

# REPORT ON THE PROPAGATION AND DISTRIBUTION OF FOOD-FISHES.

BY W. DE C. RAVENEL, *Assistant in Charge.*

## INTRODUCTION.

The work of the division was under the direction of Dr. T. H. Bean until May 23, when he resigned to accept the superintendency of the Aquarium in Battery Park, New York. The vacancy was filled by the appointment of W. de C. Ravenel, who had been in charge from October to May, while Dr. Bean was engaged in inspecting the various stations and in preparing plans for the exhibit at the Cotton States International Exposition, he having been appointed representative of the Commission on the Government board of management.

In addition to the usual work of the division, which consists of the general direction of fish-cultural work, including the propagation and distribution of fish from the various stations, arrangements were perfected for the purchase of a carload of eastern oysters in New York and the shipment of same by express to South Bend, Wash., for planting in Willapa (Shoalwater) Bay. They were delivered in excellent condition and transplanted on suitable grounds, under direction of Mr. C. H. Townsend, assisted by Hon. James Crawford, fish commissioner of Washington. Efforts were also made to increase the salmon output by operating the hatchery on Siuslaw River, and rainbow-trout eggs were collected at Mammoth Spring, Ark. The Exposition work, which devolved on Mr. Ravenel at the resignation of Dr. Bean, included the construction of an aquarium larger and more elaborate than any ever before undertaken by the Commission, besides the selection and preparation of various forms of apparatus to be used in illustrating the work of the Commission.

## INSPECTION OF STATIONS.

During the month of October Green Lake Station, Maine, was inspected by Dr. Bean. He afterwards visited Leadville, Colo.; Neosho, Mo.; Quincy, Ill., and Put-in-Bay, Ohio, and submitted reports on the work of the stations at those places, with recommendations as to improvements. The results at the Gloucester Station, Massachusetts,

were so poor—only about 17 per cent of the eggs delivered having been hatched—that in March the assistant, accompanied by Mr. I. S. K. Reeves, proceeded to Woods Hole and Gloucester to obtain data for the comparison of methods and facilities at the two stations. The conditions existing at the two were found to be entirely unlike in the most important essentials. At Woods Hole the eggs are taken from penned fish, whereas at Gloucester they are collected from fish caught by the regular fishing vessels on the banks and transported by rail from Kittery to Gloucester.

The Gloucester Station is at a serious disadvantage with regard to water—the next most important element in fish-cultural operations—as it is not only likely to be roiled after storms, occurring at frequent intervals during the hatching season, but is also heavily charged with sediment and contains much animal life (chiefly crustaceans) which interfere seriously with the working of the hatching-boxes. The hatchery is also poorly lighted. After careful consideration the assistant recommended that steps be taken to provide storage for brood fish, as at Woods Hole, and that the hatchery be improved and arrangements made to filter the water by means of sand and gravel, so as to eliminate the trouble arising from the presence of sediment, crustaceans, etc.

The importance of regular inspections of the fish-cultural stations can not be too strongly urged. They should be made at least once a year by the Commissioner or the assistant in charge of the Division of Fish-culture.

STATION OPERATIONS.

The total number of fish and eggs distributed by the Commission during this fiscal year was 619,915,852, which far exceeds the output of any previous year. The same stations were operated as in 1893-94, with the addition of the one at St. Johnsbury, Vt. This was not completed in time for the collection of eggs, but a few fish were hatched there from eggs transferred from other stations.

Following is a list of the stations operated during the year:

Green Lake, Me.	Fish Ponds, Washington, D. C.	Duluth, Minn.
Craig Brook, Me.	Central Station, Washington, D. C.	Quincy, Ill.
St. Johnsbury, Vt.	Bryan Point, Md.	Neosho, Mo.
Gloucester, Mass.	Wytheville, Va.	Leadville, Colo.
Woods Hole, Mass.	Put in Bay, Ohio.	Baird, Cal.
Steamer <i>Fish Hawk</i> (Delaware River).	Northville, Mich.	Fort Gaston, Cal.
Battery Island, Md.	Alpena, Mich.	Korbel, Cal.
		Clackamas, Oreg.

