTHER GOVERNMENTS.

It has been uniformally my policy to invite the closest relations with the National and Canadian Governments and with the states adjoining Pennsylvania. Without their friendship and hearty co-operation, the hatchery work of the State would not have reached the prominent position it has. In field work particularly, co-operation with other governments is important.

Many years ago spawn takers employed by this State would annually visit the fishing grounds in Lake Erie within the jurisdiction of the State of Ohio and bid for white fish and pike-perch eggs. The United States Government would be in the same field, and the consequence was that fishermen in that section began to demand a higher price for eggs than should be paid. Indeed as the work being done by Pennsylvania and the United States Government was directly of financial benefit to the fishermen, there should have been no charges whatever for the eggs. There also arose an undesirable rivalry between the spawn takers and those in charge.

The unsatisfactory conditions lead to a conference between the United States Fish Commissioner and me, the outcome of which was that I withdrew the State's spawn takers and the United States Government gathered all the white fish and pike-perch in Ohio waters. The take of eggs was then divided between the United States, Ohio and Pennsylvania, in proportion to the number of hatching jars which each possessed. The cost of gathering the eggs was then assessed pro rata between the three.

The arrangement worked so admirably that it has been continue since. This year I visited the Canadian Fishery in Toronto, with a view of extending the field work of the State in Canadian waters. In this I was successful. Canada, relatively speaking, does very little fish hatching work and depends chiefly on natural propagation and a close season during the spawning season for the maintenance of its fish supply in the Great Lakes.

Recognizing the value of the work that Pennsylvania is doing in fish culture, the Canadian Fishery authorities issued permits to the licensed fishermen at Port Maitland and Nanticoke to fish for white fish during the Canadian closed season for the purpose of enabling the Pennsylvania Department of Fisheries to place spawn takers on their boats to gather the white fish eggs.

Stringent orders are issued to the fisherman to offer every facility to the Pennsylvania spawn takers to gather the eggs. Permits are also issued for our spawn takers to gather lake herring eggs from Port Maitland, Nanticoke, Port Dover and Port Stanley. These permits have enabled the Department to nearly double the take of white fish eggs, and naturally to increase the take of herring spawn.

The State of New York granted a special license to Pennsylvania fishermen to take lake trout eggs from New York waters, in Lake Erie in the neighborhood of Dunkirk until December the 20th.

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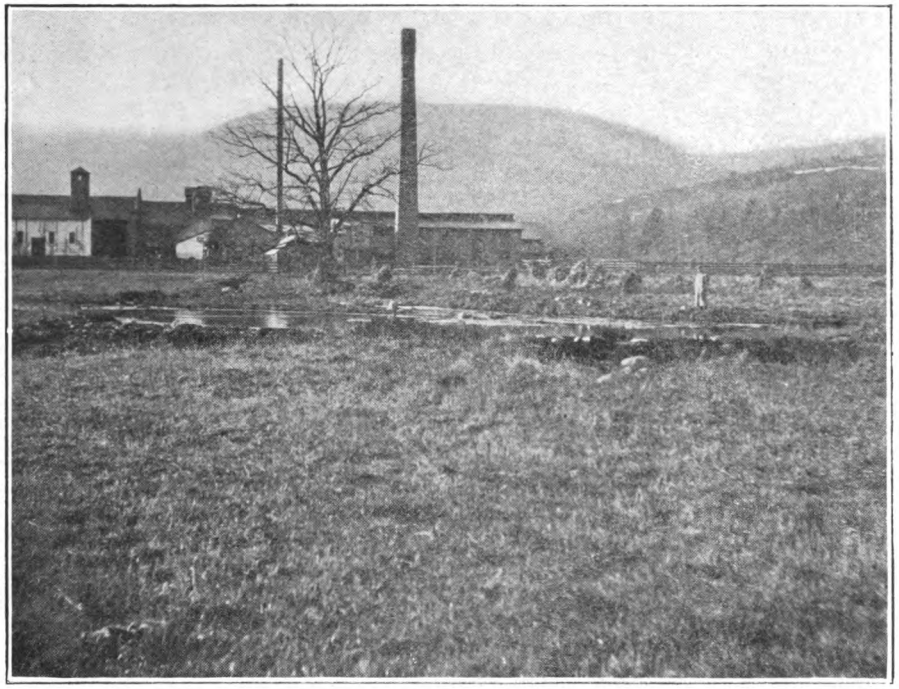

Water Pollution—Tannery Refuse Disposal—First of a series of Settling Ponds.

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I also entered into an agreement with the State of New York similar to that between Pennsylvania and United States Government, by which the New York fishery authorities will be enabled to secure a supply of lake herring eggs, and a verbal arrangement has been made between the Superintendent of the Erie Hatchery and the Superintendent of the Ohio State Hatchery, with my consent, by which our stations are to receive surplus herring eggs or vice-versa with eggs. This understanding, however, is not likely to be carried out since the Ohio station can accommodate about six thousand quarts and the Pennsylvania Hatchery eight thousand quarts of herring eggs.

FISH PROTECTIVE ORGANIZATIONS.

I cannot speak too highly of the work and influence of Fish Protective Associations of the State, especially of those known as the State Sportsmen Association, the United Sportsmen of Pennsylvania, and the Pennsylvania Fish and Game Protective Association. These three great bodies united in one common purpose are doing enormous work for fish protection and the increase of fish life, and are of inestimable value in aiding the Department of Fisheries in the work it is conducting. They may be considered to-day as the limbs of the Department. Without their aid its work would not be nearly as advanced as it is now, nor would the results accomplished have been as great.

Recognizing the unbounded importance of such organizations I have given much time during the year to the formation of local societies, and in educating the members in the best and most effective manner of producing the best results both in stocking and protecting the fish in the streams. I believe it is safe to say that to-day 50,000 sportsmen in Pennsylvania are banded together in sixty out of sixty-seven counties for the purpose of increasing fish life. The Pennsylvania Fish and Game Protective Association, the oldest organization in the State, is wielding a powerful influence, especially in the direction of the enactment of laws, not especially for the sportsmen but for the advancement of fish life. The Pennsylvania Sportsmen Association, with its experience of over thirty years, is also exercising its influence in behalf of good fishery legislation. The young and enthusiastic and rapidly growing United Sportsmen of Pennsylvania is keeping the sportsmen of Pennsylvania alive to the necessity of both protecting and stocking the streams.

WATER POLLUTION.

Much better progress was made this year in the work of purifying the streams of refuse from industrial establishments as provided under section 16 of the Act of May 1, 1909, but the rate of progress was not as great as I should have liked it to have been, nor probably as rapid as the impatience of the general public desired.

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The strength and extent of public sentiment in favor of the purification of the waters to an extent which will support fish life is surprising even to me who have watched the growth of the sentiment in the last fifteen years. It is impossible to keep pace with the almost universal demand that the waters be cleared of deleterious waste from industrial establishments.

Last year was the first under the new law which forbade any waste, injurious to fish life or fish food, being emptied into any of the waters of this Commonwealth. The greater part of the year I devoted to drawing the attention of the manufacturers to the new law and pointed out to them the necessity of its observance, also to having purification plants placed in establishments where it could be done quickly, effectively and without being laid open to the charge of persecution. I recognized the fact that a condition which had existed for years without hindrance could not be entirely changed at once.

With very few exceptions the manufacturers received my notifications in the proper spirit and generally concurred in the doctrine that the streams of the Commonwealth should no longer be considered as open sewers for all kinds of filth. As the work of disposing of waste other than by emptying it into open streams would necessarily be more or less expensive, the manufacturers naturally were anxious for suggestions for plans or methods for beginning work. A number of manufacturers proposed digging pits into sand or gravel and permit the waste to drain through these materials. I was forced to refuse to accept such a method as satisfactory. It could only be a temporary expedient because sooner or later the sand and gravel between the pit or pits and the stream would become saturated with filth and the liquid waste drain into the stream as nearly in the same condition as it was when it left the building. I did not object or refuse to permit such pits to be built, but warned those who proposed to construct them that the Department could only be silent as long as the stream was not polluted, but that when the pollution was resumed it would be necessary for them to construct or devise some other means of purification. Many manufacturers this year have built such pits as temporary purification devices and in the meantime are preparing plans for permanent purification. Some large concerns are going to very heavy expense in the construction of filtering and purification plants. A few are completed and others are in process of construction. The great paper manufacturers along the Juniata and the tanneries along the same stream are all building purification plants and settling basins, so there is a hope that the Juniata will in a few months resume its normal purity.

About a year ago a broad emerald strip was noticed in the Susquehanna River from a short distance below Harrisburg to about forty miles above. An investigation showed it to be aluminum sulphate, the refuse from a very large plant near the junction of the north and west branches of the Susquehanna. The waste being deleterious to fish life the question of stopping the pollution was taken up with the owners of the establishment responsible for it. The owners promptly and cheerfully agreed to comply and are now constructing a huge purification plant.

With very few exceptions, and those unknown to the Department, pollution from sawdust in Pennsylvania has completely ceased, and the tanning companies are, with very few exceptions, taking care of

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Showing present disposal of sawdust, formerly emptied into stream.

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their lime waste and building settling basins or filtering plants for their washings. No progress, however, has been made towards purifying the Allegheny as there are some conditions existing in that section now which completely tie the hands of the Department. I hope, during the coming year it will be possible to make a beginning. Although the Clarion River is yet as badly polluted as ever the final steps are being taken which should before long result in the purification of that stream.

In my report last year I expressed gratification at the small number of instances in which it was necessary to prosecute for failure to take care of the waste. I am glad to say that this year the number of instances where prosecutions became obligatory was equally small. In only one instance throughout the year did a manufacturer protest bitterly against the order which compelled him to take care of his waste material.

The wardens formally reported 237 cases in which notifications had been given by them as follows: Sawdust, 105; creameries, 16; dyes, 11; general pollution, 33; pumace, 11; gas works, 7; tanneries, 17; paper mills, 6; salt water, 14; acid, 10; lime, 2; chemical, 5.

LAWS RELATING TO FISH.

When the Department's bill remodeling the fish laws of the State was introduced at the last session of the Legislature it was hoped that it would pass both houses without amendment. It was as nearly a perfect document as it was possible for the Department to draft at the time and in its drafting it had the advice and counsel of sportsmen and the people interested in the fisheries of the State. It therefore not only reflected the sentiment of the Department, but of a large portion of the people interested in such matters in Pennsylvania.

Unfortunately, there were a few amendments made, and one or two serious typographical errors and mixes. After the lapse of two years it has been found that without exception, where the original bill was not amended, the various provisions have given entire satisfaction and meets the needs for proper fish protection. In almost every instance where amendments were made or where mix-ups occurred there has been trouble and dissatisfaction. The amendments have not met the expectations of the framers and it is important that the sections which contained those amendments be revised and either the original clauses restored or something else equally good inserted.

The sections most seriously effected were the first, second, third, fourth, nineteenth and twenty-first. In the first section the sunfish was stricken off the list of game fish because there were some who could not understand the value of the sunfish from any point of view. That the sunfish is a game fish regardless of its size and regardless of legislative enactment, is a question that does not admit of successful dispute. It rises as eagerly to an artificial fly as a brook trout and takes the lure in almost exactly the same manner. While it does not give as prolonged a fight as the brook trout, it nevertheless furnishes a dainty, brief, but sharp struggle. That on a light rod is most enjoyable.

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Thousands of people in Pennsylvania, especially in the southeastern part of the State, the Schuylkill and Lebanon valleys, and the western part of the State, find great delight in fishing for sunfish. Not merely women and children, but experienced anglers. One species, known as the blue gill, common in western Pennsylvania, now being introduced in the east, has a distinct value for food purposes, is quite as large as the rock bass and as large as the average calico bass. The long-eared sunfish which belongs to eastern Pennsylvania is nearly as large and with almost equal qualities for food. The common sunfish is also to be esteemed. It is the small yellow sunfish, commonly called the pumpkin seed, that is of little value for food purposes on account of its small size.

As a result of striking the sunfish from the list of game fishes, thoughtless fishermen went fishing for sunfish in May and caught them, dripping though they were with spawn, and the two years which has elapsed has witnessed a marked depletion of this valuable little fish in the waters outside of the lakes of northeastern Pennsylvania. Even if we agree that the sunfish is a fish for women and children, it still should be protected if only to give enjoyment to these two most valuable assets of mankind. It is just as wrong to deprive ladies and children of the fish set aside for their purpose as it is to destroy trout set aside for the angler. Sportsmen throughout the State are emphatic in their desire to have this fish restored to the game fish list and I trust that the Legislature will accede to their wishes.

Another amendment entirely proper in itself which was made to section one meant to class the fall fish as a game fish. Fortunately, in one respect the amendment was placed in a part of the section which did not carry out the intention of the member who introduced it, but merely classed it as a food fish. It was, perhaps, fortunate that this was so, because if the fall fish be made a game fish, the river chub should be also, because while the general public imagines the two fish to be the same on account of a great similarity. As a matter of fact they are of different genera. They look so much alike, however, that in the water it is almost impossible to tell them apart. The exterior differences are simply that in the case of the river chub the back and dorsal fin are of an olivaceous color, while the fall fish is silvery throughout. As the fall fish and the river chub deserve a place among the game fishes, I have so classed them along with the sunfish in the amended section which will be offered at the forthcoming session.

Owing to the different dates of spawning and the fact that the fall fish and river chub are at their best in the spring, I have not thought it best to propose a close season for this fish in section three. If rod and line fishing for these two fish are indulged in only they will probably nearly maintain themselves, and if necessary they can be artificially propagated with ease.

It was in section 2 that the most serious and undesirable amendments were made. One of the most unhappy was a provision permitting the catching of bait fish in any manner or at any time, except by the use of poisons or explosives. The problem of the maintenance of minnow life in the waters of this Commonwealth has become almost as alarming as the general condition of the fisheries was prior to 1870, when the various states on the Atlantic coast sent delegates to a convention to recommend to the various legislatures means for the restoration of the fisheries.

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Minnow life is just as important to the existence of food and game fishes as water. Minnows forms the chief food of all mature carnivorous fishes, and if minnow life disappears no amount of artificial propagation and no set of laws providing for close seasons, or anything else for the protection of the fish can be of any value. Minnows have almost entirely disappeared from hundreds of our smaller waters and are becoming scarce in others. Reckless methods of catching minnows for bait and unlimited permission is wholly responsible for this decrease.

Certain methods for taking what are known as bait fish, especially the species known as the stone catfish, notably the method known as thumping, is responsible for the destruction of thousands of small bass and other immature game fish. Thumping consists of hurling a stone in the water violently and stunning any fish which may be underneath. This secures the stone catfish alive, but means the death of any small fish which may be underneath. The original bill set forth certain devices which might be used for catching minnows or bait fish. I feel that those methods ought to be enacted.

This question is so serious that unless something of this sort is done, it will be necessary for the State to expend large sums of money on the propagation of minnow life. Indeed, it is a question in my mind if the destruction has not gone far enough that it will be necessary, even if restricted devices are named, to propagate minnow life in the State hatcheries.

Another amendment made in section two that has wrought trouble was a provision permitting the use of spears or gigs in streams not inhabited by trout during the months of July, August, September and October for the taking of eels, carp, suckers and mullets. One of the most dangerous devices which any man can use for fishing outside of dynamite or poison is the spear or gig. A skillful user of this instrument can kill more fish in a single night than the average man can catch in an ordinary net. It would take an army of men to watch all those who use the gig or spear to see that they did not take anything excepting the fish named, and if every man could be watched very few would escape arrest, for even though they did not intend it, every now and then they would kill a game or food fish which is protected by law from the using of the gig or spear.

In certain parts of Pennsylvania streams have been practically denuded of fish for their entire length. I believe the gig or spear should not be permitted under any circumstances. Most certainly not during the months of July and August when warm water fishes frequent the shallows. Moreover, there would be very little desire on the part of an honest advocate of the gig or spear to use it during July and August even for fishes that the law says may be caught. Eels have not begun to run freely in July or even the first two weeks in August. Suckers and mullets are so soft to be practically unfit for food and even the carp are at their poorest at that time.

No consideration, of course, is given to the man who claims that the sucker and the carp should be destroyed. First, because it is not true. No fish established in our waters that is fit for food purposes should be exterminated, and the sucker is highly esteemed by thousands of people, in the spring many considering it equal in flavor to the trout, and the German carp as a food commodity ranks among the leading fishes sold in the market. Moreover, a majority of the people who de-

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sire to spear and claim they do so for the purpose of exterminating the carp and sucker are not altogether sincere, for the fish are generally found on their table or the table of their friends afterwards. I doubt whether many ever find their way to the garbage heap. At the very least, spearing should be prohibited during July and August.

A typographical error in itself in the same section would indicate that a seine might be used throughout the year for food fish. Fortunately this is contradicted by other sections, but it has given the Department infinite trouble and the typographical error needs to be corrected.

There was inserted in section two a clause forbidding fishing on Sunday. This, it seems to me, is a moral or religious question and not one of fish protection, but it is one in which I naturally have no right to officially express approbation or disapprobation, and whether or not I should advocate the repeal of that amendment would depend on the sentiment of the sportsmen throughout the State. If it were repealed, it seems to me that the law of 1794 governing worldly amusements would sufficiently cover the whole question without especially designating the wardens of the Department of Fisheries to enforce a moral or religious law.

Originally section three of the bill, which became the fish code, provided that the minimum size of black bass caught should be nine inches. This was a matter carefully considered by the sportsmen in all parts of Pennsylvania, and the demand was almost unanimous that nine inches be the minimum size. Many believed it should be ten inches. A very few not thoroughly acquainted with the habits of the black bass or whose experience was limited to a few small streams, desired an eight inch limit.

Knowing the habits of the fish and conditions which prevailed in different kinds of water I felt that a nine inch limit was the proper average size, both in the larger waters, especially the rivers, a ten inch limit was most desirable. For some unexplained reason a majority of the Legislature felt that an eight inch limit should be enacted. This is unfortunate, because under ordinary conditions the black bass of eight inches in size is only one year old, or at most two, whereas the fish does not spawn until it is three years old.

One of the most difficult fishes to propagate in the State hatcheries is the small mouth bass. The eggs cannot be taken artificially, and consequently only a few hundred thousand can be raised as against millions of other species of fish from which the eggs can be taken artificially, and as the fish is a nest builder it is important that the bass have an opportunity to spawn, at least once, before it is killed for food purposes. The minimum size ought to be at least nine inches and I hope the Legislature at the forthcoming session will see it in the same light.

Section four was not amended at the last session, but one sentence was not quite clear, namely, how the diameter of a fyke net should be measured, and I propose to correct that by a few words.

In section 19 there was a very serious mix-up. An amendment was made in the Senate providing that where waters had been stocked by the State such waters should be free to public fishing and render a person exercising the right liable only to trespass in damage. By some accident the amendment got into the wrong place, thoroughly mixing the whole section. This I should like to see corrected so that

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it would be understandable and in addition fairer to property owners. The section as amended and intended to read opened the stream during the open season so far as the banks were concerned without regard to crop, excepting the action for damage. In the amendment which I shall submit I have exempted that part of the bank which might be planted to the water's edge with crops.

I have also held that where people were fishing for the market or the table exclusively without regard to the sport that they should pay for the privilege by the imposition of a low license fee. This idea was incorporated in section 21 of the bill which became the Act of May 1, 1909. Through a mistaken feeling for people who use nets and devices other than rods and lines, the license fees were stricken out, excepting for seines and fish baskets. I feel so strongly on the subject that I have inserted an amendment imposing a small license fee on the use of fyke nets and dip nets. The imposition of this license would not be a hardship on any person effected and would yield a respectable revenue, much more indeed than is realized from licenses in Lake Erie.

The fish basket law as enacted has not worked satisfactorily. Protests against the further existence of a law permitting its use are widespread and emphatic and the present law has been so greatly abused that it should be either repealed entirely or replaced by another and a more stringent act.

Summarized, I recommend placing the sunfish, fall fish and chub on the list of game fishes, with the same protection to the sunfish as is given black bass with respect to the close season. Second, that the law legalizing the gig or spear be abolished entirely or they be prohibited in July and August. Third, that the minimum size of black bass be raised from eight to nine inches. Fourth, that a license fee be imposed for the use of fyke nets and dip nets. Fifth, that the fish-basket law be entirely repealed or replaced by another more effective. Sixth, that the law permitting fishing in streams stocked by the State be made clear.

In addition to the foregoing it is important that a law be enacted giving the Department of Fisheries the right of eminent domain. The advancements of the hatcheries and the general work of fish culture make this right important. Also that a law be enacted placing lakes now owned by the State under the charge of the Department of Fisheries for use as auxiliary field stations. Also that the Department of Fisheries should have the right to acquire from time to time at least one or more trout streams in each county for public fishing.

For the last two or three years there has been a growing and strong sentiment in favor of exacting a license from non-resident anglers. It is pointed out that since the fishing in the trout streams of the State and the lakes have appreciably improved, the influx of non-residents for fishing purposes has greatly increased; that with few exceptions these non-residents contribute nothing towards the fish cultural work of the Commonwealth or towards improvement; that they are simply benefiting and securing enjoyment at the expense of the residents.

There is also an exceedingly strong and almost universal sentiment towards the restriction of unnaturalized foreigners in fishing privileges. Many of this element have neither knowledge nor care for the fish laws or the protection of fish. They scoop upon the streams in hordes, using all sorts of illegal devices and in some instances entirely

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depopulate the waters. It is believed that the imposition of a license to fish will put a stop to the greater part of this evil. It will make the work of the wardens comparatively easy, so far as the foreign element is concerned.

The revenue from licensing non-residents will be considerable and should go far towards balancing the amount appropriated for fish hatching purposes. The Board of Fishery Commission, at its last regular meeting decided to have introduced a bill along these lines at the next session of the Legislature.

FISH FARMS.

I believe it to be within bounds of possibility for a large proportion of the farmers of Pennsylvania to engage in fish farming with profit to themselves and consequently the benefit of the Commonwealth. On most farms there are spaces of swamp land to-day considered practically valueless which could be made to yield revenue equal, acre for acre, with the most productive field, by turning them into fish ponds and raising fish for home consumption and the market. Having this as a firm conviction, I have, ever since becoming Commissioner, been experimenting quietly as to the species of fish that could be handled to the best advantage by farmers. Thus far I have settled on three that can certainly produce very satisfactory returns by the expenditure of labor, a little money and the exercise of judgment and attention. The three fish are brook trout, German carp and catfish. I believe also that within five years frog farming can be made a reasonably assured success.

Given the proper quantity and quality of water, and the same attention that would be accorded any other phase of farm work, three acres of ground could probably be made to yield a net return of between one thousand and three thousand dollars a year. Comparatively few could engage in trout farming because of an insufficient proper water supply, but the farmer who has the right kind of water and three acres of ground and a few hundred dollars could start a trout farm which, in two years, will yield him a profit and which would be capable of enlargement and of a steady income of a size not to be despised. As far as trout farming is concerned the Department is now in a position to advise and to assist in the plotting of such a plant, and next spring as a preliminary to issue a bulletin on trout culture for farmers.

By next autumn I am confident the Department will be able to do the same by both German carp and catfish farming. In frog experiments we have progressed far enough to demonstrate success on a small scale and it now only remains for the Department to secure a piece of ground large enough to experiment on a large scale, so that thereafter those who would like to engage in this work can do so with some degree of certainty that there will be no loss and that frog culture can become a permanent feature of a farmer's business.

As to the possibility of carp farming it might be noted that two-thirds of the vast quantity of carp consumed in the State annually come from the State of Illinois, or outside of Pennsylvania, and there is no reason why that supply should not be furnished by Pennsylvania.