DISTRIBUTION OF FISHES.

The number of eggs, fry, and adult fish furnished by each of the stations is shown in the following table; also a summary of fishes distributed, arranged by species. This includes 30 species of fish and 1 crustacean, the lobster.

*Fish and fish eggs furnished for distribution by the United States Fish Commission during the fiscal year ending June 30, 1895.*

Source of supply.	Species.	Eggs.	Fry.	Adults and yearlings.
Green Lake, Me.	Landlocked salmon	20,000		128,042
	Hybrid (landlocked-Von Behr)		4,500	
	Rainbow trout		350	
	Loch Leven trout			12,512
	Von Behr trout			7,324
	Brook trout			6,803
Craig Brook, Me.	Lake trout			2,500
	Atlantic salmon	20,000		186,241
Gloucester, Mass.	Brook trout			7,307
	Cod		12,896,000	
Woods Hole, Mass.	Lobster		653,000	
	Cod	2,807,000	47,942,000	
	Flatfish		5,940,000	
	Lobster		71,000,000	
Delaware River (steamer <i>Fish Hawk</i> ).	Shad	321,000	19,859,000	
Battery Island, Md. Fish Ponds, Washington, D. C.	Shad	852,000	13,932,000	
	Carp			37,393
	Goldfish			6,830
	Tench			11,280
	Golden tench			64
	Golden ide			10
	Black bass			0,552
Central Station, Washington, D. C.	Shad			1,000,000
	Rainbow trout		8,000	
	Hybrid (landlocked-Von Behr)		5,500	
Bryan Point, Md.	Shad		41,984,000	
	do	40,898,000		
Wythoville, Va.	Rainbow trout	177,000	5,000	79,387
	Black bass			553
	Rock bass			5,558
	Carp			1,580
	Goldfish			3,002
	Lake herring	9,852,000	2,600,000	
Put-in-Bay, Ohio	Whitefish	5,000,000	80,198,000	
	Pike perch	30,000,000	202,380,000	
	Lake trout		447,500	
	do	2,100,000	1,610,000	
Northville, Mich.	Brook trout		182,500	
	Von Behr trout		20,000	
	Loch Leven trout	5,000	10,000	
	Rainbow trout		13,000	6,234
	Steelhead trout		40,000	
	Whitefish	50,000	28,000,000	
Alpena, Mich.	Lake trout	8,746,000		
Duluth, Minn.	Pike perch		13,000,000	
	Whitefish		11,000,000	
	Lake trout		4,250,000	
	Rainbow trout		18,000	
	Steelhead trout		75,000	
Quincy, Ill.	Black bass			21,820
	Crappie		50,000	5,675
	Warmouth bass			1,090
	White bass			71
	Sunfish			221
	Yellow perch			3,325
	Pike perch			209
	Catfish			5,916
	Pike			82
	Von Behr trout			3,440
	Rainbow trout	280,000	14,000	73,930
Neosho, Mo.	Rock bass			53,619
	Black bass			3,761
	Tench			3,970
	Carp			340
	Catfish			1,965
	Goldfish			7,857
	Brook trout	70,000	230,000	70,325
	Rainbow trout		30,000	750
	Black-spotted trout			1,475
	Loch Leven trout			870
Baird, Cal.	Quinnat salmon	3,676,000	500,000	
Fort Gaston, Cal.	Steelhead trout	60,000	302,500	332,000
	Rainbow trout		1,000	
	Von Behr trout		4,000	
	Silver salmon		220,000	560,000
Korbel, Cal.	do		470,000	
	Steelhead trout		550,000	
Clackamas, Oreg.	Quinnat salmon	23,000		

Summary of distribution.

Species.	Eggs.	Fry.	Adults and yearlings.	Total.
Catfish			7,574	7,574
Carp			33,935	33,935
Tench			13,852	13,852
Goldfish			18,590	18,590
Golden tench			51	51
Golden ide			10	10
Shad	1,173,000	74,205,000	1,000,000	76,378,000
Quinnat salmon	3,699,000	500,000		4,199,000
Silver salmon		910,000	560,000	1,470,000
Atlantic salmon	20,000		186,241	206,241
Landlocked salmon	20,000		124,680	144,680
Steelhead trout	60,000	963,500	332,000	1,355,500
Loch Leven trout	5,000	10,000	13,382	28,382
Rainbow trout	457,200	89,350	142,946	689,496
Von Behr trout	5,000	24,000	10,399	39,399
Black-spotted trout			1,475	1,475
Brook trout	70,000	408,500	83,916	560,416
Lake trout	2,100,000	6,297,000	1,600	8,398,600
Whitefish	5,650,000	120,198,000		125,248,000
Yellow perch			3,325	3,325
Pike perch	30,000,000	222,180,000	273	252,180,273
Lake herring	9,852,000	600,000		10,452,000
Black bass			28,233	28,233
Rock bass			47,519	47,519
Warmouth bass			703	703
Sunfish			218	218
Crappie			4,368	4,368
White bass			12	12
Cod	2,897,000	57,318,000		60,215,000
Flatfish		5,940,000		5,940,000
Lobster		72,253,000		72,253,000
Total	55,408,200	561,894,350	2,613,302	610,915,852

NOTE—2,047,000 shad fry were deposited for rearing in the Fish Ponds, Washington, D. C., but these figures are not included in the summations; also 9,500 hybrids of Von Behr trout and landlocked salmon were hatched and distributed, but these not being a distinct species are not included.

In addition to the foregoing there were furnished for distribution, but lost in transit, 6,200,000 pike-perch eggs, 1,580,000 pike perch fry, 1,570,000 shad fry, 328,000 cod fry, 6,000 brook-trout fry, 10,500 lake-trout fry, 4,000 steelhead-trout fry, and the following adults and yearling fish: 307 catfish, 5,860 carp, 1,404 tench, 1,099 goldfish, 3,362 landlocked salmon, 17,355 rainbow trout, 365 Von Behr trout, 519 brook trout, 900 lake trout, 26 pike perch, 4,478 black bass, 11,658 rock bass, 387 Warmouth bass, 3 sunfish, and 1,307 crappie.

GREEN LAKE STATION, MAINE (E. M. ROBINSON AND E. E. RACE, SUPERINTENDENTS).

Operations were continued under the direction of Mr. Robinson until November 27, when he was temporarily superseded by Mr. C. G. Atkins, superintendent of Craig Brook Station, who was detailed to assume charge of Green Lake Station pending the appointment of a successor to Mr. Robinson, and to report on the condition of affairs. Mr. Atkins remained in charge until January 23, 1895, when Mr. E. E. Race was appointed superintendent.

The fry and stock fish on hand at the station at the beginning of the fiscal year were as follows:

Variety.	When hatched.				1890 or before.
	1894.	1893.	1892.	1891.	
Landlocked salmon	149,041		4,056	3,376	2
Von Behr trout	11,674		1,140		
Loch Leven trout	15,078		1,788		
Lake trout	15,000				
Brook trout		203			90

During July and August the station force was fully occupied in caring for the stock on hand. The losses of fry were comparatively small, notwithstanding the high temperature prevailing. The lake-trout fry were moved from the hatchery to Spring Branch in June, but had to be transferred later on to another spring at Rocky Pond, as the first one dried up. On September 8 Mr. Robinson reported that by actual count there were only 2,663 of these fishes left, from which it would appear that lake trout will not stand as high a temperature as the rainbow trout and the landlocked salmon. The landlocked salmon hatched in 1892, which had been held as brood stock, were planted in Green Lake in October, it having been found that the number held was too large for the pond space available. During the months of September and October the following fishes, resulting from eggs taken the previous fiscal year, were distributed: Landlocked salmon, 128,042; Loch Leven trout, 12,512; Von Behr trout 7,324; brook trout (produced at Craig Brook Station), 6,803; lake trout, 2,500.

*Collection of eggs.*—The station being entirely dependent on the capture of fish from the open waters for its supply of eggs of trout and landlocked salmon, arrangements were made in August for the erection of a pound net at Mann Brook for the capture of spawning salmon. The grounds at Winkempaugh Brook were also inspected, and arrangements made for the collection of eggs there, and new pens and traps were placed in Great Brook. A force of men was also sent to Branch Pond to conduct operations. The first salmon was taken on September 19 at the Great Brook trap, and by the pound net on September 27.