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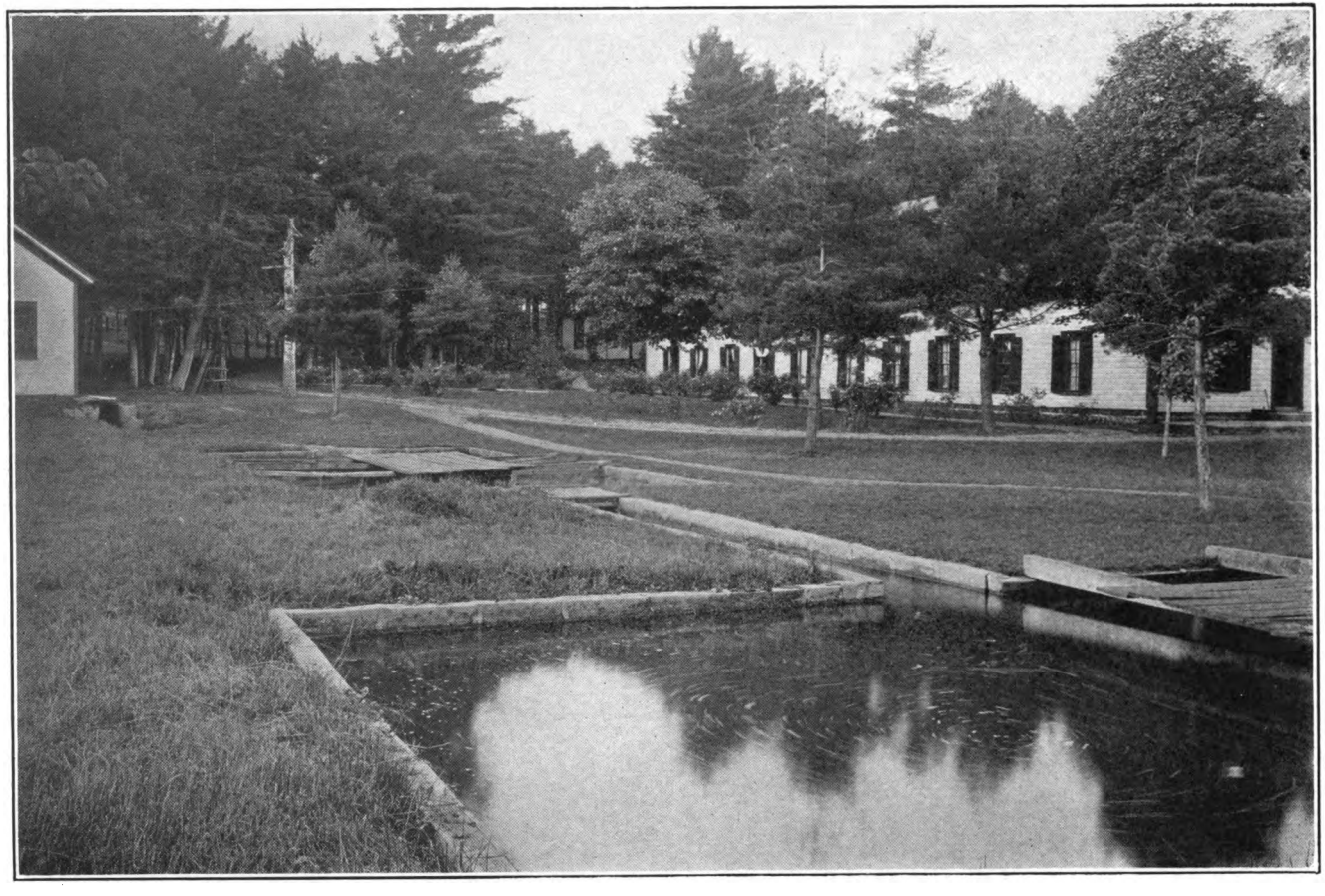

Corry Hatchery.

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REPORTS OF HATCHERY STATIONS.

CORRY HATCHERY, STATION NO. 1.

Report of Wm. Buller, Superintendent.

Hon. W. E. Meehan,
Commissioner of Fisheries.

Dear Sir: I beg to submit the following, my annual report from December 1st, 1909, to December 1st, 1910:

During the months of December and January the brook and brown trout eggs were hatched. The percentage of loss of the eggs taken at this hatchery being small. Eight hundred thousand (800,000) brook trout eggs were received in November from the Paradise Brook Trout Hatchery and were placed in No. 3 hatchery. The supply of water in this building was not as large as usual due to the drouth given in my last report. Some of these eggs became fungussed, probably due to the insufficient supply of water, but by special attention in the care of these eggs the loss was very small. The fish hatched from the entire number of eggs were exceptionally fine.

When I began to ship in March the fish, which were fingerlings number one, were strong and healthy.

I wish to speak of the hybrid trout, the cross between the brook and the European brown trout. These fish are now five years old. As yet they have failed to produce any eggs. The fish obtained from this cross are beautiful and strong. I have kept close watch of them and firmly believe they will not produce eggs.

The number of brook trout fry retained for stock fish was seventy-five thousand (75,000). These fry were placed in thoroughly cleaned ponds. I am sorry to report the loss of a number of fish in one of the ponds. This was caused by a stoppage in the drainage from the barn. We repaired the drainage and trust we will not have a repetition of this trouble. However, I saved the larger of fish in this pond by removing them to another one. I have a large number of sunfish and catfish, which I expected to distribute in November, but owing to the winter season setting in so early I will not be able to ship these fish till spring.

In my previous report I spoke of my desire to have pipe laid from a spring on a Mr. Heath's property, which would require about twelve hundred (1,200) feet of tile. When you learned of the advantage this meant in carrying an unlimited number of fish in a larger pond recently completed on the new ground purchased from Jefferson Burkhouse you directed me to lay the pipe. I wish to mention the supply of water from this spring has more than met our expectations. There is a percentage of loss in breeding fish each season at the time the eggs are taken, but I am pleased to say my loss of breeding fish this year

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has been unusually small. The springs are back to their normal flow. I think it is due to the large amount of snow which fell last winter.

I have in the hatchery at the present time four million eight hundred thousand (4,800,000) brook trout eggs and seventy-five thousand (75,000) brown trout eggs. There are a number of fish that as yet have not spawned, so that I hope to add a few more eggs to the number now in the house.

The improvements are as follows: I put in a concrete wall at the lower end of the pond on the north side on No. 3 hatchery and also one in the bottom of the pond on the east side of No. 3 hatchery, one foot deep and six inches thick to keep the rats from digging into the hatchery, which were bothering us a great deal. Laid two-inch pipe from spring house to No. 1 hatchery, and also from Spencer's woods to No. 3 hatchery. Made a sleeping room out of yellow pine in the new dwelling house. Put in a new walk in No. 1 hatchery. I put up sheeting of yellow pine five feet high on the inside of No. 1 hatchery on the west side and at both ends. Did quite a bit of grading and sowed it with lawn and white clover seed. Laid 500 feet of sewer pipe and 500 feet of six-inch pipe from hatchery to spring so that I could get water from the big pond, and also laid two hundred and fifty feet of six-inch pipe from No. 2 hatchery so that I could get water into the big pond. Put in a thirty-foot race of concrete. Painted all the hatching houses, wood shed, office and dwelling house. Put up a new porch step at the old dwelling house. I drove a well at the new dwelling house twenty-eight feet deep and get splendid water. I put in one pond with concrete walls one hundred and ten feet long, fifteen feet wide and four feet deep, another the same length, fourteen feet wide and four feet deep, and still another thirty-five feet long, twelve feet wide and five feet deep. Graveled all the bottoms of the ponds and put a coat of gravel on the drive road around the grounds. Put new bottoms in ten of the old troughs, double troughs and put in ten new troughs in No. 2 hatching house, double troughs sixteen feet long.

Hoping this report will meet with your approval, I remain,

Respectfully yours,

WM. BULLER,
Superintendent.

CORRY HATCHERY, STATION NO. 1.

Fish, etc., distributed from December 1st, 1909, to December 1st, 1910.

BROOK TROUT, FINGERLINGS NO. 1.

Bradford county,	139,600
Butler county,	48,000
Crawford county,	369,300
Clinton county,	832,800
Cameron county,	249,700
Clearfield county,	408,500
Clarion county,	41,000
Erie county,	193,200
Elk county,	392,300

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Forest county,	216,700
Indiana county,	96,000
Jefferson county,	132,000
Lycoming county,	264,000
Lawrence county,	40,000
Lackawanna county,	2,400
Mercer county,	10,000
McKean county,	244,000
Northumberland county,	114,000
Pike county,	227,000
Potter county,	486,800
Sullivan county,	245,600
Snyder county,	26,200
Susquehanna county,	120,000
Schuylkill county,	175,200
Tioga county,	230,400
Union county,	10,800
Wyoming county,	24,000
Wayne county,	76,500
Warren county,	163,500
Venango county,	60,200
Total,	5,639,700

Adult Male Brook Trout.

Crawford county,	300
Clinton county,	700
Erie county,	1,300
Venango county,	750
Total,	3,050

European Brown Trout, Fingerlings No. 1.

Blair county,	65,500
Cambria county,	5,000
Elk county,	12,000
Huntingdon county,	10,000
Warren county,	24,000
Total,	116,500

Sunfish, Fingerlings No. 1.

Warren county,	15,000
Total,	15,000

Catfish, Fingerlings No. 1.

Crawford county,	2,000
Total,	2,000

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Summary.

Brook Trout, Fingerlings No. 1,	5,639,700
Adult Brook Trout, Males,	3,050
European Brown Trout, Fingerlings No. 1,	116,500
Sunfish, Fingerlings No. 1,	15,000
Catfish, Fingerlings No. 1,	2,000
Total,	5,776,250

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ERIE HATCHERY, STATION NO. 2.

Report of Philip H. Hartman, Superintendent.

Hon. W. E. Meehan, Commissioner of Fisheries, Harrisburg Pa.

Sir: I take pleasure in submitting to you my fifth annual report from December 1, 1909, to November 30, 1910.

There was a large increase in the output over all previous years. The total output for the year was 278,737,000 fry, not including adult brood fish that were taken for other hatcheries. Taking 2,000,000 blue pike fry from the above amount, that were shipped to Dauphin Pa., for the Susquehanna, the entire balance was planted in Lake Erie.

The hatch of pike-perch was a little below that of last year. Of the first 530 quarts of eggs received, only thirty per cent. were hatched. The last 229 quarts taken 60 per cent. were cleaned up. As in other years eyed eggs were shipped to hatcheries at Wayne and Torresdale, and green eggs to Union City and Crawford hatcheries. Owing to unsatisfactory results from green eggs shipped, I later shipped eyed eggs to these stations also. The number of eggs and fry, and distribution of same, will be found in separate statements hereto attached.

We began taking blue pike on the eighth day of May. The total number taken was 221,665,000. These eggs were superior to those of last year, and good eyed eggs of these fish were sent to Wayne and Torresdale hatcheries. This is the first time that blue pike eggs were ever shipped from this station.

The latter part of March, and at a time when we were very busy hatching fish, I set up two temporary tanks, and taking the Commodore Perry, her crew, and a few additional men, began drawing seine for adult blue gills. You will notice in previous annual reports that the work was always undertaken later in the season, and mention is made of being too late. This year I was determined to be on time regardless of limited space to hold them until shipping them out.

In a few days I had 2,246 blue gill adults over one ton in weight. These fish were sent to Union City, Crawford and Torresdale hatcheries. Adult yellow perch were taken in pound nets fished by William F. Kolbe, who also furnished the small mouth bass. One hundred bass and 2,430 perch were taken in this way and sent to Crawford and Union City hatcheries.

This year is notable for the increase in amount of first grade white fish eggs taken, the number of fields covered, and under hard conditions that some of them were gotten out of fields and delivered to shipping points. There was no trouble with Port Clinton, Ohio, eggs, but the eggs taken in Canada, at Selkirk, Ontario, and Nanticoke, Ontario, were rather hard to get out, the eggs being hauled by teams in relays. A team at Selkirk would carry the eggs from that fishery to Nanticoke, a distance of eight miles, a fresh team would take

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both Selkirk and Nanticoke eggs on to Port Dover, another eight-mile drive, thence via Commodore Perry to Erie. This year the roads were very bad and made difficult and slow going.

Even under the adverse condition the eggs were taken out in fine shape, and under a nominal cost to the Department. We had permits to take eggs at Nanticoke, Selkirk, Rainham and Port Maitland. On November 2nd the Commodore Perry cleared for Port Maitland and other fishery stations with spawntakers aboard and set them off at the stations to which each one was instructed to go. Charles Klingbiel was in charge of the Port Maitland fishery, which is considered the largest one on the north shore. Mr. Klingbiel had just been nicely located and had everything in readiness for taking the spawn and caring for it, when rather unexpectedly, spawntakers from the Federal Government hatchery at Windsor, Ontario, arrived, and gave the word that they had decided to take the eggs for their own use. Mr. Klingbiel was then instructed to move to Nanticoke and cover a few more fisheries at Selkirk, with the result that more eggs were taken in Canada than last year.

November 23rd I began to send out spawntakers for herring eggs, but owing to very stormy weather, the herring run was very light, resulting in our falling far below the number taken last year. This year no herring eggs were taken at Port Stanley, owing to the funds remaining for field work not being large enough to warrant any attempt at it.

Early in November I was notified by the Hon. W. E. Meehan, Commissioner of Fisheries, that I was to co-operate with Mr. Frank Redband, Superintendent of Caladonia hatchery, of New York State, to take herring eggs. This was done. All the boats that could be covered with spawntakers were taken, but considerable trouble was experienced in getting men who could stand the hardships connected with this work. A great many boats went by default owing to lack of men.

Fishermen working by the day receive $3.00 per day, while with the funds available we were only able to pay $2.00. With an appropriation for field work a little larger than the last one received, and by paying old experienced spawners $3.00, and first year men $2.50, I believe we would be more apt to get the best men to undertake it each year. The spawner is in the lake each day just as long as the fishermen, and his work is equally as hard. The time of employment is very short and many of them do not care to undertake it more than once.

These conditions apply more fully to fall seasons of spawning when weather conditions are always at their worst. This hatchery is filled mostly with white fish eggs and I expect before December 31st to have at least ten or more millions of herring eggs running. It all depends on how fast white fish clean up so as to get empty jars. At present every jar is in use. In addition to filling this hatchery I have shipped enough herring and white fish eggs to nearly fill Crawford and Union City hatcheries.

This year collections of license fees are far above those of any previous years. In the forepart of September more than one hundred boats were operating out of here. Taking the number of boats and nets in operation and yearly increasing, field work in this respect

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must be increased and means provided for doing so, as at the present increase of fishing the hatcheries are fast falling behind in amount of fish being put back.

Gentlemen, I must again call your attention to the hatchery building as being far too small and far beyond repairs. The building is in very bad condition and I must say very unsafe to work in. It has stood the test of dampness and water for twenty-five years without any extensive repairs whatever in that length of time, and I hope that something can be done this coming summer.

The following is the collection and distribution of eggs taken this year:

Distribution of Pike Perch Eggs, 1910.

Union City Hatchery, green eggs,	7,525,000
Union City Hatchery eyed eggs,	4,901,000
Crawford Hatchery, green eggs,	8,925,000
Wayne Hatchery, eyed eggs,	8,000,000
Torresdale Hatchery, eyed eggs,	8,750,000
Erie Hatchery, green eggs,	132,825,000
Total number received,	149,275,000

The eyed eggs shipped are to be deducted from the Erie green eggs.

Blue Pike Eggs, 1910.

Total number taken,	221,665,000

Distribution of Eyed Eggs.

Crawford Hatchery,	7,400,000
Wayne Hatchery,	8,000,000
Yellow Perch Eggs,	225,000

Distribution of Lake Herring Eggs, 1910.

Crawford Hatchery,	4,040,000
Union City Hatchery,	21,513,000
Caladonia, New York,	10,201,000
Erie Hatchery,	10,100,000
Total,	45,854,000

White Fish Eggs, 1910.

Taken in Canada, Nanticoke, Ontario,	54,846,000
Taken in Ohio, Port Clinton,	55,608,000
Taken at Erie,	378,000
Total,	110,832,000

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Distribution of

Erie Hatchery,	74,214,000
Crawford Hatchery,	18,606,000.
Union City Hatchery,	16,212,000
Caladonia, New York,	1,800,000
Total,	110,832,000

Summary.

White Fish,	110,832,000
Pike-Perch,	149,275,000
Blue Pike,	221,665,000
Yellow Perch,	225,000
Lake Herring,	45,854,000
Total eggs,	527,851,000

ERIE HATCHERY, NO. 2.

Distribution of Fish, Etc., from December 1, 1909, to November 30, 1910.

Adult Perch and Small Mouth Bass.

Distribution of Perch.

Union City Hatchery,	980
Crawford Hatchery,	1,450
Total,	2,430

Distribution of Bass.

Union City Hatchery,	80
Crawford Hatchery,	20
Total,	100

Adult Blue Gills.

Union City Hatchery,	400
Crawford Hatchery,	1,080
Torresdale Hatchery,	760
Total,	2,240

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Summary.

Yellow Perch,	2,430
Black Bass,	100
Bluegill Sunfish,	2,240
Total,	4,770

Fish Distributed from December 1, 1909, to November 30, 1910.

Output of Fry, 1910.

White Fish, Lake Erie,	38,250,000
Lake Herring, Lake Erie,	53,783,000
Pike-Perch, Lake Erie,	42,754,000
Yellow Perch, Lake Erie,	200,000
Blue Pike, Lake Erie,	141,750,000
Blue Pike, Dauphin, Pa.,	2,000,000
Total,	278,737,000

Thanking the Hon. W. E. Meehan, Commissioner of Fisheries, and all members of the Board of Fishery Commission, for their assistance and courtesies extended the past year.

Yours very respectfully,

PHIL H. HARTMAN,
Superintendent.

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BELLEFONTE HATCHERY, STATION NO. 3.

I have the honor to herewith submit the report of Assistant Superintendent Harry I. Griffith, my illness having made me, for the time being, incapable of taking an active part in the work on the hatchery. I am,

With respect,
HOWARD M. BULLER.

HON. W. E. MEEHAN,
Commissioner of Fisheries, Harrisburg, Pa.

Sir: I herewith have the honor to present this my first annual report of the operations of the Bellefonte Hatchery for the term beginning December 1, 1909, and ending November 30, 1910.

Our take of trout eggs this year was the greatest in the history of the hatchery, and, I understand, is the greatest ever taken from any hatchery in the State. In all we took and fertilized 6,500,000 brook trout eggs. Of these we sent 1,950,000 green eggs to the Spruce Creek Hatchery and 900,000 eyed eggs to the Wayne Hatchery. The first began spawning the 10th of October. I had everything in readiness and knowing that there would be a great quantity I secured the aid of a couple of spawntakers from other hatcheries where they were not then needed. As everything had been prepared beforehand the work of spawn-taking ran with very great smoothness and at no time, even in the height, were we hard pressed, although naturally at times when the men had to work overtime.

I had been taught when learning fish culture that after trout eggs had been taken and fertilized the pan of eggs should be set in the troughs for a period ranging from twenty minutes to a half hour, but this seemed to me to be useless. We all know that milt dies in less than three minutes when exposed to the air or in water, and all eggs capable of fertilization must have that function performed inside of that three minutes. I knew that you, Mr. Commissioner, felt the same way about it. Consequently, instead of setting the eggs aside as usual the first lot of eggs we washed immediately and then set them aside to harden as was done in the regular way. The experiment was a complete success. As many eggs were fertilized as by the previous method of allowing the eggs to stand before washing, and the hatch will be as good. Finding the first lot of eggs taken fertilized so thoroughly I had all the eggs taken this year handled in the same manner. When we came to sort the two year old fish for egg taking we found fully 60 per cent. were males. This was rather under than over the usual percentage. We have had as high as 75 per cent. of males. I have found that of the fish we save for breeding purposes it nearly always is the case that more than half turn out to be males. I have noticed particularly that the largest of the young fish, by young fish I mean the fingerlings, are more apt to prove to be males than the smaller fish. There were a few more "ringer" eggs among the three year olds

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this year than last. On the other hand, there were less water-soaked eggs than usual. The fish recovered unusually quick from the spawning, and our percentage of loss therefrom was very small, so small as not to be noticed, which is a gratifying contrast to last year when several thousand males died.

Our output of trout last spring, 3,876,000, were distributed through thirty-five counties in accordance with the applications forwarded from the Harrisburg office. The smallest quantity, 3,000, went to Sullivan county. The greatest quantity, 729,000, was distributed in streams in Centre county. I was a little surprised to notice the small quantity which went into some of the counties that are famous for their trout streams, and on inquiry I found, with the exception of Sullivan, the counties that received the smallest supply were those in which there were no Fish Protective Societies directly interested in planting fish. Berks county, which received from me only 4,500 fish, I understand received an additional supply from one of the other hatcheries. Our trout fingerlings this year were very fine and much larger at shipping time than usual, and many letters were received from applicants expressing pleasure, not only at the size but the healthy condition in which they were in. According to the rules of fish culture they should not have been as large or healthy as usual because our troughs were overcrowded in the spring, but we worked extra hard over them and fed them well. Experience with my advanced fry and fingerlings teach me that it is better to give advanced fry and No. 1 fingerlings the same quantity of food, but oftener, that is to say, four or five times a day instead of three.

It will be noted that no mention is made of my output of rainbow trout. In accordance with your instructions we ceased the regular propagation of rainbow trout this year, although we took a few eggs, but they were so few that what little fish there were we distributed them with the brook trout. The reason given for discontinuing the propagation of rainbow trout was that instead of spawning in March or April, as they do in the natural waters, they performed that function before the close of the brook trout season. At this time we need all the room for the more valuable brook trout, and the only reason given for having rainbows was that they should spawn at a time when the troughs would be emptied of brook trout. A pond or two of fish have been retained for two purposes, or in case there should come any special applications so they could be filled.

Two years ago I received from the Corry Hatchery five cans of brown trout fingerlings. These fish have done very well and next year should yield a considerable number of eggs.

A year ago goitre, or enlargement of the thyroid gland, was prevalent in most of the ponds. There were not many cases where the disease was in an advanced stage. An examination made by Dr. David Marine, of the Cleveland University, in the presence of yourself and all the Superintendents, showed that goitre prevailed only in the early stages. Although our ponds were not dirty, we cleaned them thoroughly and I gave special orders to see that they were maintained that way, and the fish as they grew larger were not given any more food. These steps proved efficacious, and I am pleased to report that goitre has almost entirely disappeared from the fish in the ponds of this hatchery. During the spawning time I personally examined many thousands and had my spawntakers do likewise and it was rare to find

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any cases. There were, of course, some fish having the tumor, but even these fish were free from the disease itself, the lump, as fish culturists know, never disappearing. Goitre had developed to considerable extent among the silver salmon, but it has disappeared among them. Not a case of tail disease was noticed throughout the year. I am also pleased to report that our fingerlings here for breeding purposes passed through the summer with scarcely any loss. This is the first year in which this has been the case. This good result I attribute to the fact that we placed the fish in some of the regular ponds instead of those that had previously been built especially for advanced fry and fingerlings. In all we have 29,000 fingerlings which will come into breeding next summer. These, with the added trout on hand, should give us more eggs next winter than this.

As usual, after last year's spawning, I found myself with a surplus of old male trout more than could be used for food in the local institutions. There is a stream which has its rise a few yards above the hatchery flowing through it and empties into Spring Creek at Bellefonte. Its total length is about five miles. The stream is a natural trout stream, but is fished so vigorously and by so many people that it is regularly depleted. As many as between three and four hundred persons have been actually counted fishing that length of stream in a single day. At your suggestion this autumn I placed 7,400 in Logan Branch and in Spring Creek below the dam just above the bridge which crosses the stream at Main street. While it is a well-known fact that trout of this size are dangerous to smaller fish and should not be planted permiscuously in trout streams, it was felt by you and also by me that on account of the heavy fishing the stream could not be harmed by thus disposing of our surplus trout, as it was certain before the close of the coming season every fish would become a victim of the hook. It is an amusing fact that since the planting it is not uncommon to see dozens of people leaning over the bridge and the railing along the road watching the trout disporting themselves in Spring Creek, and even though the trout thus planted may destroy any stray small brook trout which get there from above, I believe the added interest to the work of the hatchery which these fish have brought about makes the planting of educational value.

In addition to the eggs shipped to Spruce Creek and Wayne County Hatchery I furnished one quart of eggs to the Bucknell University on the application of Professor Stewart under general orders from you to be used by that institution for educational purposes, and also gave them sixteen mature fish. Besides the trout a few goldfish were given. A few trout were killed and sent to sick people on a regular physician's perscription.

A moment ago I spoke of the silver salmon having contracted goitre last year and that they had become free from it. For the first two years of their life they grew with great rapidity, but beginning with the third year they ceased making rapid growth, moreover they became quite thin. I had a consultation with you in regard to the matter with a result that we thinned the fish from four ponds into six and gave them nearly double the quantity of food. Beneficial results were apparent very quickly, at least so far as a better condition was concerned. The mortality lessened, they became much more plump, and, in fact, all of them soon ceased to have a thin, starved like appearance, but the growth has not been nearly as rapid as I thought it

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would be. They have made from one to two inches growth. Their average length is now, as they approach their fourth year, nine inches. We have some, of course, that are much larger, twelve inches or more, and we likewise have many that are less than nine inches. Thus far the impounding of the young silver salmon beyond the age when they would naturally seek the sea has been very satisfactory. That they did not grow as rapidly in ponds and fresh water as they did in their own native surroundings is not to be wondered at as even brook trout do not grow to be as large a size when held in ponds as they are known to get when in the streams. The leaping habits of the silver salmon are as strongly developed as I imagine they are in the native waters. They are constantly springing into the air and in great numbers in the mornings and evenings. The silver salmon is a beautiful fish, one of the handsomest in the hatchery. Last year through a flaw the end of one of the ponds containing silver salmon broke out, allowing nearly a thousand to escape. We succeeded in saving most of them, but a number did escape into Logan Branch Run. During the last fishing season a number of these were caught by fishermen and the astonished anglers brought the strange fish to the hatchery to be named. The breaking away of the pond was therefore not without its uses since it proves the silver salmon in the stream will take the bait or fly as readily as the brook trout.

It now requires four-hundred and fifty sheep plucks, fifty beef lungs a week to feed the brood trout in this hatchery. The use of beef lungs for the young fish is new on this hatchery and they do not take very kindly to it as yet on account of its being strange to them, but it is undoubtedly a better food than the liver. At least such has been the experience of the Superintendent of the Corry Hachery. This fall, at the suggestion of Mr. Buller, I experimented with tankage for feeding fingerlings. Tankage is slaughter house offal ground fine and mixed with blood, but the trout did not touch it. This was probably due to to the fact that as soon as it was cast on the water it sank immediately to the bottom, and while fish will eat food on its way they will not pick up from the bottom unless they have been accustomed to that kind of food. The food is very cheap and should be healthful if the fish can be induced to eat it, and we will experiment further with it with the advanced fry and fingerlings this coming spring.