The collection of brood fish from all these sources was disappointing. At the close of the spawning season the eggs taken were as follows: Landlocked salmon, 164,000; brook trout, 71,750; golden trout (from Flood Pond), 17,000; square-tailed trout, 2,000; total, 254,750.

From the brood stock of Von Behr and Loch Leven trout 56,700 eggs were taken during the month of December. These were apparently of low vitality when fertilized, and died before the close of the year. The following table shows the number of eggs received at and transferred from the station during the year:

Localities.	Species.	Number.
Sent from Northville, Mich.....	Lake trout.....	100,000
Sent from Dumfries, Scotland, by J. J. Armistead.....	Loch Leven trout.....	20,000
Sent from Wytheville, Va.....	Rainbow trout.....	15,000
Sent to Central Station, Washington, D. C.....	Hybrid landlocked salmon and Von Behr.	5,231
Sent to California Fish Commission, Sisson, Cal.....	Landlocked salmon.....	10,000

The presence of immense numbers of parasites and a quantity of fungus, which made its appearance in February, necessitated the filtering of the water. To accomplish this, gravel filters were put in the ends of the hatching troughs and cheese-cloth screens in the supply trough. The cheese-cloth screens were used only during the day, and as they became clogged very quickly and had to be changed during the

night, wire screens were substituted. While the wire screen did not prevent the mud from entering the troughs, it stopped most of the parasites. It became necessary about this time to increase the amount of water from 5 to 12½ gallons, as with the smaller amount it was not unusual to find a thin scum of ice over the troughs in the morning. When the feeding of the fish in the ponds commenced, late in April, the stock consisted of 90,000 landlocked salmon fry, 19,538 brook trout, 10,352 golden trout, 83,257 lake trout, 5,066 rainbow trout, 7,259 Loch Leven trout, 4,892 hybrids; total, 220,364.

Arrangements were made to care for the lake-trout fry in troughs in the carpenter shop, the supply of water being taken from the main flume, but as the temperature rose it was deemed advisable to remove the lake trout and brook trout to a temporary nursery erected a half mile up the mountain side, east of the spawning-house. In preparing this nursery it was necessary to place a dam across the brook and to cut a road through the underbrush. The temperature of the water in the hatchery reached 71° on May 11, causing a large loss of fry, especially of those that had not absorbed the sac. The rainbow trout suffered such heavy losses that it was decided to deposit the balance (350) in Green Lake, also the 1,000 hybrid Von Behr and landlocked salmon and 3,700 Von Behr and brook. At the close of the month the following fry were reported on hand: 59,878 landlocked salmon, 14,314 brook trout, 6,800 golden trout, and 70,416 lake trout. All of the Loch Leven trout received from Scotland succumbed, owing to extreme heat, notwithstanding the fact that special efforts were made to save them by putting them in the temporary nursery.

The temperature of the water during June was normal, and the losses of fish and fry comparatively small. The maximum and minimum air and water temperatures during the year were as follows:

1894.	Water.		Air.		1895.	Water.		Air.	
	Max.	Min.	Max.	Min.		Max.	Min.	Max.	Min.
July .....	79½	69	93	59	January .....	34	33	46	- 7
August .....	77½	63	87	52	February .....	37½	32½	61	-16
September .....	70	58½	84	42	March .....	37	32½	54	2
October .....	60	40½	69	32	April .....	51½	34½	75	22
November .....	66½	33	56	10½	May .....	70½	48½	89	43
December .....	45	31	50	-6	June .....	78	62½	89	54

During winter 50 tons of ice were cut and stored, and repairs were made on the main flume. Considerable work was also done on the roads leading to the station, and a temporary bridge, 60 feet long, was built across Great Brook so as to permit of the hauling of wood.

The experience of the past two years has demonstrated the fact that the temperature of the water at present furnished the hatchery is too high during certain portions of the year for the successful rearing of lake and brook trout, though the landlocked salmon thrive in it. It is therefore recommended that steps be taken to secure the spring which has been used for supplying the temporary nursery. The water is of standard temperature, 42° F., and its volume is from 50 to 100 gallons

per minute. There is another spring on the Government property between the hatchery and Rocky Pond which should be excavated and put in condition. The temperature of this is  $46\frac{1}{2}^{\circ}$ , and by mingling it with the water from the flume it would undoubtedly suffice for rearing a large quantity of brook trout.

Following is the list of fish and fry on hand June 30, 1895:

Species.	Calendar year in which fish were hatched.				
	1895.	1894.	1893.	1892.	1891 or before.
Landlocked salmon .....	54,950		3		3,000
Brook trout .....	13,350		138		
Golden trout .....	6,480				
Lake trout .....	61,539				
Von Bohr trout .....				1,150	
Rainbow trout .....			7		
Total .....	136,319		148	1,150	3,000

CRAIG BROOK STATION (CHARLES G. ATKINS, SUPERINTENDENT).

The fiscal year opened with the following stock on hand:

Kind.	Calendar year in which hatched.						
	1894.	1893.	1892.	1891.	1889.	1888-89.	1888.
Atlantic salmon .....	214,033	867					11
Atlantic salmon domesticated .....	681	1,347	131				
Landlocked salmon .....						14	
Brook trout .....	9,370						
Rainbow trout .....					6		
Scotch sea trout .....				27			
Total .....	224,084	2,214	131	27	6	14	11

*Atlantic salmon.*—Of 174 Atlantic salmon collected at Penobscot Station in May and June, 1894, 143 remained alive in the inclosure at Dead Brook on July 1, but by October the number had been reduced to 71, 38 of which were females. These salmon were purchased conjointly with the State of Maine, and of the 415,350 good eggs obtained from them the United States Commission received 226,350 as its share, and the State 189,000. Twenty thousand of those belonging to the United States Commission were shipped to the New York Commission at Cold Spring Harbor, and the balance were retained at the station for hatching and rearing. The eggs commenced to hatch in March and finished in April, yielding 205,994 fry, of which 176,954 survived at the close of the fiscal year.

The 11 salmon hatched in 1888, and confined in small ponds over six years, died during the summer. These were the parents of the three broods of domesticated salmon which were hatched in the years 1892, 1893, and 1894, respectively. There were 2,150 of them in all at the beginning of the year, but the number was greatly reduced by two attacks of disease, one occurring in the summer of 1894 and the other in May, 1895. The survivors (991) appear to be healthy and vigorous and will be sufficient for the purpose of artificial landlocking. None of them are old enough as yet to yield eggs.

*Landlocked salmon.*—From the station's brood stock, consisting of remnants of the broods of 1888-89, which have been held in a very small shallow pond without change of quarters for the past four years, 8,800 eggs were taken in October. As they were of poor quality, only 2,783 fry were hatched from them, and of these but 1,346 remained at the close of the fiscal year. Arrangements were also made for the collection of eggs in Toddy Pond, it having first been stocked by the United States Fish Commission in 1891. An attempt to take eggs in that pond in 1892 resulted in the collection of only 4,200, but as sportsmen had reported the taking of a large number of adult fish there during the season 1893-94, it was believed that at least 100 spawners could be secured. The results were disappointing, however, as only 9 of the 40 salmon captured were females. The 12,600 eggs taken were healthy and hatched out 11,887 fish, of which 9,807 remained at the end of the year.

*Rainbow trout.*—All of the rainbow trout except one died during the year. The pond in which they were confined has a superficial area of 240 square feet, a maximum depth of about 2 feet, and is supplied with water from the waste of the rearing-troughs. The largest of these trout weighed 15½ pounds and measured 27¼ inches in length, 8½ in breadth, and 4½ in thickness. Eight of the others weighed over 5 pounds each, and two over 10 pounds. In a larger pond they would probably have lived longer and attained an even greater size. In January a consignment of 24,272 rainbow trout eggs was received from the Wytheville Station. These produced 20,260 fry, of which 11,506 remained on hand at the close of the year.