In consequence of the prolonged drought the two springs which supply the hatching houses decreased greatly in volume, in fact, the two springs only yielded a little more than what one spring ordinarily flowed. The decrease was so great that last spring I was forced to turn some creek water into the house in order to have enough for the rearing troughs. There has been a slight increase in the flow this autumn and thus far we have water, and to spare, for the eggs, and it is possible there will be sufficient for the advanced fry without again resorting to the creek water, though we may have to do so again. The volume of the flow had also greatly decreased in Logan Branch Run, and in the fall we were compelled to cut out some of the ponds in order to have sufficient supply, but the regular volume is again flowing. As all the pond room will be needed next spring for our stock I am anxiously looking forward for the breaking of the great drought.

I would respectfully call your attention to the inadequate method of preparing our fish food. It is now cut by power produced from an undershot water wheel. The water is from a small spring run, from

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all the ponds, and is impounded in a large reservoir. The wheel is supposed to be a three-horse power wheel, and it doubtless is, but the water supply is not of that power, or, if it is, it is impossible to set the wheel so that a full power can be developed. The result is that it takes an hour to an hour and a quarter to cut from six to eight buckets of food, or one feeding. There is no speed to the grinding machine and much of the food is simply torn and not properly cut. I believe it would pay to abandon the waterwheel and install a gasoline engine similar to that in use at the Spruce Creek Hatchery. With such an engine what now requires from an hour to an hour and a quarter would easily be cut inside of fifteen minutes and with less waste.

The addition of three hundred shipping cans enabled us to distribute the trout last spring much more rapidly and at a considerable less cost. In 1909 it required nearly three months to distribute about three million trout. Last year we distributed nearly four million in six weeks, and it must be remembered that our shipping facilities are not of the best, that it is only possible to make three shipments a day from this hatchery. If we were located on the main line it would be possible, with the shipping cans in our possession, to make even better time. A large stock of cans on a hatchery is in the interest of economy and rapid transportation.

At the close of the shipping season we began putting the hatchery in condition. It had been decided by you that this year rather than extend the number of ponds we would simply complete those that were started, do necessary repairs to those that had become weather worn, and pay closer attention to the development of the fish. No ponds, therefore, were constructed. A head wall at the spring, which was incomplete last fall, was finished. New foundation walls were built for the car barn, and that building, which had to be propped up to keep from falling, was put into good condition. It is now possible to run the car in and out without danger of the barn falling. The troughs in No. 1 and No. 2 hatching houses were repainted and fifty new egg trays made. The main driveway from the entrance into the grounds and past the hatching house was extended several hundred yards towards the railroad station. The ground around the big group of concrete ponds was partially graded and by next summer will be completed. The privet hedge along the road having grown high and thick enough the dilapidated fence was torn away. The neatly pruned hedge is a great improvement.

Perhaps I should have inserted in this report earlier that December 4, 1909, in consequence of the serious illness of Mr. Howard Buller, Superintendent, I was put in full charge of the operations of the hatchery and the men, reserving to Mr. Buller the supervision of the purchase of supplies and of the expenditures, and to act in an advisory capacity, and I was given the title of Assistant Superintendent.

Early in February I received notice that the fish car would be required for a trip a few weeks later. An inspection was made of the car and it was necessary to send it to the shops for some repairs. The railroad company, in returning it, broke some of the apparatus, but they remedied the trouble at their own expense. The car was taken out on this trip March 14th and returned on the 17th, carrying more than five thousand adult fish successfully from Philadelphia to Lycoming county. Needing a place for our egg trays and other apparatus connected with the hatchery I laid a floor on the joist of the

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No. 1 hatching house, making a commodious attic. We need a pair of steps. These I hope to finish before long. On the western side of the No. 1 hatching house is a set of eleven concrete ponds when the hatching house was erected. They were designed for advanced fry to be kept for breeding purposes. I am informed for a year or two they carried the fish in a very satisfactory manner, then the fish in one or two of the ponds began to sicken and a year or two later the same trouble was noticed in most of the ponds. No amount of cleaning, salting or work caused any benefit, and last year they were abandoned for carrying young fish. I would advise that the separating walls of these eleven ponds be torn out, the outlets to each closed and the space be turned into one large pond. I believe this to be satisfactory, because we have noticed that two year old fish did fairly well in these eleven ponds, but owing to the small size the total number if utilized would be very small compared to what could be carried after the whole were made into one pond and deepened. Our fingerlings for breeding purposes do well in ponds numbered 1 to 21. Including the eleven ponds we now have at the Bellefonte Hatchery sixty-six ponds. If my recommendation is carried out we will have fifty-five available ponds which will carry more fish than the sixty-six. I renew my recommendation for a large pond on the eastern side of the No. 2 hatching house along the line of the Dale property if the stream flow resumes permanently its normal flow for three year old trout, but if the stream does not resume its normal flow in the near future the pond will still be important for the purpose of gathering ice for the hatchery use, and it could be used as a breeding pond for catfish. If it can be secured at a reasonable cost we should have the water from what is known as Ross Spring. This would enable the erection of another hatching house. A new ice house is badly needed. I fully expected the old building to fall this year. I doubt whether it will last another season. There is need of a system of lighting the establishment. During the shipping season work begins as early as four o'clock in the morning before it is light, and during the egg-taking period darkness comes on long before we should stop and lights are badly needed on the place. There are, I understand, systems by which the Bellefonte Hatchery could be lighted by electricity at a comparatively small cost. I would recommend that this be looked into and a system installed as soon as possible, if one can be found suitable. The fence surrounding the property, excepting directly in front of the Superintendent's dwelling, is particularly in need of being replaced. Some of it is in such bad condition that it cannot be repaired and some has entirely disappeared. A few gaps in the privet hedge needs replanting. A walk should be constructed from the Superintendent's dwelling to the hatching houses, and also proper walks in the various parts of the grounds. The roof of the Superintendent's dwelling needs at least some repairs. Some repairs are also needed in the Assistant's house. A two horse wagon and a set of harness is required.

The above is respectfully submitted.

HARRY I. GRIFFITH,
Assistant Superintendent

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Fish Distributed from December 1, 1909, to November 30, 1910.

Brook Trout Fingerlings.

Bucks county,	15,000
Bradford county,	6,000
Berks county,	4,500
Blair county,	169,500
Chester county,	234,000
Centre county,	729,000
Clinton county,	15,000
Clearfield county,	79,500
Cumberland county,	15,000
Carbon county,	280,000
Columbia county,	336,000
Delaware county,	6,000
Franklin county,	6,000
Huntingdon county,	48,000
Lancaster county,	55,500
Luzerne county,	163,500
Lehigh county,	4,500
Lackawanna county,	78,000
Lebanon county,	115,500
Lycoming county,	12,000
Montgomery county,	238,500
Mifflin county,	45,000
Monroe county,	481,500
Northampton county,	30,000
Northumberland county,	130,500
Philadelphia county,	24,000
Pike county,	21,000
Union county,	24,000
Sullivan county,	3,000
Schuylkill county,	19,500
Susquehanna county,	19,500
Tioga county,	15,000
Wyoming county,	202,000
Wayne county,	174,000
York county,	75,000
Total,	3,876,000

Brook Trout, Mature.

Three and four year old males in Logan Branch,	2,600
Two year old males in Logan Branch and Spring Creek,	4,800
Total,	7,400

Goldfish.

Yearlings,	20
Fingerlings,	31
Total,	51

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Trout Eggs for Educational Purposes.

Professor Stewart, Bucknell University, Lewisburg, Pa., trout,	16
One quart green eggs,	16,000
Total,	16,016

Trout Eggs for Other Hatcheries.

Green eggs, Spruce Creek,	1,950,000
Eyed eggs, Wayne County Hatchery,	900,00
Total,	2,850,000

Summary.

Trout, fingerlings,	3,876,000
Trout, mature,	7,400
Goldfish,	51
Fish to institutions,	16,016
Total,	3,899,467

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WAYNE COUNTY FISH HATCHERY, STATION NO. 4.

Report of Nathan R. Buller, Superintendent.

Hon. W. E. Meehan, Commissioner of Fisheries:

Sir: I herewith submit my annual report of the Wayne Fish Hatchery, Station No. 4, for the year ending November 30, 1910.

Owing to the severe drought that has prevailed in this section for the past three years practically all the work of propagating fish, with the exception of salmon, brook trout and catfish, has been done from the field.

The permanent improvements accomplished at the Hatchery have been the finishing of the new hatching house and the new ice house. The grounds were graded in the rear of the hatching house and the grounds on each side of the driveway from the State bridge to the hatching house bridge, and the driveway itself completed by circling the new well. This improvement is a great help in getting teams close to the hatchery for loading cans. More labor has been performed on the new perch pond, but there is still a great amount of labor necessary before it is made a permanent job. When completed it will supply water to every pond on the grounds besides supplying the battery.

Brook Trout.

On account of the drought the spring decreased in volume until the flow would little more than fill a one-inch pipe, and the water of the Lackawaxen had to be turned into the trout ponds. Fortunately, although the vitality of the fish was lowered through the logical rise in the water temperature, there was no great loss of life as was the case in 1909. The fish, however, were too weak to strip when spawning time arrived.

When the drought was first felt in its severity you had a deep well driven, which you hoped would be an artesian. Unfortunately, although a fine vein of water which is equal to nearly two hundred gallons a minute was struck, the pressure was only sufficient to bring the water to within seven feet of the surface. The appropriation did not warrant the installation of a pumping apparatus, so the water could not be made use of this year. I hope that a pumping plant can be put in immediately after the opening of the new fiscal year. Unless this is done it would be better to abandon the ponds for breeding trout and have eggs sent to this station from some of the other hatcheries. It is not likely that the spring will resume its full flow until the lapse of at least two or three years. The ponds could be used for other species of fish.

Silver Side Salmon.

The usual consignment of silver side salmon eggs from the Bureau of Fisheries' Station, Birds View, Washington, arrived here on the 20th of February being eleven days in transit. Upon opening the

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case and placing the eggs in hatching trays we picked off 5,000 dead eggs, the balance of the 100,000 were in good shape. We still have some of the fish for distribution. As in previous years the distributions, with the exception of a few thousand sent to Bellefonte and Spruce Creek Hatcheries were made in the Delaware River.

Frogs.

All applications for frogs were filled from the field, and in this setcion I think it is the most economical and successful, as there are several lakes handy to the hatchery which contain each year hundreds of thousands of tadpoles, the majority of which if they were not distributed would be destroyed. Another feature in this manner of distribution is the fact that the young tadpoles remain in the deeper parts of the lake until about the 15th of September, the two year old tadpoles occupying the shallow water along the shores, and as our work is done mostly in August we cannot be bothered with the young. I would suggest more extensive work along this line as the reports from this planting and distribution are very favorable.

Sunfish.

The distribution of sunfish was mostly from the lakes. It was a little late in the season when we commenced operations, consequently the distribution was not as large as desired.

Pike Perch.

Pike perch eggs were forwarded here from the Erie Station and the distribution was made as usual. I would suggest a larger number of eggs be sent to this station as pike perch is a very valuable fish and the demand for this exceeds the supply.

Catfish.

Thousands of catfish escaping from Beaver Meadow Dam, three miles above the hatchery, found their way into the large new pond partly completed. They were mostly two year olds and averaged nine inches in length. They were distributed to applicants on file in your office.

Black Bass.

The attempt this year to propagate black bass at this station was a total failure, not owing to any neglect on my part, but to the weather and water conditions. The bass cleaned up and nested the same as usual, but the temperature of the water being very low the eggs fungused and died before hatching.

Field Work.

Operations on field work were commenced April 1st. No eggs of the pickerel and yellow perch were gathered until April 11th and the season lasted until May 2d. During the whole season the employees worked under very adverse condition, the water being very cold and the weather stormy. However, there were eggs enough gathered to supply the different hatcheries with a number of eggs of each specie.

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After the close of the perch and pickerel work preparations were made to do a great amount of work with the small mouth black bass on the different lakes, but unfortunately the water remained at such a low temperature that the work was very much retarded and results very discouraging. On all lakes were plenty of nests with eggs, but in nearly every instance the eggs either fungused or the young fish remained on the nests so long that they scattered before they could be taken up. The same conditions prevailed on all the lakes.

After the conclusion of the bass work preparations were made for the gathering of frogs which was in every way successful, and all applications filled besides some distributions made by the Department.

About this time you requested me to try and procure a number of adult yellow perch for the different hatcheries and for distribution in various lakes. I had a trap net placed in Summit Lake. Owing to it being the wrong season of the year there was very little accomplished. After about two weeks I had the net removed and sent to Conneaut Lake. As there is very little labor connected with the operations of the trap, I had the men in charge catch small sunfish to fill a number of applications which were on file at this station. I am unable to give as full an account of the work in the field as I would like to owing to not having full data, and I would kindly call your attention to the matter and would suggest that when you do not have active charge yourself of the work done in this field that it should be in charge of the Superintendent of this hatchery, and the men at work do as directed and report results every day. I consider that there can be some very valuable work done in connection with the field.

The output of fish in detail for the year is appended to this report.

Respectfully,

NATHAN R. BULLER,
Superintendent.

FISH, ETC., DISTRIBUTED FROM DECEMBER 1, 1909, TO NOVEMBER 30, 1910.

Black Bass.

Bradford county,	5,000
Susquehanna county,	17,500
Pike county,	1,500
Total,	24,000

Distributed by Field Force in Wayne County.

Advanced fry,	26,000

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Pike Perch.

Susquehanna county,	7,000,000
Bradford county,	3,000,000
Wayne county,	2,000,000
Luzerne county,	2,000,000
Wyoming ocunty,	6,000,000
Total,	20,000,000

Silver Side Salmon.

Delaware River, fingerlings,	20,000
Delaware River, yearlings,	30,000
Luzerne county,	1,000
Total,	51,000

Brook Trout.

Lackawanna county,	150,000
Wyoming county,	50,000
Wayne county,	195,000
Susquehanna county,	105,000
Total,	500,000

Frogs.

Carbon county,	8,000
Lehigh county,	10,000
Wyoming county,	8,000
Luzerne county,	7,000
Schuylkill county,	9,000
Centre county,	25,000
Northumberland county,	4,000
Lackawanna county,	10,000
Susquehanna county,	15,000
Berks county,	8,000
Crawford county,	5,000
Total,	109,000

Sunfish.

Montour county,	5,000
Columbia county,	5,000
Susquehanna county,	7,000
Wyoming county,	5,000
Northumberland county,	4,000
Carbon county,	6,000
Lehigh county,	10,000
Wayne county,	4,000
Total,	46,000

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Catfish.

Columbia county,	2,000
Pike county,	3,000
Montour county,	1,000
Northumberland county,	1,500
Schuylkill county,	1,000
Susquehanna county,	10,000
Wayne county,	5,000
Lackawanna county,	2,000
Monroe county,	1,000
Lehigh county,	2,000
Luzerne county,	1,000
Wyoming county,	1,000
Total,	30,500

Yellow Perch.

Northampton county,	10,000,000
Lackawanna county,	30,000,000
Bradford county,	10,000,000
Luzerne county,	15,000,000
Schuylkill county,	8,000,000
Carbon county,	5,000,000
Montgomery county,	3,000,000
Wyoming county,	3,000,000
Lancaster county,	2,000,000
Susquehanna county,	89,000,000
Wayne county,	100,000,000
Total,	275,000,000

Pickerel.

Luzerne county,	3,000,000
Lackawanna county,	20,000,000
Wyoming county,	5,000,000
Monroe county,	5,000,000
Bradford county,	5,000,000
Pike county,	25,000,000
Berks county,	8,000,000
Northampton county,	5,000,000
Columbia county,	5,000,000
York county,	5,000,000
Schuylkill county,	6,000,000
Franklin county,	3,000,000
Cumberland county,	3,000,000
Lehigh county,	2,000,000
Lebanon county,	2,000,000
Montgomery county,	2,000,000
Susquehanna county,	30,000,000
Wayne county,	40,000,000
Total,	154,000,000

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Summary.

Black bass, advanced fry,	50,000
Pike perch, fry,	20,000,000
Silver Side Salmon, fingerlings,	20,000
Silver Side Salmon, yearlings,	31,000
Brook Trout, advanced fry,	500,000
Frogs,	109,000
Sunfish, fingerlings, No. 1,	46,000
Catfish, two year old,	30,500
Yellow Perch, fry,	275,000,000
Pickerel, fry,	154,000,000
Total,	449,786,500

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TORRESDALE HATCHERY, STATION NO. 5.

Report of Jerry R. Berkhous, Superintendent.

Hon. W. E. Meehan, Commissioner of Fisheries, Harrisburg, Pa.

Sir: I again have the pleasure of presenting to you my annual report of the Torresdale Hatchery from December 1, 1909, to November 30, 1910.

The general conditions of the ponds and adult fish at this hatchery are good.

Improvements.

Owing to the severe storms on Lake Erie last fall there were no white fish and lake herring eggs sent here to hatch. This left the hatchery idle again through the winter months. The time was taken up grading different parts of the hatchery grounds, cutting brush on the hatchery grounds and the surroundings, grubbing out trees which had died from filling up around them, and caring for the fish, and looking after the ponds.

During the winter months the shipping cans were painted and renumbered. Early in the spring the large catfish pond was finished and filled with water, which makes four very beautiful and productive catfish brood ponds.

There was a board step or walk built above high water mark in front of the hatching house, which run out to low water mark, a distance of about five hundred feet, which was lighted at night through the shad season with electric lights. This was a great benefit to the hatchery in the gathering of shad eggs, and also a landing place for the public visitors who would come in boats to visit the hatchery. This walk has to be taken in every fall on account of the heavy ice on the Delaware River.

The upper part of the gold fish or lily pond was filled up. On account of there being so many large stones in the bottom the water would sweep away nearly as fast as it could be pumped in, and if the pump was stopped for a day or two the upper end or shoal part of the pond became dry and the little fish would get caught and die upon the bare ground. By filling up part of this pond we have overcome this and have a more shapely pond now than before.

By the help of the House of Correction labor sent here by the orders of Director of Public Safety, Mr. Henry Clay, we have straightened the northwest bank of the large pond, No. 2, which was used this last season as the sturgeon pond. A part of the pond has also been deepened. By doing this it has made a much larger and more beautiful pond, and I like your plan of turning this into a pickerel pond.

Early in the spring the algae started to form in the brood ponds worse than ever before. Just as soon as any of it appeared on the surface of the water, I took it out by means of a scap net or a small seine net. By nipping it off for two or three months I practically

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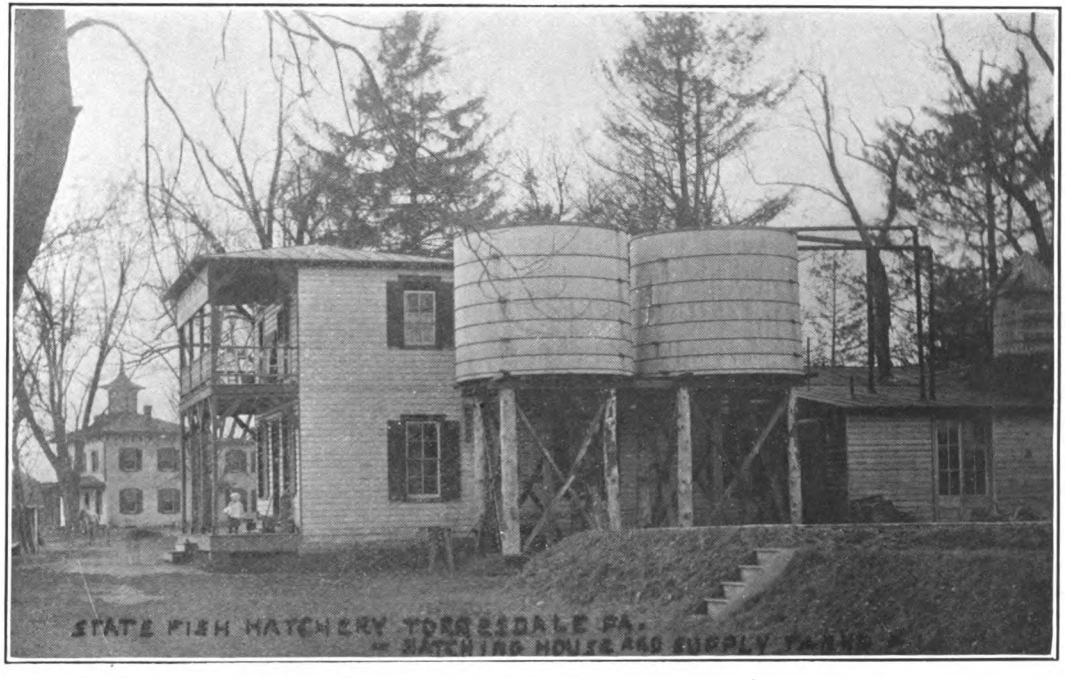

Torresdale Hatchery. Hatching house and supply tanks.

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killed it, and want to say that I had less algae in the ponds this season that ever before. In the fall, at the time of taking the young fish out of the ponds for shipment, there was scarcely any algae there at all.

The water was all drawn off this fall from the ponds and all of the dead leaves and loose mud taken from the bottoms. They were all allowed to remain bare for about a week longer, if the ponds were not needed. The adult fish were all sorted and put back into their ponds for another year, only in cases where they had to be stored in other ponds for the winter months.

Yellow Perch.

The brush was placed in the yellow perch pond about the middle of March for them to spawn on. The water conditions were about the same as the year previous. The first eggs were found on the first day of April, but there were a few of the strings that had been deposited a few days earlier. After this date there were eggs gathered from the pond every day as long as the spawning season lasted, which was until the 18th of April.

By means of the sluiceway, which was built the year before we were able to shut the muddy water off from the perch pond in time of a heavy rain. By so doing we always had clean water in the perch pond, which made it very convenient in gathering the eggs from the pond, and was a great deal better for the fish. The strings of eggs were all large this season because of there being no small fish.

From the field work there was a large number of eggs gathered from Bristol pond and hatched at this station. There were about a thousand of the adult yellow perch lost in the Delaware River by the tide driving a log against the overflow screen and knocking it off. I have about three thousand two year old fish that were raised at this hatchery which will start spawning next year and year after. These will fill for the loss of the adult fish in the Delaware River.

Pickerel.

The pickerel eggs, which were received from field work done in Wayne county under your own supervision, were very nice eggs and were hatched with a very small loss. There were also some eggs gathered from Bristol pond, which (with the exception of a very few strings of eggs) were considered good eggs to be gathered from field work and about 85 per cent. hatched. The first shipment of pickerel was made April 15th.

Pike-Perch.

The pike-perch eggs that were sent here by Philip Hartman, of Erie, were all eyed eggs and were received by me in the best of condition. They were placed in the hatching jars and it was only about two days until they started to hatch. They were hatched and shipped with practically no loss after reaching this hatchery.

Shad.

The first shad eggs were received on the evening of April 29th. This evening there were eggs collected from three gill net fishermen. At

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this time the water temperature in the Delaware River stood at about 50 degrees. After this date there were shad eggs collected nearly every day as long as the season lasted, which was until June 10th. The biggest day's take of eggs was on May 16th. On this date there were 1,425,000 eggs collected from the gill net fishermen and the shore net fisheries. On account of the United States boat "Fish Hawk" coming into the lower Delaware River, we did not make any attempt to gather eggs below what is known as the Torresdale drift. Although we did not have as much of the river to work this year as we had previous years, we increased our output of shad fry over last year 4,000,000. This was due to two reasons:

First. The fishermen understood better how to take the shad eggs and care for them after they are taken until such time as they are turned over to the hatchery. They are also beginning to see the good results and that they are being benefited by the artificial propagation of shad done on the Delaware River.

Second. From year to year we are getting better acquainted with the habits of the shad and know better where their spawning grounds are and just where and when to look for the spawning fish. We have also found that in cases where there would be one or two ripe female fish and no ripe male that the eggs may be very easily kept for about an hour either by stripping them into a pan and placing them in a cool place, or by placing the female shad on her back in a cool shady place until such time as a ripe male shad may be caught or borrowed from another fisherman.

The shad in the Delaware River run much larger this year than ever before. A nine pound shad was common and there were some taken that weighed over twelve pounds. The fishermen that collected the spawn from them say that they had as profitable, if not better, a season as last year. The average roe shad had about 40,000 eggs. The shad eggs held good until the last of the season.

Bass.

On account of the water warming up early the bass started to clean up their nests and in a short time the pond was nothing but a mass of bass nests. Just about the time they started to spawn we had a cold spell which lasted for about three weeks. This caused the bass to desert their nests and it appears to me that the cold weather lasted so long that the female fish throwed their eggs loose in the pond and they were not fertilized by the male fish. There were only two nests that were found late in the season that had any eggs on at all. Part of the eggs on each of these nests hatched which only gave a total output of about 4,000 advanced fry.

Sturgeon.

The sturgeon were taken out of the large pond several times and examined very closely, but it was found that the fish were all barren, both male and female. The adult fish seemed to be in good condition only a little poor. I think that the cause of it was that they were confined in too small a pond for them to follow their natural habits. I think that in order to carry them successfully that they should have a very large and deep body of water.

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River Herring.

Mr. Stephen, an acting assistant, succeeded in getting the spawn from the herring. After it was brought to the hatchery it was put in a hatching jar and put through the same process as the shad eggs. The eggs looked very good and started hatching the second day. About 50 per cent. of them hatched. They are very small eggs and I should say that they are very nearly as small as the smelt eggs. I think there were at least 50,000 of them hatched and planted in the Delaware River.

Sunfish.

The blue gill sunfish pond was drawn off and all of the fish taken out excepting the adult blue gills. The fish that were sent here last spring from Lake Erie, through your directions, were also placed in this large pond. This gave the pond a total of over one thousand blue gill sunfish. At the spawning time the bottom of this pond was one large nest, each fish at their own part of the nest.

I also had one pond of common and long ear sunfish with a total of about seven hundred adult fish. A part of the young fish were left in the brood ponds and part of them were removed to fry ponds and some of them were put in with the adult catfish until such time in the fall as they were large enough to be shipped out. The applications were all filled. There was a large number of them planted in the Delaware River, and there are about 25,000 fingerlings fish in one of the hatchery rearing ponds.

Catfish.

Of the two varieties of catfish, the white and yellow reared at this station, I have noticed this year in particular that the yellow are the easier fish to raise. The white catfish will spawn and hatch just as good as the yellow, but the fry are more delicate. I also find that the older the ponds are the better the results are. For instance, the largest of the series of catfish ponds was just finished and the fish put in it this spring. There were about twice as many adult fish in it as in in any other of the ponds and there were only about one-half as many fingerling fish taken out this fall as there were from the other ponds.

There were no catfish fry removed from the adult brood ponds this year, but I still recommend that where there are fry ponds suitable that they be removed from the brood ponds at the time they rise to the surface of the water in a round ball and transferred to fry ponds. Where a pond is well stocked with adult fish and the young are left in the pond with them, a portion of the young fish are bound to be eaten by the larger fish.

Catfish are generally supposed to bore a hole in the bank to deposit their spawn in. I found this year a number of instances where they cleaned up a small place on the bottom of the pond similar to the sunfish and deposited their spawn, which is in a round gelatin ball of a light mud color. The adult fish lie over this ball of eggs, constantly fanning them with their tails and fins to keep the mud from settling on them and smothering the eggs.

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Frogs.

The frogs at this hatchery were turned loose and allowed to go to the ponds that they chose to spawn. When the ponds were drawn off this fall nearly every pond contained a lot of tadpoles of the large bullfrog variety. I think they do better in breeding to let them go where they choose, but the tadpoles should be taken in the fall and placed in a pond that is wired for them and left until they get their four legs. Then they can easily be caught for shipment.

The tadpoles that were left over from shipment the fall before were all placed in one of the ponds and when the pond was drawn off late in the fall there was a swarm of little frogs going over the banks and through the grass for the other ponds which contained water.

Goldfish.

The goldfish being practically abandoned at this station there were only 80 adult fish left. They were allowed to spawn on the roots of the water hyacinth the same as usual. There were about three thousand fingerling fish raised and put out principally to the schools and public places of Philadelphia.

Terrapin.

The red terrapin at this hatchery was again a failure, so far as hatching and young was concerned. The old ones continue to thrive. Besides they attract a great deal of attention by the people that come to visit the hatchery through the summer months. I think that we would have better results in the rearing of them if there could be a larger place fenced off for them to run in.

Proposed Improvements.

Owing to the increased demand for fish in this State and the rapid growth of the Department of Fisheries of Pennsylvania, the hatching house at this station is entirely inadequate for the work that is to be done at this hatchery. It being a frame building moved here from Bristol and not in the best of condition, I would recommend at your earliest convenience that there be a new hatching house built and the old one moved to a suitable spot where it could be used as a store house.

There will also have to be a new roof put on the barn. It will not last another summer.

There should also be a concrete or stone wall built along the Delaware River in front of the hatchery grounds to keep the high tides from cutting out the bank and also to beautify the front of the hatchery grounds.

I have found that the water from the springs along the hill on the west side of the adult sunfish and bass ponds is not sufficient through the summer months to supply the three small ponds which were built for the purpose of rearing frogs. I would suggest, with your permission, that they be filled up and also the balance of the lowland on the west side of the ponds up to Linden avenue, which would make a very pretty park along the ponds.

To replace these fry ponds there could be three very nice fry ponds made on the east side of the series of catfish ponds. One of these

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could be converted into a frog brood pond and another into a frog nursery pond and the third into a catfish fry pond, which is very much needed at this station. After the building of the three proposed fry ponds there cannot be any more ponds built at this station unless the hatchery grounds were enlarged, with the exception of two or three tidewater ponds, which might be built on the meadow or flats in front of the hatchery grounds, which would be quite expensive to build.

Again thanking you for your valuable suggestions and courtesies.

The output of fish from December 1, 1909, to November 30, 1910, is herewith attached.

Respectfully,

J. R. BERKHOUS,
Superintendent.

Fish Distributed from December 1, 1909, to November 30, 1910.

Yellow Perch Fry.

Bedford county,	1,200,000
Berks county,	5,400,000
Blair county,	900,000
Bucks county,	4,200,000
Cambria county,	6,600,000
Chester county,	8,700,000
Clearfield county,	600,000
Cumberland county,	8,100,000
Dauphin county,	6,300,000
Delaware county,	2,100,000
Huntingdon county,	2,100,000
Lancaster county,	1,500,000
Lebanon county,	300,000
Montgomery county,	6,000,000
Perry county,	1,500,000
Philadelphia county,	300,000
York county,	7,500,000
Planted in the Delaware River and tributaries thereof,	9,450,000
Total,	72,750,000
Fingerling yellow perch, Philadelphia county,	200

Shad Fry.

Planted in the Delaware River by Department of Fisheries,	19,000,000

Catfish, Fingerlings.

Adams county,	6,000
Allegheny county,	500
Bedford county,	500
Berks county,	35,000
Bucks county,	21,500

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Carbon county,	10,000
Centre county,	12,000
Chester county,	12,000
Cumberland county,	2,500
Dauphin county,	11,000
Delaware county,	10,000
Green county,	10,000
Lancaster county,	12,000
Lebanon county,	11,000
Lycoming county,	5,500
Montgomery county,	33,000
Northampton county,	2,500
Perry county,	1,500
Philadelphia county,	1,000
Snyder county,	500
Tioga county,	2,500
York county,	8,000
Planted in the Delaware River by the Department of Fisheries,	100,000
Total,	308,500

Large Mouth Bass, Advanced Fry.

Montgomery county,	4,000

Bass, Two Year Old.

New York City Aquarium,	25

Tadpoles.

Bedford county,	4,000
Berks county,	19,000
Bucks county,	1,000
Cambria county,	10,000
Chester county,	18,000
Dauphin county,	10,000
Lancaster county,	8,000
Montgomery county,	41,000
Perry county,	7,000
Somerset county,	2,000
York county,	5,000
Total,	125,000

Goldfish, Fingerlings.

Philadelphia county public schools and public places,	3,000

River Herring.

Planted by the Department of Fisheries in the Delaware River,	50,000

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Pickerel Fry.

Bedford county,	6,000,000
Berks county,	3,000,000
Blair county,	3,750,000
Bucks county,	1,500,000
Cambria county,	750,000
Chester county,	1,500,000
Clearfield county,	500,000
Huntingdon county,	1,750,000
Lancaster county,	1,500,000
Lebanon county,	4,750,000
Montgomery county,	1,000,000
Perry county,	2,250,000
York county,	2,500,000
Planted by the Department of Fisheries in Delaware River,	1,400,000
Total,	32,150,000

Wall-eyed Pike Fry.

Bedford county,	60,000
Berks county,	490,000
Blair county,	560,000
Cumberland county,	1,190,000
Dauphin county,	1,130,000
Huntingdon county,	1,120,000
Lancaster county,	1,064,000
Lebanon county,	364,000
Montgomery county,	560,000
Perry county,	350,000
York county,	1,540,000
Planted by the Department of Fisheries in Delaware River,	72,000
Total,	8,500,000

Sunfish, Fingerlings.

Adams county,	6,000
Bedford county,	1,000
Berks county,	45,000
Blair county,	500
Bucks county,	11,500
Cambria county,	12,000
Centre county,	2,500
Chester county,	24,500
Cumberland county,	1,000
Dauphin county,	17,000
Delaware county,	1,000
Huntingdon county,	500
Lancaster county,	13,000
Lebanon county,	6,500
Lycoming county,	21,500
Montgomery county,	42,500

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Perry county,	3,000
Philadelphia county,	1,000
Wayne county,	5,000
York county,	9,500
Planted by Department in Delaware River,	75,000
Fish retained for stock for Department,	25,000
Total,	324,500

Summary.

Yellow Perch, fry,	72,750,000
Yellow Perch, fingerlings,	200
Shad, fry,	19,000,000
Large Mouth Bass, advanced fry,	4,000
Large Mouth Bass, two year old,	25
Tadpoles,	125,000
Gold Fish, fingerlings,	3,000
River Herring,	50,000
Pickerel, fry,	32,150,000
Wall-eyed Pike, fry,	8,500,000
Catfish, fingerlings,	308,500
Sunfish, fingerlings,	324,500
Total,	133,215,225

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ERIE AUXILIARY, STATION NO. 6.

Report of A. G. Buller, Superintendent.

Hon. W. E. Meehan, Commissioner of Fisheries.

Sir: The following is my annual report from December 1, 1909, to November 30, 1910:

During December, 1909, I received from the Erie Station 49,187,000 lake herring eggs. These with those received in November made a total of 101,909,000 lake herring eggs in the hatchery. From these eggs were hatched 66,300,000 fry and the same were planted in Lake Erie.

The eggs began to hatch on the 28th day of March and on the 8th of April the last fry were planted. On account of this large number of eggs hatching in so short a time it was necessary to make two heavy shipments each day. It was gratfying to have so large a percentage of these eggs hatch.

December 2d and 12th I received 129,600 lake trout eggs. These eggs were collected from one of the tugs fishing out of Erie. Shortly after being put in the hatchery troughs they began showing the white spot. I did not hatch one fish from these eggs. During the month of April I received one case of wall-eyed pike eggs from Erie, but these eggs were also in a poor condition. From what I could learn the different Superintendents had the same experience with the wall-eyed pike eggs. Later in the month Mr. Hartman, Superintendent of the Erie Station, sent me 4,400,000 eyed eggs. My total distribution of this specie was 7,000,000.

I take pleasure in reporting the gathering of 20,000,000 yellow perch eggs from a pond at this hatchery. I also received 42,600,000 eggs from the Wayne county field, making in all 62,600,000 perch eggs. About the time the perch began to spawn I spent one day at Waterford. Through the kindness of Mr. J. F. King and a friend I was shown around the lake. My purpose was to find yellow perch spawn, but I failed to locate any. However, Mr. King and his friend, who are enthusiastic fishermen, volunteered to keep a lookout for spawn, but were unable to find any this season. I also spent a day at Lake Pleasant, but met with no success. We have been stocking these two lakes with young fish for several years and fish are showing aboundantly. I trust we will be able to gather eggs from these lakes next season.

In the month of April I received 26,640,000 chain pickerel eggs from the Wayne county field. These eggs are similar to the yellow perch eggs. There is a very small percentage of loss in the hatching of these eggs. As we have but the one battery at this station it was necessary to use the trout hatchery building to handle the large amount of eggs received.

I do not have a favorable report to give about the black bass work. May 24th I located the first bass nest. The weather was mild and the water had the proper temperature. About June 1st the temperature

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fell to very nearly freezing point, resulting in the entire loss of eggs that were on the nests at this time. By June 10th the water temperature raised and the fish began working again. As the larger number of fish had already spawned there were only a few nests of eggs hatched and these had very few fish. Before this severe cold weather the fry ponds were filled with small insects which furnished food for the small fry. When I was about to place the fry in these ponds I found there was not any food to be found, and as it is necessary for the young fry to have this natural food I decided to plant the fish in the streams at once.

I made one shipment of adult sunfish to Pittsburgh. These fish were placed in ponds at Schenley Park. I have a large number of young sunfish which I intended to distribute in November, but owing to the exceptionally early winter weather it has made it impossible to ship these fish until spring.

While the American Fisheries Society was in session in New York City, the Superintendents became interested in a new species of fish called pearl roach on exhibition in the New York Aquarium. We learned that this fish could be successfully kept in water of either high or low temperature. They are beautifully marked. We expressed our interest to Mr. Meehan and shortly after arriving home from New York I received a letter from him stating that Dr. Townsend, the Director of the aquarium, had agreed to furnish the Department of Fisheries with a liberal number of these fish. We were successful in obtaining 390, ranging from three to six inches in length.

I was instructed by Mr. Meehan to deliver twenty-five yearling small mouth bass that were hatched and reared at this station to the aquarium at New York City for the special exhibit of fish at the aquarium during the time the American Fisheries Society met at that place.

During the months of March, July and August I received four hundred blue gilled sunfish, sixty small mouth black bass and five hundred yellow perch as breeders from Erie.

At present we have 13,896,000 white fish eggs and 3,636,000 lake herring eggs gathered this autumn from Erie.

I have a few suggestions I wish to make which will improve the condition of the hatchery, also increase the output of fish. In the first place I feel we need another battery in the battery house and more fry tank room. As we are now situated, we must use the troughs in the trout hatchery for handling perch and pickerel eggs. This requires a great deal of extra work and the eggs are not as successfully hatched as in jars on the battery. I should like to suggest the purchase of a suitable net to be used in Lake LeBeouf. There has been a large number of muscalonge caught with hook and line in this lake, and I believe it possible to obtain a number of eggs for hatching.

The improvements made at the hatchery during the year are as follows: The dwelling house was painted. One pond 50 by 150 feet was completed, and another about one acre in size partly finished. We are unable to use horses in the digging of these ponds as it is too swampy. We also planted a large number of shade and fruit trees on the grounds, and graded additional ground. One section of the hatchery may now be said to be complete excepting for a small amount of grading along the driveway and the planting of a few more trees,

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Already this section presents the appearance of a long established hatchery and is attractive and parklike.

The above is respectfully submitted.

A. G. BULLER,
Superintendent.

FISH, ETC., DISTRIBUTED FROM DECEMBER 1, 1909, TO NOVEMBER 30, 1910.

Yellow Perch.

Bradford county,	3,672,000
Clearfield county,	4,320,000
Erie county,	16,956,000
Elk county,	2,160,000
Lycoming county,	14,256,000
Northumberland county,	1,080,000
Sullivan county,	4,860,000
Snyder county,	2,160,000
Tioga county,	9,504,000
Warren county,	2,700,000
Total,	61,668,000

Chain Pickerel.

Bradford county,	600,000
Crawford county,	2,000,000
Erie county,	13,000,000
Lycoming county,	9,200,000
Tioga county,	1,100,000
Total,	25,900,000

Wall-eyed Pike.

Crawford county,	250,000
Dauphin county,	1,125,000
Erie county,	625,000
Forest county,	125,000
Lycoming county,	3,750,000
Montour county,	125,000
Northumberland county,	250,000
Tioga county,	250,000
Warren county,	500,000
Total,	7,000,000

Sunfish.

Allegheny county,	1,000

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Small Mouth Bass.

Erie county,	5,000

Lake Herring.

Erie county,	66,300,000

Summary.

Yellow Perch, fry,	61,668,000
Sunfish, adults,	1,000
Chain Pickerel, fry,	25,900,000
Wall-eyed Pike, fry,	7,000,000
Small Mouth Bass, fry,	5,000
Lake Herring, fry,	66,300,000
Total,	160,874,000

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CRAWFORD HATCHERY, STATION NO. 7.

Report of W. H. Safford, Superintendent.

Hon. W. E. Meehan, Commissioner of Fisheries, Harrisburg, Pa.

Sir: I have the honor to submit the following as my report of the operations at the Crawford station for the year of 1910:

The output of fish for the year just ending is not quite half that of last year. This is entirely due to a short water supply last fall and lack of eggs from the field last spring. In my report to you for the year 1909 I called your attention to the excessive drought and shortage of water at that time. This continued so that we were unable to operate our battery during the winter of 1910. This made a shortage in our output of fish from at least fifteen to twenty millions. In the spring when we had plenty of water we only received about half of the eggs from the field of the yellow perch and pickerel that I am usually allotted. This again reduced our output many millions, so that while the number of fish hatched this year is not near as great as that of last the failure is not due to us, but to the elements alone.

In our pond propagation we have been very successful, especially with the small mouth bass. It is the most important species of fish propagated at this hatchery. The other hatching work was about the same as last year, with the exception of the frogs, the output of which is slightly reduced owing to the fact that only one pond was in use.

One new class of work was taken up here this year, but only in a preliminary manner—that of gathering muscallonge eggs from Conneaut Lake. In connection with our field work in Conneaut Lake, we took and developed the first wall-eyed pike eggs ever taken within the borders of the State.

While I am unable to report to you the building of any new ponds at this station the past year, the regular force has been kept very busy preparing the ground for a new and large bass pond next year. This began with the removal of a great many trees, brush cut and burned, and many stumps taken out. This, together with the routine work, such as cutting the lawns, cleaning of ponds, and other necessary work has taken the full measure of our time. Some needed repairs were made to the hatchery floor. The entire battery was painted and placed in condition ready to receive eggs. It is now in operation and we have about twenty million eggs.

Our water supply at present is abundant, and it is my earnest hope from now on we will have an ample supply. All buildings are in a state of good repair, with the exception of the hatchery, which needs a new floor and some little work on the foundation. The equipment, as you saw at your last official inspection, is in good shape. We need more ponds for the development of the station. Those now built are crowded to their fullest capacity, and some of them are too small for the class of work for which they are used. I would like to build in the

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coming year at least one pond for bass and one for yellow perch. This would give us the two ponds now occupied by this species of fish for fry ponds or other work.

The position in which our grounds are with respect to the water supply for the ponds renders it almost necessary that we make some different arrangements than those we have now. The depth of water in the ponds we have already constructed is as light as we dare to get along with. And as our pond extension takes place, it naturally follows that each pond will be a trifle shallower than the preceding one. The survey shows a difference of two feet from the lake level at the outlet to the present height of water in our ponds. This increase of two feet is absolutely impossible under our present manner of raising the water in Conneaut Lake outlet with the dam which we have. But by the laying of a water main from the lake to the hatchery grounds I am confident there would be a good depth of water in the ponds already built, and for those to be constructed in the future. In time of floods also, thick, muddy water would all be eliminated. Our present method is moreover rather dangerous. We have to constantly watch and continually repair the dam.

From present indications I look forward to a much larger output for the coming year than the one just passed, as the water flow in the hatching house is again normal.

Black Bass.

In the season just ended, notwithstanding adverse weather conditions, we had excellent success with our bass. In the early part of the season we lost some nests, but fortunately the majority of our bass was rather backward in their spawning. This accounts for our good year. The fry in some cases failed to raise from the nests, the result being weakness and starvation and causing some loss. Nevertheless, I have the pleasure of reporting a very substantial increase in this year's output over that of last.

Sunfish.

This year's output of sunfish is very satisfactory. The infusion of new stock has shown in the increase of fry. The pond holding these fish is one of our smallest ponds containing adult fish. Our output for this year is all that could be expected. I am very sorry that we have not a larger pond to propagate this most important little fish.

Yellow Perch.

Our yellow perch this year did not give us nearly the number of eggs they did in 1909. The loss of spawning fish the winter before greatly reduced the number of adult fish in the pond. This, together with the poor condition of a great many of those left, caused a shortage of the number of eggs cast. We have, however, some new stock fish now which I am hoping will give us the returns we are looking for.

Catfish.

The output of catfish this year, considering the size of the pond in which they are held and the number of stock fish, did very nicely. They practically doubled last year's output. While we were unable to fill all the applications on file at this station, I think we did very

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well in the amount shipped and planted. With the territory we cover from this station, I would suggest that we build a much larger pond for this species of fish. We have a great many streams in this part of the State that is particularly adapted to catfish.

Frogs.

The reduced number of frogs in our output of this year over that of last I account for, as I stated above, that only one pond was in condition to use. We had no loss of any kind other than normal. The one pond produced about the average amount possible for its area. I shall endeavor to repair the inclosure so we will be able to operate both ponds the coming year.

Field Work.

Acting under your orders, preparations were made last spring to start an important branch of field work out from this station. The purpose of the Department was to start the propagation of that valuable fish, the muscallonge. The net result of this work, so far as we went, was a success in every way. While the amount of eggs gathered last spring practically amounted to nothing, we found that plenty of spawning fish could be caught. This work being an unknown quantity we were not prepared for what was to come, or the large number of fish we would have to care for.

The majority of fish taken were males, and having no place in the lake to put them, it was found necessary to transfer them to the ponds at the hatchery. This was done by using large tanks hauled back and forth by wagon. This not only took a great deal of our time, but was sometimes injurious to the fish. The method of taking adult fish from the lake was with a trap net. This insured the fish to us in a perfect condition.

With your permission, it is my purpose to construct two or three holding crates and fasten them securely in some sheltered spot in the lake so that the fish, when taken from the net, if unripe, can be placed in the large tank in the boat and rowed to the crates and held until ready to spawn. This would take only a short time, and besides being better for the fish would mean much less work.

In connection with the muscallonge work, I was agreeably surprised at the large number of wall-eyed pike taken. This was unlooked for. The fish ran quite large. These were also taken to the ponds along with the muscallonge. From the number of fish caught we succeeded in taking about a million and a half of very fine eggs. As I stated before, last year being the very beginning of the work, the new net was not received in time to start with first of the spawning season. We really came in at the end of it. The coming year we will be prepared to put the nets in the water the moment the lake is clear of ice. I feel confident that as we go along we will be able to take a goodly number of not only the eggs of the muscallonge, but also those of the wall-eyed pike.

Exhibit of Fishes.

Under your directions, the third annual exhibit of fishes by the Department was given at the Conneaut Lake Agricultural Society. This was held at Exposition Park. It was an honor and a pleasure

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to have you personally open this exhibition. The great interest shown by the people who visited this exihibit makes it worthy of consideration.

American Fisheries Society.

I am glad to say that I had the pleasure of attending the meeting of the American Fisheries Society held in New York City the last week in September. It was one of the very best meetings I ever attended from an educational standpoint. The very able papers read, both on propagation of fishes and water pollution, was of great value to every fish culturist present.

Recommendations.

That the entire grounds be fenced as the annoyance from neighboring farm stock is one of our worst features. Considerable damage is done to the lawns and embankments by their tramping. I would also recommend for your consideration the laying of a water main of not less than twelve inches in diameter from the outlet at Conneaut Lake to the upper end of the hatchery grounds. The building of at least two more ponds for adult fishes, and the laying of a new floor in the hatchery building.

In closing my report, I have tried to give you as near as possible the entire workings of the station for the past year. Below will follow a tabulated statement of the different counties receiving fish and the number given to each. All of which I most respectfully submit.

Very respectfully yours,
W. H. SAFFORD,
Superintendent.

FISH, ETC., DISTRIBUTED FROM DECEMBER 1, 1909, TO NOVEMBER 30, 1910.

Bass.

Armstrong county,	7,000
Allegheny county,	7,500
Beaver county,	2,500
Butler county,	5,500
Crawford county (including Conneaut Lake),	13,900
Fayette county,	1,500
Green county,	12,000
Lawrence county,	14,500
Mercer county,	12,500
Somerset county,	2,000
Venango county,	15,500
Westmoreland county,	4,500
Washington county,	2,000
Total,	100,900

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Wall-Eyed Pike.

Allegheny county,	1,500,000
Butler county,	2,400,000
Beaver county,	1,050,000
Crawford county (including Conneaut Lake),	1,575,000
Fayette county,	1,125,000
Indiana county,	300,000
Lawrence county,	1,050,000
Mercer county,	675,000
Somerset county,	300,000
Venango county,	3,675,000
Westmoreland county,	375,000
Total,	14,025,000

Cat Fish.

Erie county,	30,000
Elk county,	18,000
Lawrence county,	4,000
Total,	52,000

Pickerel.

Allegheny county,	1,000,000
Butler county,	1,000,000
Beaver county,	500,000
Crawford county (including Conneaut Lake),	3,500,000
Fayette county,	1,000,000
Green county,	1,300,000
Lawrence county,	500,000
Mercer county,	1,300,000
Somerset county,	100,000
Venango county,	2,900,000
Westmoreland county,	350,000
Washington county,	600,000
Total,	14,050,000

Frogs.

Green county,	16,000
Lawrence county,	18,000

Yellow Perch.

Armstrong county,	1,000,000
Allegheny county,	1,000,000
Butler county,	1,600,000
Clarion county,	1,300,000
Crawford county (including Conneaut Lake),	1,500,000
Cambria county,	200,000
Fayette county,	1,250,000
Green county,	1,700,000
Indiana county,	350,000

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Lawrence county,	900,000
Mercer county,	1,250,000
Somerset county,	550,000
Venango county,	1,600,000
Washington county,	600,000
Westmoreland county,	450,000
Total,	15,250,000

Sun Fish.