*Swiss Lake trout.*—A case of lake-trout eggs, said to contain 80,000, was received from Switzerland in March. The package had been delayed by some mischance, and the eggs arrived in such poor condition that only 541 fry were hatched from them, and but 20 of them were alive at the close of the year.

*Brook trout.*—In October and November collections of brook trout eggs were made from fish artificially reared at the station and from wild fish at Craig Pond, the station fish yielding 8,500 eggs and the others 16,000. The collection at Craig Pond was in the nature of a reconnoissance, the fish being taken on the spawning beds by means of a trap constructed with stakes and nets. Of 20 taken, only 13 were adults, and 9 of these were females. In addition to the collections made at the station a consignment of 49,480 eggs was received from the station at Leadville, Colo., and 61,145 fry were hatched from these and the station stock. The fry suffered severely during the months of May and June, and there were only 39,331 on hand at the close of the year.

The Atlantic salmon and trout were kept in troughs and fed as usual on maggots and chopped beef until October, when 7,207 trout were distributed to applicants in New England and 177,525 Atlantic salmon were liberated in the tributaries of Penobscot River, in the vicinity of the station. Of 10,000 wintered in the troughs, 9,020 were liberated in the Penobscot in May, the balance being retained.



The following statement shows in detail the distribution of salmon:

Date.	Where planted.	Number.
1894.		
Oct. 26	Frank Cotton's Brook, tributary of Alamoosook Lake	5,440
26	Meadow Brook, tributary of Alamoosook Lake	5,228
26	Saunders Cove, Toddy Pond	6,138
27	Trundy's Brook, Toddy Pond	8,543
27	Sacket Harbor, Toddy Pond	8,200
27	Luko Harriman's Brook, tributary of Toddy Brook	5,164
27	Wardwell Brook, tributary of Alamoosook Lake	2,252
29	Stubbs Brook, Bucks Mills	5,474
29	Little Dead Brook, Bucks Mills	3,330
29	Meadow Brook, Gilpin, tributary of Alamoosook Lake	8,967
29	Heart Pond	10,519
29	Pearls Stream, Toddy Pond	8,536
29	Wardwell Brook, tributary of Alamoosook Lake	5,529
31	Pearls Stream, Toddy Pond	8,304
31	Charles Harriman's Brook, tributary of Toddy Pond	5,613
31	Luko Harriman's Brook, tributary of Toddy Pond	2,808
Nov. 1	Dead Brook, tributary of Narramissic River	8,943
1	Toddy Pond	12,862
1	Gully Brook, tributary of Alamoosook Lake	6,795
2	Narramissic River	9,732
2	Saunders Cove, Toddy Pond	10,052
3	Brier Brook, Gilpin, tributary of Alamoosook Lake	8,409
3	Toddy Pond	6,982
30	Craig Brook	2,143
30	Alamoosook Lake	11,462
1895.		
May 13	do	1,540
14	do	200
22	do	2,404
24	do	1,700
25	do	2,403
28	do	773
	Total	186,542

On June 30 the following fish and fry were in stock:

Kind.	When hatched.							
	1895.	1894.	1893.	1892.	1891.	1890.	1889.	1888-9.
Atlantic salmon	176,954	624	342					
Atlantic salmon, domesticated		216	725	50				
Landlocked salmon	12,590							5
Brook trout	39,331							
Rainbow trout	11,506						1	
Scotch sea trout	3,313				22			
Swiss lake trout	20							
	243,714	840	1,067	50	22		1	5

During the summer and fall of 1894 considerable attention was given to the problem of growing live food in artificial ponds for young fish. Entomostraca formed the most important subject of these studies and efforts, but several other kinds were cultivated also, and one species of *Polyphemus* became so abundant at one time as to incite the hope that a solution of the problem was near at hand. The supply was soon exhausted, however, and though no marked success was attained with any of the species handled, it is still deemed advisable to continue experiments in this line. The production of maggots for food is particularly valuable from the fact that it becomes possible to utilize in this way a great deal of material that would otherwise be lost. An excellent food was obtained from the carcasses of disabled or worn-out horses,

purchased at the rate of 1 cent per pound for what they would dress. Blood was also utilized by mixing it with cheap flour or meal and cooking into pudding, which was ground up before being fed. This was not taken very readily by the fish, however, and they did not appear to thrive so well on it as upon meat or maggots. Experiments were also made with canned herring spawn, shipped from the station at Havre de Grace, Md. The rainbow trout fry ate it readily and thrived upon it, but the salmon and brook trout did not appear to relish it. The total amount of the various kinds of food purchased during the year and cost of same are shown by the accompanying statement:

Kind of food.	Pounds.	Cost.
Butchers' offal.....	3,765	\$57.96
Refuse meat.....	3,555	51.00
Blood.....	2,720	30.17
Middlings.....	884	13.24
Flour.....	231	3.06
Shorts.....	50	.63
Salt (2 bushels).....		1.50
Horserfesh.....	7,249	72.86
Beef carcasses.....	1,008	16.08
<b>Total.....</b>	<b>20,062</b>	<b>246.56</b>

This added to the miscellaneous expense for trucking, etc., amounting to \$76.40, makes the total cost of fish food for the year \$322.96.

The maximum and minimum temperatures of the air and water, taken at 2 p. m. during the year, were as follows:

Month.	Air.		Water.				Snow.	Rain.
			Hatchery, west side.		Head of north stand.			
	Max.	Min.	Max.	Min.	Max.	Min.		
1894—July.....	93	58	70	70	70.5	63	.....	2.0
August.....	85.5	59	73.5	66.5	70	63	.....	7.2
September.....	82	57	68.5	62	66.5	60	.....	2.95
October.....	66	42.5	62	53	61	53.5	.....	3.95
November.....	56.5	16	54	36.5	54	38	11	1.35
December.....	48.5	12	38.5	33	42.5	34.5	13	2.55
1895—January.....	44.5	8	35.5	32.5	38	34	27	2.9
February.....	37	—4	35.5	32	38	33	28	.....
March.....	47	17.5	38	33.5	48	35	8.5	2.1
April.....	63	35.5	51	35.5	52	37.5	2	3.25
May.....	89	43	68	60	66	50	.....	1.15
June.....	86.5	53	74	61	69	50	.....	1.6

ST. JOHNSBURY STATION, VERMONT (J. W. TITCOMB, SUPERINTENDENT).

During the previous fiscal year a dam was built across Sleeper River, trees were cleared away from the line of the proposed water pipe, spring brooks were ditched and bridged, a driveway was built to the railroad, a side track constructed by the St. Johnsbury and Lake Champlain Railroad Company on the west side of the station property, and grading was done for a site for the superintendent's house and stable. The stable was completed May 19, 1894, and at the close of the fiscal year the hatchery was nearly finished. On August 1, 1894, the building was

turned over to the superintendent, and arrangements were at once made for the construction and introduction of the necessary hatching-troughs, water supply, and drain pipes. An outbuilding, ice-house, and flag-staff were erected during the summer. A dam was constructed on the spring brook west of the hatchery, under the direction of Mr. G. H. Schneider. A small house was erected over the spring reservoir at the dam, and a 3-inch pipe was laid from the dam to the hatchery, which afforded a small supply of water. Fences were built along the highway and surrounding the station property back of the woods. During the summer and fall 40 hatching-troughs, equipped with screens and supply tanks, were made by the regular employees of the station.

Owing to the large amount of sediment with which the water was charged it was deemed necessary to provide filter screens at each spigot. The superintendent devised a new form of spigot, with a hood, for supplying the troughs, as he found that with those in use the water spurted over the aerating board, instead of falling against it, thus making it impossible to keep the eggs on the trays.