Allegheny county (including City Pittsburg),	2,000
Butler county,	3,500
Crawford county (including Conneaut Lake),	50,000
Clarion county,	3,000
Fayette county,	5,000
Green county,	5,000
Lawrence county,	3,500
Mercer county,	5,500
Venango county,	2,000
Washington county,	6,000
Westmoreland county,	1,000
Total,	86,500

Summary.

Yellow Perch,	15,250,000
Pickerel,	14,050,000
Wall-Eyed Pike,	14,025,000
Bass,	100,900
Sun Fish,	86,500
Cat Fish,	52,000
Frogs,	18,000
Total,	43,582,400

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SPRUCE CREEK HATCHERY STATION NO. 8.

William F. Haas, Superintendent.

Hon. W. E. Meehan, Commissioner of Fisheries.

Sir: I have the honor to submit my fourth annual report dated from December 1st, 1909, to November 30th, 1910, inclusive. We have had a very satisfactory year on the Spruce Creek Hatchery. Our output of trout last spring was greater than the previous year and our take of eggs this fall was heavier than ever before. Our output of Brook Trout was 3,120,000, they were shipped to 22 counties, among them were several that were in the territory of the Bellefonte Hatchery. The principal one was Berks to which I shipped 180,000. The reason of this was that it was found easier for me to ship to Reading and south than for the Superintendent of the Bellefonte Hatchery. It was easier for him to reach the northern section of the county, by the way of Sunbury.

According to your special orders I shipped 250 mature trout to the Western Reserve University, Cleveland, Ohio, and 50 to the Columbia University, New York, for the use of the pathologists in their study of goitre. For the Department of Fisheries of Pennsylvania, I also shipped on special orders 200 mature trout for the show ponds on the grounds of the House of Refuge at Glen Mills.

At this point I would like to say that the new system which you put into practice this year of encouraging Camps of the United Sportsmen to make a single application only for each stream and ordering a number of cans to be sent on that application, instead of the old practice of a number of people applying for trout for one stream has been a great saving in money. It has also been a saving of time and much trouble. It has made it possible to ship our trout also much more quickly.

There are counties in which by the new system we have saved in postage alone more than $1.00 in a single shipment. I think it is safe to say that the saving of postage stamps alone was nearly $50.00.

The trout were fine, healthy and larger than usual and we finished shipping from the hatchery much earlier than last year, although we had more fish, and we began shipping later than last year. There were two reasons, first, because we had more cans, and, second, because of the saving in time in preparing for the shipping under the system.

I kept about one hundred thousand fingerlings to rear for breeding purposes. This I did under your orders in order to have a large stock of brood fish at the earliest possible moment, and to replace as quickly as possible the heavy loss which we had last fall from goitre and fungus, the latter from some parasite unknown at present to those who examine the fish.

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I am pleased to report that the number of cases of goitre is much less than last year, when I think three-fourths of my fish were more or less afflicted by the disease. At the present time not one fish in a dozen show any trace of the affliction. Those which had it and did not die from fungus, either have entirely recovered or are recovering. This condition I believe is due to having followed the directions of yourself and Dr. Marine of the Western Reserve University, Cleveland, Ohio. In his report to the Department of Fisheries Dr. Marine shows that goitre is usually caused by one of four things, viz: dirty ponds, overcrowded ponds, overfeeding with unnatural foods and insufficient water supply.

My ponds were not dirty; but were kept scrupulously clean neither was there an insufficient water supply and I did not think the ponds were over-crowded; but I did believe that up to the time of the discovery of the great number of cases of goitre, the fish were overfed, especially with liver. Unfortunately about the 1st of November at a time when feeding should have been reduced, it was necessary for me to go, under your orders, to one of the Commercial Hatcheries to take surplus eggs which had been given by the owner for State use. My men not being thoroughly experienced did not reduce the food supply and indeed increased it slightly. When I returned I found that the fish did not eat all that was given to them. It was then the goitre was discovered. At my request you visited the hatchery and an exhaustive investigation was made and at your suggestion the food supply was greatly reduced.

Later when Dr. Marine visited the hatchery the food supply was still further reduced and although I did not consider the fish overcrowded at Dr. Marine's suggestion I reduced the number per pond and gave even a more frequent pond cleaning. There was an immediate improvement after the first reduction in food and it was even more reduced when the food was further reduced and the number in the pond lessened. There are a few trout having the lump on the throat; but none of them has any sign of inflammation inside of the throat and I consider them well. At least they have no appearance of being sick, I understand from Dr. Marine that if the lump once forms it never disappears, even when the fish gets well.

There was a recurrence of fungus this autumn; but nothing like last year when we lost 200,000 fish certainly not more than 2,000 died this fall.

I believe myself that the great epidemic of goitre dated back of last year when they were overfed. I believe that it really began two years before, when the fish were in the troughs and we had an epidemic of what we called sore throat. This came about through my inexperience and lack of knowledge of the water of the hatchery; which had only been in existence for two years. With my troughs full of advanced fry, I flowed into them about the same quantity of water that is supplied to the troughs at the Corry Hatchery, where I learned my business. I did not take into account the difference of the water at Corry, which is very soft, while that at Spruce Creek Hatchery mildly hard.

At the time you warned me of something of the kind, but it was in shape of a suggestion that I increase the water depth of the troughs, this I did but with only slight improvement; subsequently the hatchery was visited by you and all the Superintendents and a

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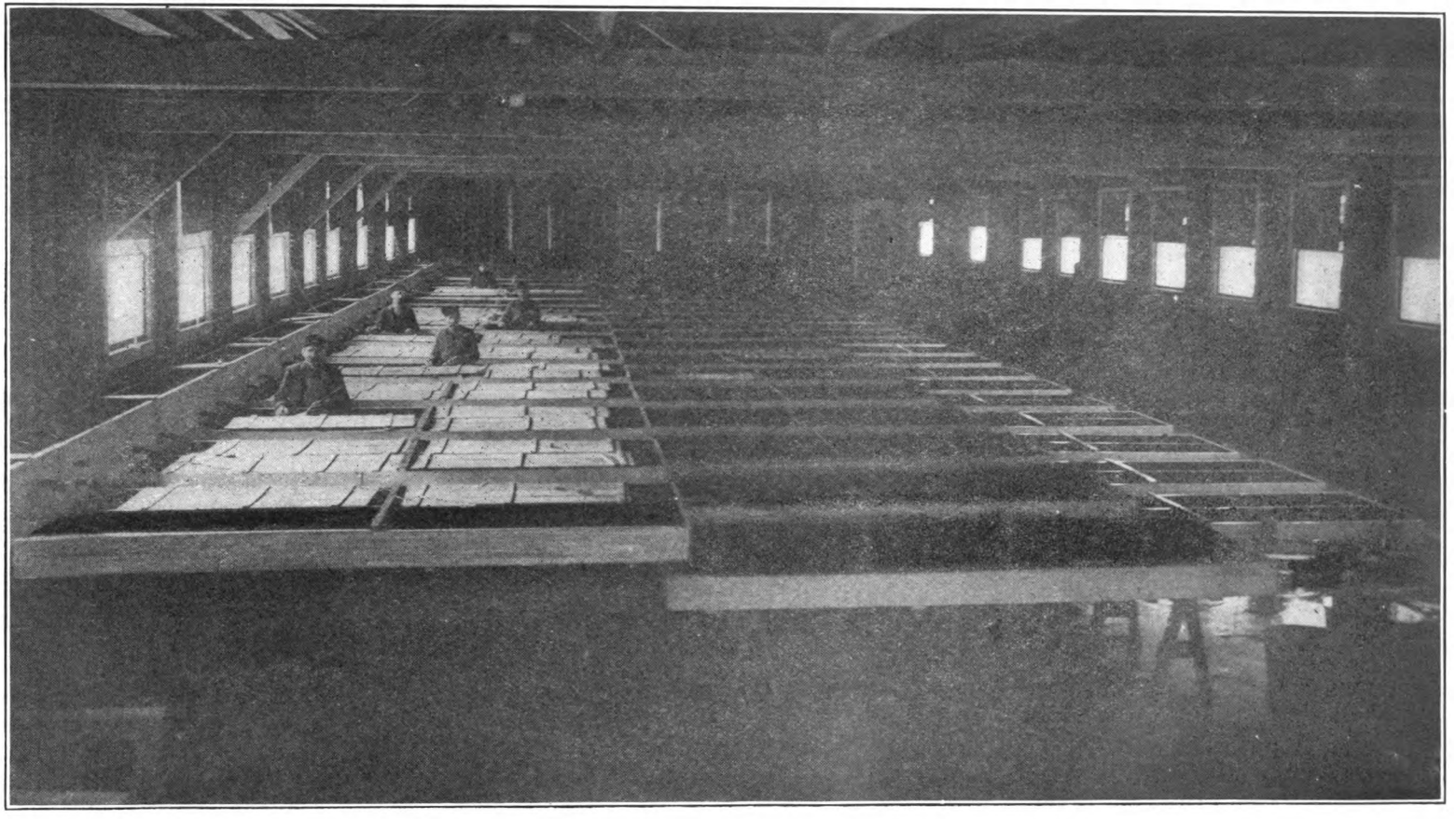

Interior Spruce Creek Hatching House. Eggs are in upper tier of troughs.

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conference was held, at which you presided, and the result was that the trouble was finally located and determined to be a lack of a volume. I increased it with the result that I have never since had sore throat among my advanced fry. The small volume which I at first used was an insufficient supply and sore throat developed. The sore throat I now believe was in reality the first stages of goitre. The sore throat spot was entirely different in appearance from that which is quite common among lake trout advanced fry.

The fish which we held back for breeding purposes were rather overcrowded in the fry ponds and as is customary were given all the food they would eat, in order to advance their growth, and this, if Dr. Marine is correct, would mean that the goitre developes and not decreased. While I have now knowledge, I believe that that parasite which bred the fungus developed from the boards which line our ponds. We tar the ponds and we cleanse them, but there is more or less slime which gathers and this must breed some form of life. I should like the wooden sides replaced with concrete as soon as possible.

Partly in consequence of our heavy loss of fish last winter we did not take as many eggs this fall, as we would have done otherwise. Although as I said in the beginning of my report, we took more altogether than the previous year; but that was because of the increased number of fish that into breeding. I am sorry to say that there was a very large percentage of males among our breeders. The number was very nearly 75 per cent. of the whole.

We have no means of distinguishing the sex among trout for the first year and a half of their life, excepting that as a rule the larger trout are usually male. We also had an unsually large amount of females among our two year old and three year old fish that were barren. We had very few "ringer eggs."

Last year when most of our eggs were received from a Commercial Hatchery, there was a large number of ringer eggs. This convinces me that ringer eggs are caused by overfeeding. It is the practice in Commercial Hatcheries to give the trout as much food as they can gorge, in order to promote a more rapid growth. A Commercial Hatchery trout at two years old is nearly as large as the State Hatchery fish at three years.

We had very few cases of bloody eggs and they were in the last run of fish. Our trout began spawning very late, our first eggs were taken October 15th, and the number was very small, only 15,000. Our three year old females gave surprisingly few eggs per fish, but they are unusually fine eggs, much larger and better. They were impregnated very easily. This year we abandoned the practice of letting the eggs stand from 20 minutes to one half hour before washing, but washed the eggs five minutes after they were impregnated.

Last year I experimented and reported to you that I had done this with great success and fertilized and hatched even more eggs per hundred than when the eggs were allowed to stand the usual time, before washing. I was led to make the experiment because, I had learned from you at one of the annual meetings of the Superintendents, that milt dies within three minutes after being taken from the male. That being the case I can see no use in letting the eggs stand longer than five minutes for they must be fertilized within the three.

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We took altogether 1,725,000 eggs from the fish on our own hatchery. We received from Bellefonte Hatchery 1,900,000 and we received as a gift from Weisport Commercial Hatchery 275,000, making in all 3,900,000 in the hatchery on December 1st, in all, about four hundred thousand eggs more than last year. Our percentage of hatch will be much larger, from the fact that all but 275,000 are from State Hatchery fish.

I have a number of lake trout, which this year are five years old and therefore of spawning age. To my disappointment I found all of about one-half dozen were males and the females show no signs whatever of eggs. The males however were all well supplied with milt. Our expectations of having lake trout eggs is therefore not realized. We lost most of the lake trout that would have been five years old on account of a flood two years ago. It tore out the ponds in which they were. I have one thousand three year old fish and about fifteen hundred two year old. These in time should give us a good supply of eggs.

Our oldest fish are much smaller than they would be on account of their having been kept in a small pond for the first two years of their life. The younger are placed in some of our largest ponds and those which are three years old are nearly as large as our five year old fish. Our two year old are fine, large, healthy specimens.

Two years ago you issued an order that the propagation of brown trout be resumed and directed also, a quantity of fish be sent me for breeding. I received several cans of fingerlings from the Corry Hatchery. These are now two years old and there are about four thousand of them.

They will reach maturity next year. These fish escaped the epidemic of goitre and fungus, not a single case was detected.

I also have eight thousand silver salmon which will complete their two years next March. In all my experience in fish culture I never knew a fish that will eat as much or which shows so much activity and leaping powers as the silver salmon. They swim around the ponds with great rapidity and are constantly springing from the water for a height of a foot or more. I find that in order to secure the most rapid growth they must have plenty of pond room and more than twice the amount of food that would be given trout of the same age. They now average about seven inches in length. I have no trouble whatever with them. They feed on the surface readily. The silver salmon is one of the prettiest fish I know. I feel confident of rearing them to spawning age.

The food problem was one which last winter and spring gave me great anxiety. The meat company from which I obtained sheep plucks raised the price to seven and one-half and asked three and one-half cents a pound for lungs, or equivalent to thirty-five cents for a pair of lungs. The price for lungs was prohibitive and I was forced to cut them out as an article of diet, although the best food for the trout. I notified you and you endeavored to secure a material reduction in price of the sheep plucks from the parties who were sending, but without avail. And in the meantime the meat bill ran up to $65.00 and sometimes $75.00 a month. As such prices would be beyond the appropriation we looked about for another source of supply and this autumn secured from an inde-

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pendent company sheep plucks at a reasonable price, as we had been paying seven and one-half and eight cents for beef lungs or twenty-seven cents less than we had been paying. By securing reduced prices we saved more than $25.00 a month on our meat bill.

Having no power we were compelled to grind all our meat for the fish by hand. This occupied two hours and one-half to three hours of two men's time, making the cost of food very high. During the summer a gasoline engine was installed for $165.00. By its use the meat required for all the fish is now prepared and cut in thirty minutes. This includes both sheep plucks and lungs. If we used all sheep plucks the work would be done in twelve minutes. We save $2.50 a week in the cost of preparing food. The cost of operating the engine is so small it cannot easily be figured out. The engine was installed in August, at which time we purchased five gallons of gasoline. On the first of December two gallons and one half remained, and the engine is operated every other day. We paid fourteen cents a gallon for the gasoline since the middle of August. The total cost of gasoline for operating the engine has been thirty-five cents.

We lost our entire stock of brood black bass, sun fish and catfish. About the early part of February these fish were taken from the ponds in which they belonged to the large lake trout pond, which I built last summer. They were moved because their own ponds had become clogged with mud and it was deemed desirable to freeze the bottoms and also to clean them. Early in February there came a sudden thaw and a heavy downfall of rain which created a flood in Spruce Creek. It was the heaviest flood in a number of years. It overflowed the banks of the stream and rose to within six inches of the top of the dyke.

About seven hundred feet below the upper end of the grounds there was a ten-inch terra cotta pipe laid from the creek to the upper end of the lake trout pond. The pipe had been hurriedly laid, and the ground not properly tamped, consequently when the flood came it washed away the sandy soil on each side of the pipe and undermined the dyke. A breech about ten feet wide resulted and the flood poured into the lake trout pond. The soil in the breast of the pond not being firmly settled was washed away at the outflow and the entire stock of bass, sun fish and catfish escaped. The loss of the fish was not serious since the whole number was not more than three hundred.

The tearing out of the lake trout pond, gave me an opportunity of deepening the upper end which was entirely too shallow. We dug out about a foot and repaired the pond and it now gives us nearly two feet in shoal water. It was designed to supply this pond with water from the creek and use it for old brook trout and the larger lake trout and return the water to the stream above a dam which tuns the bulk of the stream through a race way for the benefit of a grist mill about a quarter of a mile below.

The owner however was not satisfied and secured an injunction from the county court, which you believe to have been granted in opposition to well known water laws and you placed the matter in the hands of the Attorney General, who I understand holds the same opinion as you, and has taken an appeal to Superior Court. In the meantime out of respect to the county court, under your directions,

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I have not used any of the water from Spruce Creek; but keep the ponds supplied with what water I could spare from the springs on the grounds. This is insufficient to sustain trout throughout the summer, the water temperature in August rising to 74 degrees. Until we can use the creek water or obtain a sufficient supply of spring water elsewhere the pond cannot be used for any species of trout excepting during the winter and spring and if the creek or spring water obtained in sufficient quantity the pond can be used for the rearing of bass.

The flood of which I have just spoken carried with it much trash, among it was a large tree that swept down the stream roots first. It struck the bridge which spanned the creek just below the dwelling house. The impact was so great that the stringers were smashed and the bridge carried away. The new structure was built inside of two weeks. Mr. Isett, a neighbor, furnished the stringers at a nominal cost, another neighbor who owns a right of way and land furnished the planks and we put up the structure and furnished the remaining material, costing about $40.00. This was the only flood we had throughout the year.

We suspected the existence of several undeveloped springs above the one which supplies the hatchery and last winter and this spring we sought and found one which flowed a full two-inch pipe. We traced another which yields very nearly the same quantity and we started to trace another on the banks on the creek, which undeveloped as it is, yields a three-inch pipe of water. We have I think about located the spring. Next spring, I think when fully developed, it will yield a four-inch pipe of water. The two springs which we developed flow into a terra cotta pipe which empties the great lake trout pond. The water of the new spring still undeveloped will be used for the same purpose.

We made many improvements during the year. We built three trout ponds two of which are 40 feet long by 22 feet feet wide each, and one is 110 feet long by 22 feet wide. We not only completed these ponds, but filled in the hollows and graded the ground surrounding them. With the completion of the three new ponds we now have 28 trout ponds. This did not include the large lake trout pond.

Last year we started the building of a meat house 12 by 14 feet, but when winter came it was only half completed. This we finished in the spring, in it we have the gasoline engine and meat apparatus, a large refrigerator for the meat and also our grind stone. Besides building the ponds we did a large amount of grading and beautifying the property from the spring to about 100 feet below the hatching house and from the hillside to within a few feet of the dyke. Shades are build on all the ponds, and these are painted white with green edgings, we also extended the driveway and raised it about three feet at the entrance. The grounds are above normal high water, but not yet above flood.

We made 60 new trout trays; we made four new double troughs, making in all 58 for the hatching house, all with the two of the full number. The digging of all 400 feet of ditches to carry the new spring water from the spring to the head of the big lake trout pond, was the means of draining the swamp above the group of trout ponds and when the ground became dry I had it plowed and sowed with grass seed for a lawn until we desire to utilize it for other purposes.

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There is so much construction work to be done on the Spruce Creek Hatchery that will require broken stone, that I recommend the purchase of a stone breaker. At present we are compelled to buy all our broken stone from quarries about three miles from the hatchery, have it hauled by the railroad. By some queer kind of figuring instead of hauling the stone at once east to Spruce Creek Station, it is conveyed to Tyrone, five miles west of the quarries and then hauled to Spruce Creek, making a total of 13 miles from all which we have to pay freight, exceeded to an amount which by 10 cents a ton the original cost of the stone. This makes the crushed stone when delivered at the station 80 cents a ton. With a small stone crusher the whole cost would not be over 15 cents a ton and we would have in addition to the crushed stone the screenings for covering the road.

A tool house is also badly needed. Until this year we had a vacant space in the hatching house where we could do a little carpenter work and keep our tools. The new troughs will use this space and a carpenter and tool house will be useful.

The Superintendent's dwelling and the hatching house will need painting next year and the barn ought to be also enlarged and a wagon shed be built.

Appended to the report please find output of fish in detail.

Respectfully submitted,
W. F. HAAS,
Superintendent.

SPRUCE CREEK HATCHERY, STATION NO. 8.

Distribution of Fish from December 1st, 1909, to November 30th, 1910.

Brook Trout Fingerlings.

Allegheny county,	32,400
Berks county,	180,000
Blair county,	111,600
Bedford county,	85,200
Cambria county,	346,000
Cumberland county,	708,000
Dauphin county,	8,400
Fulton county,	148,800
Franklin county,	75,600
Fayette county,	124,800
Huntingdon county,	341,800
Indiana county,	106,800
Juniata county,	10,800
Lancaster county,	1,200
Lehigh county,	6,000
Mifflin county,	200,400
Northampton county,	40,800
Philadelphia county,	31,400

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Perry county,	24,000
Westmoreland county,	104,400
Somerset county,	168,000
York county,	262,800
Total,	3,119,200

Mature Trout.

Huntingdon county,	300
Total,	300

Scientific Institutions.

Columbia University,	50
Western Reserve University,	250
House Refuge, Glen Mills,	200
Total,	500

Summary.

Trout Fingerlings,	3,119,200
Trout, Mature,	300
Scientific Institutions,	500
Total,	3,120,000

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REPORT OF CHIEF WARDEN.

To the Board of Fishery Commission.

Gentlemen: I have the honor to herewith present my report as chief warden in conformity with the provisions of the Act of General Assembly approved the first day of May, A. D. 1909. The following is intended not only to report what has been done in the way of fish protection by the warden system of the Department of Fisheries, but in addition thereto to call to your attention existing conditions which cause an inestimable waste of fish life and which requires prompt action if the normal supply of fish as a food product shall be maintained in this State.

During the year stated our force consisted of eleven regular wardens, ten of whom received a salary, and one who volunteered his services without compensation. Two of the regular wardens receiving salary and also having charge of two very important districts in Pennsylvania, were transferred to field work and to assisting the work at the hatcheries during about half the period of the year, which has greatly crippled us in the work of protection in these districts, as well as the several districts throughout Pennsylvania.

It is observed, no doubt, that the present fish code permits the appointment of 30 regular wardens. To conform with this provision of the Act of Assembly referred to, and further realizing the fact that it is impossible for a warden to patrol and protect more than three counties, the State has been apportioned into 29 districts arranged according to the amount of work in a district. While many of the districts contain three counties, others in which there are a large number of streams, many of them inconvenient of access, consist of but two counties. I regret to state, however, that the Act of Assembly became a law after the Legislature had adjourned, when it was too late to ask for sufficient appropriation for the compensation of more than eleven wardens or one less than the number permitted by the previous Act of Assembly, therefore it has only been possible for us to place wardens in eleven districts of the twenty-nine districts stated, and eighteen districts of the apportionment remain practically unpatroled.

The only protection that it was possible to give to districts not having a regular warden was confined to specific reports of violation coming from the unprotected districts. In such cases an adjoining warden was detailed to go into such vacant district and investigate the complaint and institute the necessary proceedings against the violator.

During the year the Department commissioned eighty-one special wardens in different parts of the State which appeared to have a good moral effect on the violators in the respective communities in which the specials were located, although but ten arrests were made during the year by special wardens. As the present fish code provides for no remuneration to the special warden it was impossible

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to expect them to spend a considerable length of time in the work of protection, therefore the work depended upon the regular wardens almost exclusively.

The total number of arrests made for violation of the fish laws from December 1, 1909, to November 30, 1910, were 280, of which 255 were convicted and 25 were acquitted. The amount of fines imposed during the year was $6,074, of which sum $3,877 was paid. During the year there were twenty-three appeals from the Justice's decision to the Court of Quarter Sessions, and sixteen of those convicted were committed to jail in lieu of the payment of the imposed fines.

Two hundred and seventeen arrests were made by the regular wardens, ten by special wardens, and 53 by the state police and constables.

The following itemized tables will show the work in detail:

Summary.

Total number of arrests,	280
Total number of convictions,	255
Total number of acquittals,	25
Total number of fines imposed,	$6,074 00
Total number of fines paid,	3,877 00
Total number of appeals,	23
Total number committed to jail,	16

REGULAR WARDENS.

Name.	Arrests.	Convictions.	Acquittals.	Fines imposed.	Fines paid.	Appeals.	Jail.
J. W. Criswell,	19	16	3	$450	$390	--------	3
C. H. Nesley,	40	40	--------	750	415	--------	2
E. H. Stephen,	15	10	5	310	120	3	--------
W. E. Shoemaker,	40	38	2	685	515	--------	5
C. R. Holland,	13	11	2	400	175	7	--------
Raymond Marcy,	23	23	--------	585	40	4	3
J. E. Conklin,	2	2	--------	30	30	--------	--------
J. P. Albert,	19	14	5	470	470	--------	--------
J. D. Sizer,	16	16	--------	72	32	--------	--------
C. F. Gehman,	6	6	--------	250	150	1	--------
F. B. Whiteman,	24	24	--------	470	260	--------	2
Total,	217	200	17	$4,472	$2,597	15	15

Disposition of Fines.

Fines imposed,	$4,472 00	
Served in jail,	----------	$900 00
Appealed to court,	----------	765 00
Reversed by court or settled for costs,	----------	210 00
	----------	$1,875 00

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SPECIAL WARDENS.

Name.	Arrests.	Convictions.	Acquittals.	Fines imposed.	Fines paid.	Appeals.	Jail.
Wm. Rinkenberger,	1	1		$100 00		1	
Wm. J. Acker,	4	3	1	60 00	$60 00		
W. R. Jordan,	2	2		50 00	50 00		
Boyd L. Osler,	1	1		20 00			1
John Allison,	2	2		20 00	20 00		
Total,	10	9	1	$250 00	$130 00		1

Note.—The difference between the amount of fines imposed and the amount paid is due to the fact that in one case there was an appeal of $100 and one case the defendant went to jail, $20, which makes $120, leaving $130 received by payment.

STATE POLICE AND CONSTABLES.

Name.	Arrests.	Convictions.	Acquittals.	Fines imposed.	Fines paid.	Appeals.	Jail.
State police,	18	12	6	$200 00	$200 00		
J. W. Edwards,	3	3		60 00		3	
John Benson,	1	1		20 00	20 00		
John Heslop,	2	2		40 00	40 00		
A. M. Cornman,	2	2		200 00	200 00		
F. M. Liverman,	1	1		20 00	20 00		
S. H. Stair,	4	4		40 00		4	
Clyde Chaplin,	3	3		60 00	60 00		
Ernest Emory,	1	1		20 00	20 00		
E. H. Reed,	1	1		20 00	20 00		
W. M. Hilty,	1	1		100 00	100 00		
W. H. Weiss,	2	2		40 00	40 00		
Clyde Smith,	3	2	1	2 00			
H. N. Leacock,	1	1		10 00	10 00		
Wm. A. Snyder,	4	4					
J. D. Crostwaite,	1	1		20 00	20 00		
Wm. F. Smith,	5	5		500 00	400 00		
Total,	53	46	7	$1,352 00	$1,150 00	7	

Fines imposed,	$1,352 00	
Appeals,		$100 00

Table of Violations.

Dynamiting,	27
Netting trout,	16
Seine net,	31
Gill net,	2
Fyke net,	7
Dip net,	13
Cast net,	2

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Trammel net,	4
Layout line,	21
Spear,	30
Shooting fish,	5
Taking fish with hands,	4
Game fish out of season,	21
Short trout,	6
Short bass,	12
Selling trout,	3
Snaring fish,	5
Gigging bass,	1
Short perch,	9
Fish basket,	17
Short pickerel,	5
Fyke net in trout streams,	8
Devices not specified,	5
Sunday fishing,	11
Pollution of streams,	9
Resisting wardens,	3
Tip-ups,	4
Total,	281

Careful investigation, as well as the reports from the regular wardens, show a marked decrease of violations in the districts regularly patroled by the wardens. The frequent appearance of the wardens along the streams in their respective districts has had a marked and good effect on those who are inclined to violate the law, and many violations were prevented in this manner. Reports further show that violations remain up to the standard, if not actually on the increase, in the districts having no wardens and not regularly patroled.

Many of the arrests now on record for this year were made on reports received from the districts having no wardens. This shows conclusively the moral effect upon the community. When it is known that a warden is patroling the streams regularly people will not risk violating the law. This condition, it appears to me, is more to be desired than a large number of arrests, for prevention is better than prosecution and by prevention fish are in the streams for legal capture.

Therefore it is earnestly hoped and urged that the next Assembly will appropriate a sufficient amount of money for the protection of fish to enable us to place a regular warden in every one of the now vacant districts. By so doing the violations throughout the entire State will be reduced to a minimum and a large percentage of fishes now being destroyed by illegal means and methods will be protected and permitted to remain in the streams which will do much towards keeping up a normal supply in the waters of this State.

An attempt to patrol the entire State with the few wardens now on regular duty would reduce the efficiency of the protection in the districts now occupied by them. We deem it therefore advisable to properly patrol a portion of the State rather than to attempt to patrol the whole of it, for such an attempt would reduce the amount

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of protection that is now given to the patroled districts, bringing the whole State to such a level in its protection than the law would be slightly regarded.

I am further glad to be able to report that the violations of the fish laws on Lake Erie, within the jurisdiction of Pennsylvania, have been reduced to a minimum, largely through the vigilant work of Pennsylvania's patrol boat, the Commodore Perry. During the past year there has been practically no violations of the fish laws on Lake Erie.

I am glad to be able to report that the conduct of the wardens, both regular and special, has been all that could be desired. No complaints have been received at this office charging any of the wardens with improper conduct of any kind.

I deem it my duty to call to the attention of your Honorable Board existing facts pertaining to the rapid decrease of fish life in the great majority of the streams in this State not inhabited by brook trout and the natural lakes. I believe the time has come to decide if the streams of Pennsylvania shall permanently contain at least a moderate supply of fish life to assist by natural propagation the production of the most desirable food supply, or whether such supply shall depend exclusively upon artificial propagation, by placing fish obtained from the State hatcheries into the streams to remain for a brief period of time and then to be removed again for food when they have attained a scanty edible size.

I regret to state that there are many streams suited for fish life and free from industrial pollution in which fish life is practically if not totally extinct. Such streams are nearly all in sections in which certain destructive legal devices are excessively used. The obtainable cause seems to point conclusively to excessive wastefulness. A limited restriction in the methods and quantities of fish taken would do much to remedy this. The principal source of waste of fish life seem to point directly to the use of the fish basket, spears or gigs, the unrestricted taking of minnows, the use of small mesh nets and the use of nets during the spawning period.

The fish basket no doubt has done more to cause the reduction of the normal supply of fish in the stream than any of the devices mentioned. In fact, from its present construction it is impossible for the small fish, which must be depended upon to maintain the future normal supply, to pass through and live. Considering the fact that the average number of these devices yearly screening the waters of the Commonwealth are about one thousand, and all in one section of the State, it is easy to understand the vast destruction of the small fish in the waters which go to perpetuate the supply of this food product.

Another waste of this food supply worthy of mention is that of the catching and destroying of the immature eel. Reports show, as well as my personal observation, that in hundreds of cases this year, as well as in former years, that much of the food supply furnished entirely by the eel industry of the State is being wasted through the taking of eels that have not developed to maturity. In fact, 80 per cent. of the number of eels taken with this device are less than one year old and when cleaned average in weight about two ounces. The normal eel taken from the stream should weigh at least a pound, which should be the weight of an eel three years old.

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It will be observed, therefore, that the taking of the small and immature eel that is being practiced at present throughout the State will only realize about 12½ per cent. of this supply of a most desirable food product; that about 87½ per cent. of the normal supply of this product is wasted through the reckless manner of taking them.

During the two years just passed the gig or spear has been a close second in its work of destruction of the use of the fish basket. The extreme drought during both seasons referred to has caused the gig to be a most dangerous device for the taking of fish. In fact, the majority of the streams of this State have been so low that the fish had very scanty means of protection, and while collected in the small shallow pools of the streams they could be picked from the water by the use of the gig about as readily as they could have been picked if they were lying on the shore. I regret to state that this method of taking fish, even under this deplorable condition, was very extensively practiced, so extensively in fact that many streams, which a few years ago were ideal for fishing, is now practically, if not totally, barren of fish life, and if these streams are again to be inhabited it will be necessary to re-establish the normal supply exclusively by artificial stocking.

Another deporable source of waste is the taking of fish of any kind during or just preceding the spawning period for such fish. By so doing many millions of eggs are wasted and destroyed entirely. This is to be greatly regretted as nothing has a greater tendency to reduce the normal supply than the extensive wasting of the spawn that would be otherwise deposited to aid in the making up of the future supply.

I earnestly urge that prompt action be taken to prevent the wasting of fish life referred to. The conclusive proof that the rapid destruction and inevitable extinction of fish life by these devices and methods is the fact that waters in which these devices are forbidden, or waters which make it impossible to use these devices, are maintaining a normal supply of fish. In fact, many of them are on the increase.

The trout streams in which fishing with devices other than rod, hook and line is forbidden is maintaining a fair supply of fish, notwithstanding the excessive drought of the last three years. Natural lakes that are too deep and unsuited for the use of the devices referred to are maintaining a normal supply of fish. Deep power or mill dams also show by the quantity of fish still remaining in them that the devices referred to are responsible for existing conditions.

Investigations show that the native fishes which in fact make up the bulk of the annual food product are the first to suffer by the reckless manner of wasting the fish. In fact, the belief prevailed throughout the State that there is scanty or in fact no protection for certain of this type of fish.

While the game fish in many cases have not been illegally taken by destructive devices, the undisputable effects have been the destruction of the food supply for the game or carnivorous fishes. Carnivorous fishes feed most exclusively on the minnow, the small of their own kind and other living water life. The destruction of the commoner native fishes means the destruction of the food supply for the carnivorous species of fishes which in turn has compelled the carnivorous fishes to feed more abundantly upon their own young, thereby creating the extinction of their own race as well as the native fishes of the stream. We trust that no effort shall be spared in the bringing about

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of such restrictions as will again create a normal supply of fishes in the streams.

I also desire to further recommend for the protection of fish life the passage of a law requiring all persons who are not citizens of the United States and non-residents of the Commonwealth of Pennsylvania to pay a license fee of not less than $10 before they are permitted to fish in the waters of this Commonwealth.

THE POLLUTION OF STREAMS.

It is very gratifying to me to be able to report very satisfactory progress in the way of purifying the streams and waters of the State from pollution by industrial waste. During the past year the greatest achievement no doubt has been that of the devising effective methods for purifying and removing the varied objectionable materials. While the work has in no wise arrived at a stage of perfection, but is still a subject for experiment, the numerous personally conducted experiments have enabled us to classify and arrange the several kinds of material into groups, having like properties and likewise requiring similar methods for their purification or removal.

The methods thus far employed are filtration, neutralization, precipitation and decomposition. Experiments fully demonstrate that no single method can be adopted to dispose of the varied deleterious substances owing to the nature of the widely different chemical properties of which the waste material is composed. It is also frequently necessary to combine two or more of these methods to accomplish satisfactory results.

The filter occupies a very important place in the process of removing objectionable waste material, and it should almost invariably be included in the purification plant, as it appears to be the only known method to separate solids as well as all suspended matter from mechanical mixtures. A filter will not, however, remove free acids or alkalies from water. Such material must be transferred into other compounds or a filter will be of little value.

It is equally useless to attempt to remove dye stuff and particularly analine dyes by use of a sink or settling pond, for dyes will not settle to the bottom, but will remain suspended indefinitely. Experiments have shown it to remain suspended for a year without perceptible change.

The use of sinks and settling ponds should be discouraged, if not forbidden. While it does not come within the jurisdiction of the Department of Fisheries to forbid the use of sinks and settling ponds as the Department's jurisdiction is limited to the condition of the refuse when it enters the stream, the Department will not accept the sink and the settling pond as a satisfactory method of purification, neither can it be considered a reasonable means of removing suspended waste material. Further, this method is most dangerous as the refuse is likely to follow the strata and get into the course of water used for domestic purposes and untold injury to humanity and animals is most sure to follow.

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FREE ACIDS AND ALKALIES.

The varieties of pollution that are the most injurious to human, animal and fish life are those that contain free acids or alkalies, and in many cases they are the most difficult to detect by observation alone as both materials are practically colorless when in solution. These methods, in most cases, require special processes in their purification inasmuch as they cannot be removed by filtration. The best methods of removing them can only be determined after ascertaining the nature of the waste material which contain them.

During the year just ended nine arrests have been made for the pollution of streams of this State. Notwithstanding this small number of arrests, much has been done in the work of abating pollution from the various establishments by the installing of purification plants after the manner most suited to dispose of the particular kind of waste being deposited into the streams. Many industrial establishments on receipt of a notice either given by the Department or the Department's district warden, at once proceeded to install plants designed to meet the individual requirements approved by the Department of Fisheries, thereby either totally abating the pollution or removing the principal portion of the objectionable material as to render it practically fit for fish life.

Among the industrial establishments who have totally abated the pollution or have greatly improved the condition of the same are to be found tanneries, paper mills, dyeing establishments, gas houses, saw mills, chemical works and creameries. While much still remains to be done in the work of purification a noticeable improvement has been made in the condition of a great majority of the worst polluted streams of the State.

Respectfully submitted,

J. W. CRISWELL,
Chief Warden.

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COURT DECISIONS.

During the year there were various questions arose as to the interpretation of the Act of May 1, 1909, but in the comparatively short time between the passage of the Act and the making of this report there were few of the questions that reached a final decision. The most important case, however, while not brought under the fish law was the water case at Butler, where the Courts decided that the rights of the public are superior to those of individuals. This decision is a far-reaching one and carried out to its logical conclusion will do much to clear the way for the public to enjoy their rights to take fish in the waters of the State without being harassed by a petty suit for trespass.

A QUESTION OF TRESPASS.

The right of the public to fish in the various waters of the Commonwealth has long been one of much interest. The various acts in regard to fish have attempted to prescribe the rights of the public, but as yet have never met the question entirely to the satisfaction of everyone. In the Act of May 1, 1909, a paragraph was inserted in which an attempt was made to further extend the rights of the public to fish from the banks or bed of a stream without subjecting the angler to the drastic penalties of the Trespass Act of 1905.

It is recognized that the Commonwealth has no right to deprive a man of his property without due compensation of law, and his right of property covers his dominion over that property, so that he at least can hold anyone responsible for any possible damage that an outsider occupying or crossing his land may do. The Act of 1909, therefore, in prescribing the rights of persons to fish on other person's land distinctly states that such persons shall be liable for any damage whatever that they may do.

In June last after the passage of the Act of May 1, 1909, an angler fished in Lake Sabula, an artificial pond in Clearfield county. The land was posted under the provisions of the Act of 1905, and the angler was arrested and fined $10 by the Justice of the Peace. An appeal was taken to the Court of Quarter Sessions under the claim that the case was covered by the Act of May 1, 1909, superceding the Act of 1905. The Court decided that the case did not come under the provisions of the Act of 1909. The following is the opinion of the Court:

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Commonwealth of Pennsylvania, vs. C. E. Swartz.	In the Court of Quarter Sessions of Clearfield County. No. 46 September Session, 1909. Sur Appeal from Summary Conviction.

OPINION.

The defendant was arrested, tried and convicted before S. M. T. Barclay, Esq., of DuBois, of trespassing upon land of John E. DuBois, posted as private property under the Act of April 14, 1905, P. L. 169. From the judgment of the magistrate, upon due allowance by the Court, the defendant appealed, and the cause heard in a Court of Quarter Sessions at the June Argument Court of 1910.

From the testimony offered the following facts appear:

First: That John E. DuBois owns a large tract of land, situate in Sandy township, Clearfield county, Pennsylvania, near what is known as Sabula, through which land originally ran a small stream of water tributary to Sandy Creek. That many years ago the present owner, or his predecessor in title, for the purpose of erecting a splash dam, threw a breastwork across the said stream near the town of Sabula and between the hills abutting said stream, so as to create there an artificial lake or dam nearly a mile in length and nearly a quarter of a mile in width. That said dam was used by the owners thereof during the life of the lumbering business in that locality for the purpose of a splash dam for floating logs in said small stream down said stream to the mill of the owner. That after the business of logging had ceased, some years ago, the present owner, John E. DuBois, continued to maintain and keep in order the said splash dam as an artificial lake for pleasure purposes, and has expended thereon a considerable sum of money in removing stumps, logs, rubbish, etc., and in making it a beautiful lake for his own pleasure and the pleasure of others to whom he grants the privilege of locating thereon. That the Sabula Outing Club, composed of residents of the borough of DuBois, have privileges granted them from the said John E. DuBois and have, in pursuance of said privilege, erected along one side of the said artificial lake a considerable number of cottages, in which they reside during the summer months. That on one side of said artificial lake a public road traverses, which is distant from the water's edge from twenty-eight to two hundred feet, along which space of ground the owners or the licensees have made improvements by putting the same in grass, planting trees, etc., so as to add to the beauty of the surroundings.

Second. That on or about the 15th day of June, 1909, the owner, John E. DuBois, had notices to trespassers posted around said dam, which read as follows:

"Notice to Trespassers.

"This land is private property and all persons are warned not to trespass thereon under the penalty of the Act of 14th of April, 1905. (Signed) John E. DuBois."

In addition thereto the Sabula Outing Club employed D. S. Knarr as workman engaged in clearing out, working about and beautifying the said artificial lake and grounds adjacent thereto, and as watch-

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man to protect the interests of the said owner and occupants from trespassers thereon.

Third. That on the 30th day of June, 1909, C. E. Swartz, the defendant in this case, went upon said premises regardless of the notices to trespassers theretofore posted and also after being warned by D. S. Knarr, the watchman, that it was private property and told to get off, and fished in said artificial lake for several hours; for which trespass he was arrested under and by virtue of the Act of 1905 aforesaid. That upon being notified by said watchman and his attention called to the notices to trespassers posted upon the premises, he stated that he would not leave the said premises and would remain until he was ready to leave, and that he was there to test the law with respect to such notice.

Fourth. That the stream on which said artificial lake was created was *not* shown by any evidence to be declared a public stream or a public water by virtue of any Act of Assembly in the State of Pennsylvania, and is not in fact a navigable stream.

Fifth. That there is no evidence in the cause to show that the said artificial lake, or the stream of which it is a part, has ever been stocked by fish from the State Hatcheries upon the written application of the owner or occupants of the said land, and we therefore find that the said stream has not been so stocked from the public hatcheries.

Sixth. That the said C. E. Swartz did not have any grant or permissive right from the owner to fish in the said artificial lake or dam on the 30th day of June, 1909, and that he, as a part of the general public, have never acquired any right of fishing in said stream by virtue of any law of this Commonwealth.

The following requests for findings of facts were submitted by Counsel and will now be passed upon.

The Commonwealth submits the following requests for Findings of Facts:

"First. John E. DuBois is the owner of a large piece of land, situate in Sandy township, Clearfield county and State of Pennsylvania, upon which is a large dam of upwards of a mile in length, and of considerable width, created by throwing a breastwork across a small stream, which produces the dam, and which dam was constructed upwards of thirty years ago."

Affirmed.

"Second. On or about the 15th day of June, 1909, John E. DuBois had notices to trespassers posted around said dam, which read as follows: 'Notice to Trespassers. This land is private property and all persons are warned not to trespass thereon, under the Act of 14th of April, 1905. John E. DuBois.' And the Sabula Outing Club had employed a man to look after said premises as well as to clear up the land around said pond."

Affirmed.

"Third. That the said John E. DuBois had cleared the premises therein by removing logs, stumps, rubbish, etc., on which he expended a large amount of money and along either side of the dam were two small groves, and shade trees had been planted along the left hand side thereof between the public highway and the water."

Affirmed.

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"Fourth. That on the 30th day of June, 1909, Charles E. Swartz, the defendant in this case, went on said premises, regardless of said notices, and after being warned by D. S. Knarr, the watchman, that it was private property and told to get off, he stated that he would not go, and would remain as long as he wanted to and did remain till noon, when he was about to take the train to Sabula, when arrested."
Affirmed.

"Fifth. That there were no fish in said pond furnished by the Fishery Department of the State of Pennsylvania."
Affirmed.

"Sixth. That said dam was artificial pond created on a small stream by the constructing of the breastwork across the stream and it is on the premises of John E. DuBois, claimant in this suit."
Affirmed.

"Seventh. Said Charles E. Swartz, the defendant in this case, committed a wilful trespass on the premises of John E. DuBois on the 30th day of June, 1909."
Affirmed.

Defendant's Requests for Finding of Fact.

"1. That the defendant did no damage to the property of John E. DuBois."
Affirmed, in that no special damage to the property of John E. DuBois was shown. This, however, is immaterial, as we look at it, to the consideration of the case.

"2. That the stream in which he was fishing is a public stream and has been fished for more than thirty years by whomever desired to fish it without opposition or question by the owner or any other person."
Refused. There is no evidence in the cause to show that this stream was ever a public stream or even declared navigable, as many such streams are declared, by Act of Assembly. There was testimony in the cause to show that for many years the stream, as well as the dam, have been used by the public for fishing purposes without any protest on the part of the owner. This finding, however, as to user, as we look at this case, is immaterial to its consideration.

"3. That said stream was stocked with fish by some person and so far as the testimony in this case shows probably with fish procured from the State of Pennsylvania."
Refused. There is testimony to show that the stream was stocked with bass some years ago by some person, but there is nothing to show that it was by the owner or with his consent, nor is there anything to show that the fish planted were from the fish hatcheries of the State of Pennsylvania or sent out under any application by any person having a direct interest in the maintenance of said pond as a public fishing ground.

THE LAW.

The following propositions of law are believed to be applicable to the case in hand:

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First. That the defendant, C. E. Swartz, in going upon the premises of John E. DuBois, on the 30th day of June, 1909, in violation of the posted notices on said premises warning trespassers against so doing, and in violation of the personal warning of the watchman placed there for that purpose, and in having refused to leave when requested and declaring his purpose to stay thereon in order to test the law, committed a wilful trespass and is liable to the penalty provided by the Act of 1905.

Second. That the Act of 1st of May, A. D. 1909, P. L. 353, section 19, has no application to the case in hand as a defense available for the defendant in this case, for the following reasons:

1. There is nothing to show that this stream is a public water of the Commonwealth or water within the forestry reserves belonging to the Commonwealth.

2. That this artificial lake or dam and the ground which it covers are the subjects of private ownership and there is nothing in the case to show that any written application for stocking the same was ever made by the owner or occupants, so as to make it liable for public fishing under the third paragraph of the said section 19 of the Act of 1909, thereby so as to relieve the defendant from responsibility as a trespasser under the Act of 1905.

3. That this artificial lake or dam does not come within the class of waters provided for in the fourth paragraph of said section 19, in that the owner is both a resident and is known. And further that the provisos to the third paragraph are not applicable to the conditions of classification of waters made by the fourth paragraph of said act. Waters whose owners "by habit and custom permit the public to fish therein" are, inter alia, made the fourth class entitled to free distribution of fish, but in no sense does said paragraph attempt to give the general public fishing rights over such waters without the consent of the owner. If it did so attempt, it would be in violation of the constitutional right of owners of private property and a taking of such private property without compensation.

The following requests for Findings of Law were presented and will now be passed upon.

Commonwealth's Requests:

"First. The defendant, having committed a wilful trespass on the premises of John E. DuBois on the 30th day of June, 1909, is subject to the penalties provided by the Act of 14th of April, 1905." Affirmed.

Second. Notices having been duly posted on the said premises by John E. DuBois, the owner thereof, and the defendant having been personally warned by D. S. Knarr that he was trespassing on private property and having refused to leave when requested to do so, committed a wilful trespass by going on and remaining on said premises, after such notice, and should pay the maximum penalty of ten dollars ($10.00)." Affirmed.

Defendant's Requests:

"1. That the Trespass Act of 1905, under which the defendant was prosecuted, is not applicable to the facts of this case."

Refused.

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"2. That the defendant had a right to fish in said waters, being liable only for the damages to the land that the owner might sustain."
Refused.

"3. That the general fish and game law of 1909 repeals that part of the Trespass Act of 1905, so far as it applies to the facts in this case."
Refused.

"4. That under the law and the facts, the defendant is not guilty and should be discharged."
Refused.

DISCUSSION.

None of the facts in this case were seriously disputed. The defendant knowingly and intentionally trespassing on the property of the prosecutor, John E. DuBois, for the deliberate purpose of testing the law as to his right so to do. His act, therefore, was wilful and clearly within the meaning of the Act of 14th of April, 1905, which was passed for the protection of owners from trespassers of this character. The only serious defense set up was that someone years ago had placed in this artificial lake bass obtained from some place not shown in the testimony. There is nothing to show that this was done by or with the consent of the owner, John E. DuBois, neither is there anything to show that he ever made any application to the Fisheries Department for the stocking of this dam or lake. The evident intent and purpose of much of the testimony offered on behalf of the defendant was to bring the defense in this case within the provisions of the third and fourth paragraph of section 19 of the Act of 1st of May, 1909. This section provides and makes it the duty of the Commissioner of Fisheries to make free distribution of fish produced at the State Fish Hatcheries or otherwise required to certain objects in the order of preference: First, to public waters; second, to public school authorities and for scientific purposes; and, third, "to the waters within this Commonwealth, of which the bed and banks are the subject of private ownership, upon the written application of one or more of the owners or lawful occupants thereof: Provided, that such waters be suitable for the fish applied for, and that the applicant or applicants shall agree, in such application, to allow lawful fishing by the public in the waters over their lands which are planted with fish upon such application, and that they, the said applicants, shall have and claim no right to eject or molest any persons lawfully fishing on their lands, on the banks of or over such waters, in a peaceful and orderly manner: Provided, that during the open season for game or food fish the owner, lessee, or occupant of the real estate through which or over which the stream so stocked with game or food fish shall pass, or the owner, lessee, or occupant of the bank of any natural lake or pond so stocked with game or food fish, shall hereafter not have the authority to forbid fishing along the banks or in the said stream or waters; but the person or persons so fishing shall be liable in trespass for any and all damage which he or they may do the said real estate or other property: Provided, further, that all persons fishing on or over the land of others, by virtue of the provisions hereof, shall be liable for all damage they may cause during such occupation:" Paragraph fourth. "To the waters, last aforesaid, whose owners are non-residents and unknown, or who by habit and custom

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permit the public to fish therein: Provided, that such planting may, at the discretion of the said Commissioner, be made without application therefor." Then follows a clause making it unlawful for making applications for a supply of fish for waters not made public, and providing penalties, etc.

This act is new legislation on the subject. The prior Act of 1901, which was repealed by this act, does not contain a clause which could be construed to have the meaning of either of these paragraphs, although the twenty-third section of said Act of 1901 does attempt to provide for the right of the public to fish in certain waters.

In this case, the owner, John E. DuBois, has certainly not been shown, since the passage of this Act, to have put himself in the position of an applicant for free fish under the third paragraph, and we do not understand that it is so claimed. The fourth paragraph, the latter clause of which it would seem is relied upon by the defendant to relieve him from the consequence of his trespass, cannot be so construed. Primarily this whole section is intended as a direction to the Commissioner of Fisheries as to the free distribution of the product of the State's Fish Hatcheries. Incidentally it provides for an express or implied contract on the part of private owners furnished with free fish from the State Hatcheries, that public fishing shall be allowed in such private waters during the open fishing season. To sustain the contention of the defendant the same express or implied contract for public fishing provided for in the proviso clause to the third paragraph would have to be added after the fourth paragraph. As we look at it, however, the waters intended to be stocked by virtue of the fourth paragraph are not waters such as this is shown to be. There are many streams in the mountains of this county, as in other counties, passing through lands whose owners are non-residents and unknown, and which streams or waters are the natural habitat of trout and on which the owners expended neither time nor money, to which the said paragraph naturally applies. This artificial lake or dam never was such a stream. The owner alone has been at the expense of its improvement and beautification. The public have expended no time, thought or money upon it. We know of no reason in law or common sense why the owner should be deprived of his absolute control thereover and are of the opinion, therefore, that this defendant, as a wilful trespasser on the property of the prosecutor, was properly convicted. The only authority brought to our attention since the passage of the Act of 1909, is in the Court of Quarter Sessions of Warren County, Commonwealth vs. H. L. Raymond, No. 4 September Sessions, 1909 (in manuscript), in which President Judge Bouton, specially presiding in said Court, convicted a defendant. His opinion, as stated therein, is controlled by Commonwealth vs. Foster, 36 Superior Court 433, which case is based upon the language of the twenty-third section of the Act of 1901. The principles therein cited by the President Judge Rice, of the Superior Court, are relied on also in this case. We do not believe that the Legislature of Pennsylvania intended that the Act of 1909 should have the construction contended for by the defendant in this case. To do so would be to hold "that it is within the power of the Legislature to provide for the public the means of healthful recreation upon private land, and for that purpose to deprive the owner of his right to control the use of it, without compensating him for such partial or total destruction of his dominion over it." Comm. vs. Foster, Supra.

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We hold, find and enter, therefore, the following judgment and conviction:

Now, July 14th, 1910, C. E. Swartz, of the Borough of DuBois, County of Clearfield and State of Pennsylvania, is convicted before the Court of Quarter Sessions of the Peace of Clearfield County, Pennsylvania, of wilfully entering upon land owned by John E. DuBois, on the 30th day of June, 1909, which said land is situate in Sandy township, Clearfield county aforesaid, printed notices forbidding said trespassing having previously been prominently posted upon said land by said owner, stating that the said land is private property and warning all persons from trespassing thereon under the penalties provided by the Act of Assembly No. 124, approved April 14, 1905, which notices remained so posted at the time of such entry by the said C. E. Swartz, defendant.

And it is further adjudged that for the said Act of Trespass the said C. E. Swartz forfeit and pay a fine of ten dollars, with costs of suit, to be distributed according to law. In default of payment of said fine and costs the said C. E. Swartz be and is hereby committed to the County Jail of Clearfield county for the period of ten days, being one day for each dollar of said fine, as provided by said Act of April 14, 1905.

By the Court,
(Signed) ALLISON O. SMITH, P. J.

INTERFERING WITH A FISH WARDEN.

Last spring Charles F. Gehman arrested two men for violation of the fish laws. He is a regular warden and served the warrants on the two men at the establishment of their employer. The employer angrily ordered the warden off the place and threatened to have him put out, in spite of the fact that the warden showed his authority. The man was arrested and convicted by the magistrate for interfering with a warden in the discharge of his duties, a fine of $100 being imposed as provided by the Act. The defendant appealed to Court. The Court, after hearing the testimony, decided that while not sympathizing with the man and feeling that he was technically guilty, yet he thought, in view of mitigating circumstances, that he would suspend sentence for ten days if the defendant would pay all the costs in that time, this the Court thinking would be sufficient to deter the man from a similar conduct in the future. The costs amounted to $38 without the costs and mileage of the defendant's witnesses. The following is the opinion of the Court:

IN THE COURT OF QUARTER SESSIONS OF THE PEACE IN AND FOR THE COUNTY OF MONTGOMERY.

Commonwealth vs. Harvey S. Souder.	Interference with fish warden engaged in enforcing the fish laws.

Appeal by the Defendant from summary conviction before a Justice of the Peace.

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By the Court: The defendant was convicted before the Justice of the Peace for interfering with a fish warden who was enforcing or carrying into effect the provisions of the fish laws. A penalty of one hundred dollars was imposed. From this conviction the defendant appealed.

The case was heard by the Court and the evidence discloses that a fish warden accompanied by a constable arrested two men for illegal fishing. The men were working in the factory of the defendant, but were taken outside the workroom and the warrants were served upon them. They desired to return to the working room of the factory to change their clothing and prepare to accompany the officers. The day was cold and raw and permission was given to return to the working room. The officers, however, accompanied the men. The room was noisy because a number of saws were in operation. The defendant evidently thought the officers were agents to sell goods or solicit insurance. He swears this was his belief, and he attempted to put them out as interfering with his workmen. The officers attempted to explain their business, but the noise, no doubt, prevented the hearing of their assertions. The defendant pushed them to the door, when the fish warden exposed his badge of office. By this time the defendant, in his efforts to eject the officers, became excited. He says he told them, "I do not give a d—— what you are, if you don't get out something will happen." The letters on the badge could not be read without a close inspection, and the officers never used any declaration which communicated to the defendant the fact that they were authorized to make arrests for violations of the fish laws. It is true, however, that the defendant by his hasty action, no doubt, failed to gain the knowledge of the true situation.

The twenty-fifth section of the Act of May 1, 1909, P. L. 368, contemplates that the person making threats or using force against the officer shall do so knowing that the officer is engaged in enforcing the fish laws. The Act punishes for the interference with a fish warden or for preventing the enforcement of the fish laws. The Act does not impose a penalty for interference with every officer of the law regardless of the service he is performing. The section has a single purpose —punishment for the obstruction in enforcing the fish laws. As we stated, the defendant did not know that the officers were engaged in removing the men arrested for illegal fishing. This was due to his excitement and hasty action. He, no doubt, would have known their errand if time had been afforded for explanation. His action might have resulted in an escape of the two men. When the defendant quieted down he realized his mistake and the officers removed their prisoners without trouble.

The officers, if they had explained their visit at the office of the factory, no doubt, would have secured their men without any difficulty. Some consideration is due to an employer of workmen, when an officer seeks to remove a man for a charge which involves a penalty of ten dollars only. The secrecy and precautions adopted where a man charged with a serious felony is to be arrested are not ordinarily necessary where a very minor offense is involved.

The conduct of the defendant does not commend itself and the evidence indicates technical guilt, but we are not satisfied that it would be just to impose so large a penalty as one hundred dollars, and yet the Act does not seem to allow any other punishment. Section twenty-five evidently contemplates some action more serious than that

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charged and proved against the defendant, otherwise the penalty would not be so large.

The costs in this case are taxed at thirty-eight dollars. This does not include the fees and mileage of the defendant's witnesses. By the time he pays all these costs he will be more careful in the future and use more discretion in dealing with an officer of the law.

If he pays these costs within ten days we will enter a judgment sustaining the appeal. If they are not paid as suggested the appeal will be dismissed and the sentence of the Justice will then be executed.

By the Court,

AARON S. SWARTZ, P. J.

June 18, 1910.

THE QUESTION OF MOVABLE SLATS.

Last year a man was arrested in York county for violation of the law in regard to fish baskets, the charge being that the number of slats movable did not correspond with the law. The man was convicted before the magistrate and appealed to the Court, which held that the information did not comply with the law in regard to summary convictions. The following is the opinion of the Court:

Commonwealth vs. J. CALVIN SMITH.	In the Court of Quarter Sessions of the Peace of York County, Pa. Appeal from summary conviction for violation of Section 8 of the Act of May 1, 1909, P. L. 353.

OPINION.

The information in this case charges that the defendant "did unlawfully maintain and fish a fishbasket, in the waters of the Conewago Creek within the County of York, in the Commonwealth of Pennsylvania, and did thereby violate the following provisions of the Act of Assembly, to wit: that more than seven slats were not movable in the first or fishing section of said basket and slats were not well rounded, all of which is contrary to Section 8 of an Act of Assembly approved the first day of May, A. D. 1909, P. L. 353."

But said section of said Act does not refer to any "first or fishing section" of such basket, nor does it limit the number of non-movable slats, or require the rounding of their edges anywhere, except in the bottom of the basket. This complaint is, therefore, defective in not specifically charging the defendant with the very act forbidden in the statute, viz: having too many immovable slats, or slats which were not well rounded, *in the bottom of his fish basket.*

The omission of this essential element of the charge was a substantial jurisdictional defect in the record, and the transcript filed in the case also shows that it was not supplied by the evidence offered before the magistrate.

In all quasi-criminal prosecutions like this, practically the same certainty and particularity are required in stating the charge against the defendant as is observed in drawing bills of indictment: Comm. vs. Cannon, 32 Pa. Super. Ct., 82.

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In Shyrock vs. Braddock Boro., 43 Pa. Super. Ct., 515, Rice, P. J., said, "While many of the technical formalities of summary convictions have long since been dispensed with there are some essentials which still exist and must appear on the record. It is still necessary that a summary conviction shall contain a finding that a specific act has been performed by the defendant and that it shall describe or define it in such a way as to individuate it, and show that it falls within an unlawful class of acts." Without this a judgment that the law has been violated goes for nothing: Reid vs. Wood, 102 Pa., 312; Comm. vs. Davison, 11 Pa. Super. Ct., 130.

This general complaint that the "slats were not well rounded" is especially insufficient in this case, in view of the proven fact that this was an old fishbasket, constructed and licensed for three preceding years under the Act of 1903, P. L., 319, which required the entire basket to be made of slats.

But aside from this technical objection to the sufficiency of the complaint we are of the opinion that the defendant has a good and sufficient defense thereto on the merits of the case.

Section 8 of the Act of 1909, provides that the bottoms of all fish baskets "shall be movable for the entire width of each and every fall, or so much of said bottoms shall be movable, as to leave not more than seven slats in one section; and such bottoms, or parts of bottoms shall be taken out of said falls, *or so adjusted as to make it impossible for them to catch fish from eight o'clock in the morning and kept out until four o'clock in the afternoon.*" When, therefore, the entire movable bottom, or the movable parts of the bottom of the basket, are so adjusted as to make it impossible for them to catch fish between the hours named, the purpose of the Act is fully accomplished, and the owner of the basket has discharged his duty even though seven or more slats may remain immovable within the basket. In this case, the defendant has removed the middle portion of the bottom of his basket containing twenty-four slats, leaving six on the one side of the opening and five on the other, fastened to the basket. But the evidence clearly shows that the opening thus made was considerably wider than the widest possible flow of water through the penstock of the mill, at the opening of which the basket was placed, and no water from any other source could enter it. The defendant has so adjusted, and so placed, his basket, with reference to the current which flowed into it, that none of the water could fall upon the immovable slats when the middle portion was removed, and no fish could be taken therein. He had therefore complied with the material provisions of Section 8 of the Act of 1909.

His basket was not placed in the open stream in the usual way, so that a rise in the water might possibly entrap fish on the slats remaining after the middle portion had been removed. It is quite obvious that the removal of the other slats, under these circumstances, was entirely unnecessary.

The law does not require a man to do a vain and useless thing, and it would be a hard and technical ruling to hold the defendant amenable to the penal provisions of this act for not removing these slats which were entirely harmless, in the position in which he had placed his basket.

In Comm. vs. Jolly, 15 Dist. Rep., 308, which was also a fish basket case under the Act of 1909, the Court said that "the racks above the

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water as well as those so deeply emerged that a fall in the water, such as might occur between sunset and sunrise would not render them dangerous to fish, or hinder their migration, *need not be removed,* is a construction which no doubt would be within the reason and spirit of the statute."

In Comm. vs. Hippey, 37 Pa. County Ct. Rep., it was held that if the owner of the basket does not take out the whole bottom of the basket he must so adjust the seven remaining slats as to make it impossible to catch fish in the basket during the prohibited period.

In these and other similar cases, the Courts have recognized the effective disabling of the basket to be the essential thing required by the Act, rather than the literal observance of the minor details which are unnecessary for the protection of the fish.

The other portion of the charge is, that the slats were not well rounded in said first or fishing section of the defendant's basket. But the evidence shows that they were from one-half to three-fourths of an inch apart, instead of only three-eights of an inch, as required by the Act of 1909, and that from age and use, and through the decaying action of the water for several years, their edges had become somewhat rounded. In this condition they met the requirements of the act as to the width of space between them, and also avoided the danger of injury to fish from sharp edges. We are inclined to the opinion, therefore, that the slats in the defendant's basket were "well rounded," within the true intent and meaning of the Act of Assembly, notwithstanding the fact that they had not been mechanically rounded by the hand of the defendant, as the Commonwealth contends that they should have been. The omission of an act on the part of the defendant where thus apparently, to accomplish the purpose of the statute, viz: the protection of fish, would at most be a technical offense within the class known as mala prohibita, and should be brought clearly within the provisions of the statute, to be punishable.

The Court should not lose sight of the spirit and purpose of this Act of Assembly, viz: the protection of game fish, and by too strict a construction of its provisions under circumstances which make a literal compliance therewith immaterial, make a penal offense out of an act which was inspired by no proven wrongful motive and which falls rather doubtfully within the prohibition of the statute.

Under such circumstances the benefit of the doubt should always go to the defendant, as in all criminal or quasi-criminal cases.

And now, to wit: November 7th, 1910. The defendant's appeal is sustained and the judgment of the justice is set aside.

By the Court,

NEVIN M. WANNER, A. L. J.

THE QUESTION OF WING WALLS.

In the law regarding the erection of fishbaskets it was the intention that ample space should be left on each side of the wing walls of a basket for the passage of boats and fish. Unfortunately numerous typographical errors crept into the bill and the language is not plain.

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A York county man erected a fishbasket so that the wing walls virtually covered the whole stream. Suit was brought under Section 8 of the Act of May 1, 1909, and the man was convicted before a magistrate and fined. He appealed to the York County Court, which reversed the decision of the magistrate on the ground that the act does not apply to one basket, but to two. The following is the opinion of the Court:

Commonwealth vs. C. F. Williams.	In the Court of Quarter Sessions of the Peace of York county, Pa. Appeal from Summary Conviction for unlawfully maintaining a fish basket.

OPINION.

The defendant is charged with having, on the 25th day of October, 1909, unlawfully maintained and fished, a certain fish basket, in the waters of Fishing Creek, in the County of York, the wing walls of which basket occupied more than three-fourths of the width of said stream and extended from main shore to main shore thereof, in violation of Section 8 of the Act of Assembly of May 14th, 1909, P. L. 353.

Said section provides as follows: "And no wing walls of any two baskets shall be within twenty feet of each other at the upper end, when side by side, or extend beyond each other at the upper end, or reach from main shore to main shore, or extend over more than three-fourths of the width of a stream, or occupy so much of the stream as to prevent the passage of canoes or boats and fish at either side of the stream, or be constructed of any material other than loose stones; and no basket and wing walls shall be set immediately above one already legally located nearer than one quarter of a mile."

The extending wing walls of the defendant's fish basket, for which he held a license, at their widest part, were only twenty feet apart, while the distance between the main shores or outside banks of the streams, at the same point, was about seventy feet.

But owing to the abnormally low stage of the water, on the date of the commission of the alleged offense, the entire current of the stream passed within and through the wing walls of said basket, so that there was no water on the outside of them for the passage of fish.

Though not extending from one main shore to the other, or occupying more than three-fourths of the distance between them, the wing walls of this basket did occupy more than three-fourths of the actual width of the running stream, which we construe to be the meaning of the clause of the statute under consideration. If it means three-fourths of the width of the channel between the main shores, the defendant would clearly not be guilty of the offense charged against him. The defendant contends, however, that section 8 of said act does not, in express terms, or by necessary implication, forbid the extension of the wing walls of a single fish basket so as to include more than three-fourths of the width of a stream. This is true. It does not limit the size of the wing walls of a single basket, or prescribe how it shall be placed in a stream, except with reference to another basket therein. It does not, in the usual statutory phrase prohibit the extension of the wing walls of any basket or baskets beyond the statu-

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tory limits, as though it was intended to apply to one or to any number of baskets. On the contrary, it provides with mathematical precision, that "no wing walls of any two baskets" shall occupy more than the prescribed portion of a stream.

The unusual particularity of this language seems to justify the conclusion that it was deliberately chosen and should bring the enactment within the application of the maxim, expressio unius est exclusio alterius: Johnson vs. Southern Pac. R. R., 117 Fed. Rep., 462-465.

Though the defendants case may be clearly within the general purpose of the law, it is just as clearly not within the letter of the statute. It is a casus omissus, which cannot be supplied by implication or read into the statute by judicial construction.

The Act of 1909, being a penal, or quasi-penal, statute, must be strictly construed, according to the words actually used therein, whatever may have been the intent of the Legislature in passing it. It may be, that only much larger streams than this, such as are capable of receiving the wing walls of two baskets side by side, without stopping the passage of boats and fish around them on either side, were contemplated in the passage of this act. There is substantial ground for this suggestion in the provision of Section 8 of the Act, that the wing walls of said baskets shall not occupy so much of the stream in which they are placed as to prevent the passage of canoes or boats, at either side of them. Could such a provision have been intended to apply to a boatless litle creek like this, which at higher stages of the water than that of October 25th, 1909, could scarcely have furnished room for the passage of boats and canoes on each side of the wings of two fish baskets even as small as the one in question. Would the game and food fishes in a stream of such small volume be sufficient in size or in numbers to call for protection?

But, as was said by Rice, P. J., in Cornplanter Township Road Case, 26 Pa. Superior Court Rep., 30, "Speculation as to whether the omission of the Legislature to include something within the act, was intentional, or an inadvertent mistake would not be profitable, for in either case the omission is not one which the Court may supply by construction."

Again, in Commonwealth vs. Gouger, 21 Pa. Superior Court Rep., 217-219, the same judge reviews the subject exhaustively, citing many cases to the effect that where the languages of a penal statute is plainly expressed, nothing can be added to or taken from the same, in order to cover an omitted case, which may be within the mischief intended to be remedied, and which may seem to have been inadvertently omitted.

The English rule, as laid down in Hawkins Pleas of the Crown, Curw. Ed., page 188, section 16, was, that "no parallel case which comes within the same mischief shall be construed to come within the purview of it" (the statute) "unless it can be brought within the meaning of the words."

In Pittsburg vs. Kaltrider, 114, Pa. 547, the Court said, "In construing an Act of Assembly, it is always unsafe to depart from the plain and literal meaning of the words contained in the act, out of deference to some supposed intent or absence of intent on the part of the Legislature." See also Denn vs. Reid, 12 U. S. 228; U. S. vs. Hag-

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gett, 40 Fed. Rep., 637; Johnson vs. S. Pac. R. R., 117; Fed. Rep., 465.

In Bolles vs. The Outing Company, 175 U. S., 265, it was held: "A statute being penal must be construed with such strictness as to carefully safeguard the rights of the defendants, and at the same time preserve the obvious intention of the Legislature. If this language is plain, it will be construed as it reads, and the words of the statute given their full meaning. If ambiguous, the Court will lean more strongly in favor of the defendant than if it were a remedial statute. It has been held in numerous cases that this rule of strict construction applies to all acts imposing fines and penalties, and in fact to all statutes in derogation of the common law, vide cases cited in 26 Am. and Eng. Ency. of Law (2d Ed.), pages 659-660. Also Trainer vs. Wolf, 140 Pa., 279, and the Commonwealth vs. Knickbaum, 199 Pa., 351-355.

Another instance of inaccurate legislation is found in the same section 8 of the Act of May 14, 1909, wherein it is declared (first) to be unlawful to use fish baskets from December 1st to August 14th next ensuing; (second) to be lawful to use them from September 15th to November 13th next ensuing. But there is no provision as to the period from August 14th to September 15th, and from November 13th to December 1st of each year. Surely against the uncertainties of such penal legislation as this, the unfortunate laymen who may incur its penalties, though he may not understand its import, is entitled to the protection of a strict construction of the statute.

Now to wit, March 21st, 1910: The defendant is adjudged not guilty, and the complaint against him is dismissed, and the County of York is directed to pay the costs of prosecution.

By the Court,
NEVIN M. WANNER, A. L. J.

CONSTITUTIONALITY OF THE ACT OF MAY 1, 1909.

In Lancaster county, in 1909, several men were arrested for having fish baskets in the Susquehanna River which did not conform with the provisions of the Act of May 1, 1909. They were fined by the magistrate and appealed to the Lancaster County Court on the ground that the Act of May 1, 1909, P. L. 353, was unconstitutional, the objection being that the title contained more than one subject. The Lancaster County Court, in a carefully considered opinion in which it cited previous opinions of the Upper Courts, said that the title was not necessarily an index, but should only contain enough to give notice of the intent of the act, and therefore if it did it was sufficient for anyone to make himself fully acquainted with the provisions of the act. The Lancaster County Court therefore sustained the constitutionality of this act and the decision of the magistrate below. The following is the opinion of the Court in one case which is similar as regards all others:

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IN THE COURT OF QUARTER SESSIONS OF LANCASTER COUNTY.

Commonwealth vs. John W. Hippy.	January Sessions, 1910. No. 74. Violating Fish Laws. Appeal from Conviction before Alderman A. K. Spurrier.

OPINION.

In all of the cases for violating the fish laws now before us for determination, one of the questions raised is the constitutionality of the Act of May 1, 1909, P. L. 353; and as this act is the basis of the prosecution, and all the convictions, so far as the legal question is concerned, must, therefore, stand or fall by it, we will, in the first instance, give our attention to the discussion of this point.

The title to this act is: "An Act to classify the fish in the waters within this Commonwealth, declaring which are game fish, which are food fish, and which are bait fish, and to regulate the catching and sale and encourage the propagation of the same, to protect the waters within this Commonwealth from unfair, improper, wasteful and destructive fishing and to protect fish from being destroyed or injured by destructive means; to provide for the appointment of fish wardens, and to declare their official powers and duties; to encourage and regulate the propagation of fish within this Commonwealth, and to regulate the free distribution of the same by the Department of Fisheries, in the waters within the same; to define powers and duties of the Department of Fisheries; to regulate the sale and shipment of fish artificially propagated for profit; to forbid the sale of unlawful devices for catching fish; and to provide penalties and punishments for the violation of the provisions of this Act, and providing how and by whom the costs shall be paid."

The objection raised is, that this title contains more than one subject; that it not only regulates the propagation, distribution and catching of fish in the waters of the state, but also defines the powers and duties of the Department of Fisheries, and that these two purposes are separate and distinct. However, after carefully considering it, we do not think that the objection should be sustained. While we know of no case that has arisen under the Act of 1909, its title is very similar to that of the Act of May 29, 1901, P. L. 302, which Act came before the Superior Court in Comm. vs. Kenney, 32 Sup. 544. The title to that Act reads: "An Act to declare the species of fish which are game fish, and the species of fish which are commercially valuable for food, and to regulate the catching and encourage the propagation of the same; to define the public waters within the state; to protect the waters within the state from improper and wasteful fishing; to provide for the appointment of Fish Commissioners and fish wardens, and to declare their official powers and duties; to encourage and regulate the artificial propagation of game and food fish by said State Fish Commissioners; to regulate the distribution of the same in the waters of the Commonwealth; to provide penalties and punishments for the violation of the provisions of this Act." In that case, the defendants were fishing with lines attached to umbrella bows with

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bells fastened to the tips, and it was asserted that they were fishing contrary to the provisions of the Act of 1901. It was held, in the Court below, that the statute could not be applied to any other fish than those which were therein declared to be either game or food fish, and that its provisions must relate to the catching, &c., of such; that carp, catfish, eels and suckers were not embraced in either class of game or food fish, though the time and the manner in which they might be caught were provided for in a number of the sections of the Act. The Superior Court reversed this decision, and held the Act to be constitutional. Orlady, J., in delivering the opinion of that Court, said: "The purpose of this Act is clearly defined in the very words of the title to be 'to regulate the catching and encourage the propagation of game and food fish,' and these words reasonably invite an inquiry, not only into the number of, the time when, and the methods by which such fish may be lawfully taken, but as well the methods deemed necessary by the Legislature to encourage their propagation, and the modification, if any, of former legislation on this subject. The fish excluded from the species of game and food fish enumerated in the Act, are either indigenous to our waters or are placed therein by lawful authority and are clearly within legislative regulation. The title substantially, though without particularity, described the subject and purpose of the Act, so that everything which reasonably pertains to that subject is in law suggested by the title. The legislative purpose in regulating the catching and encouraging the propagation of game and food fish cannot be known until every section of the Act is read; in such an inquiry, the legislative will in regard to the methods, devices and appliances which may be lawfully used in fishing for other than game and food fish, is unequivocally defined; so that the title is not misleading, every section being reasonably indicated through the subject matter stated in the title." In Comm. vs. Rothermel, 27 Sup. 648, it was held that the Act of June 3, 1878, P. L. 160, entitled, "An Act to amend and consolidate the several Acts relating to game and game fish," was not unconstitutional as containing two subjects, game and game fish; and in Comm. vs. Clymer, 217 Pa., 302, the act of May 18, 1893 P. L. 94, entitled "An act to establish a Medical Council and three State Boards of Medical Examiners, to define the powers and duties of said Medical Council and said State Boards of Medical Examiners, to provide for the examination and licensing of practitioners of medicine and surgery, to further regulate the practice of medicine and surgery, and to make an appropriation for the Medical Council," was constitutional and gave sufficient notice of the provisions contained in section 14 of the Act, making a violation of its provisions, relating to the practice of medicine without a license, a misdemeanor.

Section 8 of the Act of 1909, provides: "That it shall be unlawful to use fish baskets in the waters within or under the control of this Commonwealth from the first day of December to the fourteenth day of August next ensuing, each date inclusive; that it shall be lawful to use fish baskets from the fifteenth day of September to the thirteenth day of November, in each year, both dates inclusive, and from four o'clock in the afternoon until eight o'clock on the following morning, for the capture of eels, and no fish basket shall be set or used in a stream known as a trout stream; and no wing-walls of

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any two baskets shall be within twenty feet of each other at the upper end, when side by side, or extend beyond each other at the upper end, or reach from main shore to main shore, or extend over more than three-fourths of the width of a stream, or occupy so much of the stream as to prevent the passage of canoes or boats and fish at either side of the stream, or be constructed of any other material than loose stones; and no basket and wing-walls shall be set immediately above one already legally located nearer than one-quarter of a mile; And provided, that the bottoms of the basket, so used, shall be made of well-rounded wooden slats, not more than two inches wide, so set or placed that they shall not be less than three-eighth of an inch apart when swollen by water; And provided further, that the bottoms of said baskets shall be movable for the entire width of each and every fall, or so much of said bottoms be movable as to leave not more than seven slats in one section; and such bottoms, or parts of bottoms, shall be taken out of said falls, or so adjusted as to make it impossible for them to catch fish, from eight o'clock in the morning and kept out until four o'clock in the afternoon; And provided further, that the number of the license of said basket shall be clearly and permanently painted or marked on the sides thereof," &c. In Comm. vs. Rothermel, *supra,* it was said that "there is, in principle, no distinction between a prohibition of hunting or fishing on a specified day and during a specified period; and it is for the Legislature to fix the times and seasons in which these acts shall be permitted or forbidden."

Section 1 of the Act of 1909 declares that the fish within the Commonwealth shall be designated and classified as game fish, bait fish and food fish. Section 2 declares that it shall be unlawful to use any device, means or method whatsoever for taking the fish from the waters of the Commonwealth, except such as are therein setforth, and eel pots and fish baskets are declared to be lawful methods. A *proviso* also adds: "That the nets and devices, described hereinbefore as legal, may also be used under the conditions and regulations hereinafter set forth." Section 8, from which we have quoted above, makes it unlawful to use fish baskets from the first of December to the fourteenth of August, and permits their use from the fifteenth of September to the thirteenth of November. The period between the fourteenth of August and the fifteenth of September is not provided for, the Act thus leaving an interregnum. Comm. vs. Brensinger, 1 Berks, 313. It also adds the words: "And from four o'clock in the afternoon until eight o'clock on the following morning." This means, we think, that, from the fifteenth of September to the thirteenth of November, the fish baskets must be used during these hours; for, later in the section, it is provided that "such bottoms, or parts of bottoms, shall be taken out of said falls, or so adjusted as to make it impossible for them to catch fish, from eight o'clock in the morning and kept out until four o'clock in the afternoon." We do not see how there can be any other conclusion arrived at upon this point.

The next question is, as to the construction of the Act of Assembly, in regard to the bottoms. The provision is in the alternative, namely, that the bottoms of the baskets shall be movable for the entire width of each and every fall, or so much of said bottoms be

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movable as to leave not more than seven slats in one section. We think that the words "section" and "fall" are synonymous, and that, unless the whole bottom is movable, no more than seven slats in any one fall can be made immovable without violating the Act. If this is not correct, then the owner of the basket may divide the fall into as many sections as he sees fit, and fasten seven of each of these sections to the bottom of the basket, and thus defeat the evident intention of the Act, which is to prevent the catching of fish in the baskets at certain times. Under such interpretation, there is no fixed meaning for the word "section," and it is left entirely at the option of the owner. The owner of the basket must, we think, take out the whole bottom of the fall, or he must so adjust it as to make it impossible to catch fish in the basket, which means, he must so adjust the seven slats if he shall leave them in any one fall. In Comm. vs. Allen, 36 Sup., 220, it was held that the substituting of wire screen for slats in an eel basket, and having three-fourths of the bottom a permanent construction and immovable, is a violation of the Act of April 27, 1903, P. L. 319, which provides "that every basket so used shall be made of slats not less than one-half inch apart, with a movable bottom which shall be taken out of each basket, so used, at sunrise, and be kept out until sunset." Orlady, J., in delivering the opinion of the Court, said: "The license issued to the defendant authorized him to construct and maintain a fish basket in strict conformity to the defined plans as set out in the statute, and none other. * * * The basket, as he maintained it, was a trap for every kind of fish that came down the stream, and how many would be unlawfully detained therein in their passage would depend upon the effectiveness of the contrivance to accomplish the purpose of the defendant."

Let us now turn to the facts of this case. A license for a fish basket was, on October 13, 1909, granted to John W. Hippy. The license number was 33. It was testified, by Mr. J. W. Criswell, Chief Fish Warden, that, when he visited the basket, on September 30, 1909, at about 12.30 P. M., there was no license number on it, and that, when it was visited about a week or ten days later, there was a number upon it. It was also testified, by Mr. Criswell, that twenty-seven slats in the fishing section of the basket could not be moved, and eight slats were removable, and twelve small shad were in the basket. Mr. Criswell was corroborated by Mr. Charles H. Nesley, one of his Deputy Wardens. The defendant testified that his basket was not altogether finished, and it never fished, because the water was too low; that the whole rack was five and one-half feet wide, and it had a four-foot section that was removable, leaving a foot and a half that was not removable. He admitted that he did not mark the license number on the basket as soon as he procured it, and he did not recollect the day that he put it on. Two other witnesses testified that they saw the number on the basket, but they did not fix a definite date. We are convinced that there was sufficient evidence before the Alderman upon which to base his conviction, and we, therefore, dismiss this appeal and confirm his proceedings, and the defendant is directed to appear before the Alderman for execution of the sentence.

Appeal dismissed and proceedings confirmed.

(Signed) CHAS. I. LANDIS, *P. J.*

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APPEALS IN SUMMARY CONVICTION.

The question of appeals in cases of summary proceeding has been one that has troubled the Department ever since its creation. The Constitution and the Act of 1876 which puts into execution the article of the Constitution uses the term "Summary Conviction," and it has been held by some Courts that where a defendant is acquitted by a magistrate, or a Court not of record, no appeal lies, because there has been no conviction. The Constitution and the Act both say that in all cases of summary conviction "either party may appeal."

Early in the year the Court of Perry County decided in a case where the defendant was acquitted by the Justice of the Peace for violation of the fish laws, that the Commonwealth had no right to appeal. The Department consulted with the Attorney General's Department and was advised that the legal question is a most important one to be settled, and an appeal from the decision of the Perry County Court was taken to the Superior Court. Shortly after the decision of the Perry County Court the question of the right of the Commonwealth to appeal in the case of summary conviction, where the defendant was adjudged not guilty by the magistrate, was decided in Clinton County by Judge Hall in favor of the contention of the Commonwealth.

It is plain that if the Commonwealth has no right to appeal in cases of summary conviction where the defendant is acquitted, the Commonwealth is at the mercy of ignorant or dishonest magistrates. In the Clinton County decision the Court took strong ground that the term "summary conviction" is merely a name for the proceedings, and cites from Blackstone.

The following is the opinion of the Court:

Commonwealth of Pennsylvania vs. Charles A. Spotts.	In the Court of Quarter Sessions of Perry County, Pa. No. 5 January Sessions, 1910.

MOTION FOR AN ALLOWANCE OF AN APPEAL.

An information was made before John A. McCroskey, a Justice of the Peace, charging the defendant with unlawfully fishing and maintaining a fish basket in the waters of the Sherman's Creek, within said County and State, contrary to the provisions of Section Eight of the Act of May 1, 1909.

J. W. Criswell, Chief Fish Warden of the Commonwealth, now petitions the court, within the prescribed period allowed by the Act of Assembly, for a special allowance of an appeal, in which it is averred (1) that at the hearing before said Justice, on 4th January 1910, the defendant was discharged; (2) that the Justice grossly and wantonly disregarded the evidence adduced on part of the Commonwealth; (3) that said Justice grossly and wantonly disregarded the provisions of Section Eight of said Act of May 1, 1909, and other acts relating to hearing and determining cases brought thereunder; (4) that from statements made by said Justice of the Peace to pe-

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titioner before and to others after said hearing, the said Justice was under coercion or duress by some person or persons in favor of defendant.

We are not provided with a transcript from the Justice's docket, nor does the petition aver that the defendant was arrested, but we may assume from the fact that a hearing was had and the defendant discharged, that the proceeding was of a summary nature, and that an arrest had been made, or, at least, that the defendant appeared and stood his trial upon the charge. If these facts may be assumed, then the questions arising are whether there has been proper cause shown, and whether the right is given to the Commonwealth to appeal in case of acquittal, or discharge of the defendant by a justice of the peace. Art. V. Sec. 14 of the Constitution of Pennsylvania provides that "In all cases of summary conviction in this Commonwealth, or of judgment in suit for a penalty before a magistrate, or court not of record, either party may appeal to such court of record as may be prescribed by law, upon allowance of the appellate court or judge thereof, upon cause shown." To carry into effect this provision of our Constitution, the legislature, by enactment of the 17th April, 1876, P. L. 29, provided "That in all cases of summary conviction in this Commonwealth, before a magistrate or court not of record, either party may within five days after such conviction, appeal to the court of quarter sessions of the county upon allowance of said court of quarter sessions, or any judge thereof, upon cause shown," etc.

Counsel for petitioner, in support of his contention of the right of the Commonwealth to appeal, cites us to a number of authorities, none of which, however, sustain the contention, as we view the question raised in the issue now to be determined. The case of Comm. vs. Johnston 16 W. N. C. 349, was a case where there has been a *conviction* before the burgess of a borough, for violation of an ordinance; in Thompson vs. Preston, 5 Sup. Ct. 154, the appeal was taken by *defendants* from a judgment for a penalty and without allowance by the court, and, in Comm. vs. Eichenberg, 140 Pa. 158, the suit was for a penalty, and judgment being entered for the defendant the plaintiff filed his petition for an appeal, which was refused for the reason that appellant showed no proper cause or ground in support of his appeal. In Comm. vs. Jolly, 15 D. R. 305, the case last cited by the petitioner, Judge McClure, in a case very similar in its facts to the one at bar, under an argument for appellant's counsel for a literal interpretation of the words "in all cases of summary conviction" in the Act of 1876, supra, held that the "contention was without merit, as the legislature clearly meant by this expression all summary proceedings, otherwise the provision in the Act, that either party may appeal, would be inoperative."

The Legislature doubtless sought to render certain the statutory enactment and disclose its true intention by an amendment of said act, passed 22d April, 1905 (P. L., 284), wherein it is provided that "*the defendant* may after such conviction appeal," etc. But, this amendment was in Comm. vs. Lucky, 31 Sup. Ct., 441, declared to be in contravention of Art. III, Section 3 of the Constitution, in that it does not clearly express in its title the provision depriving the appellate court of its discretion in the allowance or refusal or appeal in cases of summary conviction, and, also, that it violates Art. V, Sec. 14, in

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that it deprives the appellate court of the power to allow or refuse an appeal in cases of summary conviction. This relegates us to the Act of 1876, which clearly designates the court in which the appeal shall be heard and the forum which shall entertain jurisdiction for allowance of appeal in cases of summary conviction, to wit: the court of quarter sessions. It further provides that "in all cases of summary conviction * * * either party may * * * after such conviction appeal * * * upon allowance," etc. But no provision is made in the act for an appeal where there has not been a *conviction,* or, in other words, where there has been an *acquittal* of the defendant, or he has been *discharged.* But, we are asked not to place such a literal interpretation upon the words of the act as will render it inoperative, and to construe the words summary *conviction* as in Comm. vs. Jolly, supra, to mean summary *proceeding,* which would give effect to the act. Such construction might perhaps be imported into the Act of Assembly as the intention of the Legislature, but how can we hold that the framers of the Constitution also intended something which they did not say, or place something therein which they did not mean. It is not in the province of the court to supply that which must necessarily change its import. The precise words are used "in all cases of summary *conviction,*" and not in all cases of "summary *proceeding.*" We must, therefore, conclude that the words in the statute were used advisedly and convey the exact power conferred by the Constitution, and that in a judgment in suit for a penalty, either party has a right of appeal, and in a summary *conviction* either party has a right of appeal, but in a summary *proceeding,* where there is an acquittal, neither the Constitution nor any statutory enactment gives to either the right of appeal.

We can scarcely conceive of a prosecution resulting in a conviction, in which the Commonwealth might want to exercise the right of appeal. Such may arise, e. g., where the justice failed or refused to impose the full amount of penalty prescribed by a statute, and the informer being entitled to part of said penalty—but of this we need not inquire. The case at bar arises in a summary proceeding, where no conviction was had and the defendant was discharged. The appeal is sought, not "after such *conviction,*" but *after an acquittal.* In Comm. vs. Wallace, 7 Sup. Ct., 405, the rule is held to be that there can be no appeal to an appellate court where the verdict was one of not guilty, and that, "there cannot be a rule for a new trial where the verdict was given for the defendant." Unless, therefore, it appears by express authority, as by Act of 19th May 1874, in cases of nuisance, forcible entry, etc., the Commonwealth, after verdict of acquittal has not right of an appeal from a judgment of the court of quarter sessions. In the last above cited case, it is said: "The practice in Pennsylvania from the origin of the Commonwealth, has been based upon the view that a verdict of acquittal in a criminal case is the final determination of the case." It may be argued that this expression relates to a trial by jury, and it may be conceded that such was the fact. But the spirit of our Constitution, as appears by the debates of the Constitutional Convention, and the trend of our law, is toward protection and safeguards against oppression in prosecutions. It is, therefore, within the spirit of our law to hold that the right of appeal in a summary conviction means only *"conviction,"* and does not mean *"proceeding,"* under which appeals will lie upon either conviction or

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acquittal. Then, too, what anomalous condition would be presented where the defendant, as in the case at bar, had been arrested, tried, and discharged, to have a proceeding in court on appeal. The defendant is neither in jail nor under recognizance to appear. There is no restraint upon him, his liberty is absolute, to go wherever and wheresoever his own inclinations may direct. The 27th Section of the Act of 1909, under which the proceedings are instituted, makes no provisions for an appeal, except "upon conviction." Thus, as we view the law, the Commonwealth, under the facts here presented, was never given a right to an appeal. This being determined, we need not pass upon the question of the sufficiency of the cause shown.

And now, 17th January, 1910, the application for an allowance of an appeal is denied, and a direction to the Justice of the Peace, to grant the appeal, is refused, to which ruling counsel for the petitioner excepts and bill is sealed.

By the Court,

JAS. W. SHULL,
President Judge.

(Seal)

The following is the opinion of the Court:

IN THE COURT OF QUARTER SESSIONS OF CLINTON COUNTY.

Commonwealth vs. Albert Tripp.	No. 6 October Sessions, 1909. Motion to quash appeal.

OPINION OF THE COURT.

On the 14th day of June, 1909, Joseph Berrier, a game protector of the State of Pennsylvania, made oath before Harry Morrison, a Justice of the Peace of this county, charging one Albert Tripp with shooting and killing a bear in the County of Clinton on the 27th day of June, 1908, during the closed season, contrary to the Act of Assembly approved the 22d day of April, 1905, P. L. 248.

The defendant was arrested and brought before the Justice for a hearing on July 28, 1909, at which time he entered a plea of not guilty and the evidence in the case was heard. The Justice certifies in his transcript that after withholding his decision for several days, on the 10th day of August, 1909, he discharged the defendant because he was satisfied from the evidence offered that the offense had been committed more than one year before the defendant was "served" and that his prosecution was, therefore, barred by limitation, and for this reason the defendant was discharged.

On August 13, 1909, application was made to this Court under the terms of said act, and in accordance with the Act of April 17, 1876, P. L. 29, for the allowance of an appeal, and the Justice was directed to allow the same upon affidavit being made that such appeal was not intended for delay, the costs to abide the final decision of the case.

On August 20, 1909, the defendant presented his petition for a rule to show cause why the said appeal should not be quashed, and a rule was issued thereon which now comes to be heard.

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The defendant bases his application upon the following propositions:

First. That there is no right to appeal from a summary conviction at common law and no statute allowing an appeal in the present case.

Second. That even though there be such statutory authority it applies only to a case where the defendant is convicted, and that under no circumstances can the Court of Quarter Sessions allow an appeal in a case where the defendant has been tried and discharged by the Justice.

Third. That no such appeal can be allowed because the defendant having been tried and acquitted by the Justice, who was a Court of competent jurisdiction, its effect would be to place him twice in jeopardy.

The defendant's first proposition has been decided by the Superior Court in the case of Comm. vs. Kephart, 39 Supr. C., 524. There can be no doubt that an appeal lies in a case of summary conviction upon a compliance with the terms of the Act of April 17, 1876, P. L. 29.

The defendant relies upon Judge Patton's reasoning in the case of Comm. vs. Hudson, 17 D. R. 1,013, to support his other two propositions. With all due deference to Judge Patton's learning and ability, which we fully recognize, we are unable, after careful consideration of that case, to agree with him on either of these questions. Article V, Section 14, of the Constitution of Pennsylvania, provides that: "In all cases of summary conviction in this Commonwealth, or of judgment in suit for a penalty before a magistrate or court not of record, *either* party may appeal to such Court of record as may be prescribed by law upon the allowance of the Appellate Court, or a Judge thereof upon cause shown." And the Act of April 17, 1876, P. L. 29, provides that: "In all cases of summary conviction in this Commonwealth before a magistrate or Court not of record, either party may within five days after such conviction appeal to the Court of Quarter Sessions * * * upon allowance of the said Court of Quarter Sessions: Provided, That all appeals from summary conviction shall be upon such terms as to payment of costs and entering bail as the Court or Judge allowing the appeal shall direct." Judge Patton concludes from his perusal of this provision that when the defendant is acquitted and not convicted the case does not fall either within the letter or spirit of the constitutional provision of the Act of Assembly allowing an appeal. Conceding that the question has not heretofore been raised in Pennsylvania he cites two Illinois decisions in which it was held a statute giving the right of appeal from an acquittal in a criminal case was in violation of the constitutional provision of Illinois that no person "shall be twice put in jeopardy for the same offense." He also cites an Oregon case where it was held that the city could not appeal from the acquittal of the defendant on the charge of violating a city ordinance, but whether or not there was any statute allowing such an appeal, or whether it was in contravention of the Oregon Constitution he does not state. So far as appears from his opinion none of these cases can have any bearing on the present case because we have an Act allowing such an appeal and it is not on contravention of our Constitution *which expressly provides for it.* Judge Patton evidently bases his conclusions on the fact that the term "summary conviction" is used both in the Constitution and in the Act of Assembly and this, he assumes, can only apply to cases where the defendant is convicted and can have

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no reference to cases where there is an acquittal. If this be true, what then was the purpose of the framers of this Constitution and of the law in conferring the right of appeal on *either* party. Surely the Commonwealth would have no occasion to appeal in case of conviction. If an appeal is to be allowed in such cases only it would be conferred upon the defendant alone. As a matter of fact, the term "summary conviction" is one which has been applied from time immemorial to certain forms of procedure. It was used by Blackstone and has come down to us through the common law. It is as distinct a designation of a certain form of procedure and has as distinct a meaning in the law as the terms: Actions in Trespass, Actions in Assumpsit, Actions for Penalties or Suits in Replevin. The word "conviction" used as a part of the name of this form of procedure has no reference to the final result of the action. The name of this form of procedure is the same, whether the result be a conviction or an acquittal. There is no doubt in our minds that the intention of both the framers of the Constitution and of the Act of 1876 was to give the Commonwealth the right of appeal, in order to prevent the possible nullification of such salutary legislation as is contained in the game laws by the local prejudice of petty Courts.

The third proposition of the defendant that the effect of allowing an appeal to the Commonwealth would be to place him twice in jeopardy requires a more extended notice. That no one shall be twice put in jeopardy of life or limb for the same offense is an ancient and well established doctrine. It is part of the universal law of reason, justice, and conscience. It is embodied in a maxim of the civil law, "Non bis in idem," and is embedded in the very elements of the common law, and expressed in several of its maxims. It was incorporated in the Constitution of the United States, which provides that no person "shall be subject for the same offense to be twice put in jeopardy of life or limb," the Constitution of Pennsylvania likewise provides that "no person shall for the same offense be twice put in jeopardy of life or limb," but it is now well settled that the provision of the Constitution of the United States prohibiting a second jeopardy does not bind the States, but applies only to offenses against the trials under the laws of the United States. It is true, a contrary opinion was expressed in some of the earlier cases, but the present doctrine is well settled as above stated. Barron vs. Baltimore, 7 Peters (U. S.), 243; Fox vs. Ohio, 5 Howard (U. S. O.), 410; Twitchell vs. Commonwealth, 7 Wal. (U. S.), 321, and many other cases which might be cited if necessary, and as to the provision of our own Constitution it has been equally well settled that the clause applies only to cases of felony, of death, and not to crimes of an inferior grade. McCreary vs. Comm., 29 Pa. St., 323; and even in a capital case the defendant is not in jeopardy until the jurors are sworn. The present argument of the defendant, therefore, it seems to us, rests upon no constitutional provision, but rather upon an idea gained from long acquiescence in this State in the doctrine of the Common Law. In our Federal Courts an action to recover a statutory penalty, even though civil in form, is a criminal case and there would seem to be no doubt of the applicability there of the doctrine of former jeopardy and it would seem to require no very forced construction to hold that actions for the recovery of statutory penalties are also within its purview, but in England and in most of our states the contrary view has been taken: Wilson vs. Ras-

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tell, 4 T. R., 753; Calcraft vs. Gibbs, 5 T. R. 691.. We think that the general rule established by the best considered cases is that when a person has been placed on trial on a valid indictment or information, before a Court of competent jurisdiction and has been arraigned, and has pleaded, and a jury has been empaneled and sworn he is in jeopardy, but until these things have been done jeopardy does not attach. McFadden vs. Comm., 23 Pa. St. 12; Heater vs. Comm., 85 P. S., 139; Alexender vs. Comm., 105 P. S., 1; United States vs. Shoemaker, 2 McLean (U. S.), 114. It is settled in this State that the finding of a bill of indictment not a true bill by the Grand Jury will not bar a subsequent prosecution for the same offense, but, however, this may be even though we should admit that the present prosecution was heard before a Justice who was a Court of competent jurisdiction either to convict or acquit the defendant, and that a second jeopardy therefore would be barred by the common law, surely no one would argue that the Legislature had not the power to change the common law in this respect, unless such a change is in violation of the Constitution. That it is not in violation of Section 10, Article I, of the Constitution, which prohibits anyone from being put twice in jeopardy of life or limb, has already been decided by our highest Court, as we have already said, and so far as this particular offense is concerned this legislation is expressly authorized by Article V, Section 14, which, under the decisions in no way conflicts with the former section, and even though it did it would be of equal authority. We are of the opinion that an appeal is allowed to the Commonwealth in all cases of summary conviction by the Constitution itself and by the subsequent legislation which made this constitutional provision effective, and that the phrase "summary conviction" used in the constitutional provision and the legislation referred to, must be construed as a term referring to a well-known mode of procedure in law and not with reference to the meaning of the word "conviction" as used in the ordinary sense of an adverse verdict. Appeals in similar cases have been previously allowed by the Superior Court, in the case of Comm. vs. Kenny, 32 Supr. C., 544, and Comm. vs. Immel, 33 Supr. C., 388. Judge Patton thinks this was because the question decided in his opinion was not called to the attention of that Court, but we prefer to think this would have been unnecessary if his objections are sound.

For the above reasons the rule is discharged.

By the Court,

HALL,
President Judge.

January 17, 1910.

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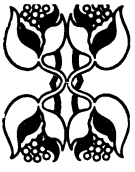

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