As the equipment of the hatchery was not completed until late in the fall, and the spring water supply was inadequate for the conduct of fish-cultural operations on a large scale, no efforts were made to collect eggs during the season, but on January 10 a consignment of 50,000 lake-trout eggs was received from Northville Station in excellent condition, only 87 dead ones being found. They were laid down in four troughs, with an average water supply of 2 gallons per minute, which was the total output of the spring at that time. The eggs commenced hatching on January 20, finishing March 31, with a loss of about 2½ per cent. The heavy thaw on the 7th of February caused a greatly increased volume of water, accompanied with a fine sediment, which adhered to the eggs and appeared to smother the fry. The variation in the water supply and the accompanying variations in its consistency continued to the end of the year, and frequently it would be so roily for days at a time that neither eggs nor fry could be seen. The longest period in which it was impossible to see to pick over the fry was five days. The volume of the spring during June was about 18½ gallons, which seems to be its normal capacity. The heavy losses of fry which occurred in May and June were due not only to the condition of the water, but also to the small amount available for each trough, namely, 2 gallons per minute, the average temperature being 52°. On June 28, 1895, the supply was increased by the introduction of water from the Sleeper River. On April 20, 25,000 steelhead-trout eggs were received from the Fort Gaston Station. They had been en route nine days, and though the upper trays nearest the ice were in good condition, the eggs in the lower trays had hatched and the fry were dead. The immediate loss was estimated at 8,500, and the loss in the troughs to the end of June was 9,827 additional. The 6,673 fry left at the close of the year were active, healthy fish, and took their food freely.

The maximum and minimum temperatures of the water and air at the station from January 1 to June 30, 1895, were as follows:

Month.	Water.		Air.	
	Max.	Min.	Max.	Min.
January .....	38	32	42	-26
February .....	36	32	37	-22
March .....	36	32	42	-10
April .....	50	33	66	12
May .....	58	41	86	33
June .....	63	45	90	52

NOTE.—The sign — indicates below zero.

GLoucester Station, MASSACHUSETTS (A. C. ADAMS IN CHARGE).

The lobster and mackerel work of the previous fiscal year was continued until July 14, under the direction of W. P. Sauerhoff, during which time, from 55 egg-bearing lobsters, 717,000 eggs were taken and 652,000 fry hatched and liberated in the harbor off Gloucester. During the season the fishermen in the vicinity of Gloucester apparently took but little interest in the work of the Commission, and it was difficult to get them to save their egg-bearing lobsters.

*Mackerel.*—Work with this species was very unsatisfactory, owing to the limited supply of eggs and the consequent lack of opportunity to experiment with water conditions, etc. Only four lots of eggs, aggregating 586,000, were obtained, 38,000 of them being taken in July, on the 10th. The eggs commenced hatching six days after being taken, but the fry died immediately.

On July 27 the station was closed and placed in charge of a watchman until November 1, when cod operations were resumed.

*Cod.*—The season opened November 22, 1894, and closed March 19, 1895, during which time 50,120,000 eggs were taken and 12,929,000 fry hatched and liberated. The spawn-taking force, directed by Capt. E. E. Hahn and consisting of a part of the crew of the *Grampus*, was stationed at Kittery Point, Me., for convenience in taking eggs caught by the Ipswich Bay fishermen, who usually market their catch in Portsmouth and Kittery Point. The balance of the crew was on duty at the station. From the 793,000 good eggs received in November 275,000 fry were hatched and liberated in good condition off Gloucester Harbor.

The weather in the month of December being favorable for good work, eggs were received almost daily, and by the 20th the hatchery was full. During the month 19,261,000 eggs were collected, from which 11,533,000 fry were hatched. Of this number 6,395,000 were liberated off Gloucester in December, and the balance in January, the last deposit being made on the 22d. Of the eggs obtained in December 2,481,000 were purchased from two small vessels fishing off Gloucester. The total number of good eggs received in January was 20,981,000, from which 1,121,000 fry were hatched and deposited in waters off Gloucester. Toward the end of the month two or three short storms caused the

water in the harbor to become so roily that it was impossible to wash the sediment from the eggs. Very few fry were hatched from the 9,085,000 eggs received in February, and none of them lived. This was due to the low temperature of the water, which fell to 29° F. and continued cold until March 26. The fry appeared to lack sufficient strength to break out of the shell, and on March 19 the remainder of the eggs (2,110,000) were put overboard, preparatory to the closing of the station on March 26.

WOODS HOLE STATION, MASSACHUSETTS (JOHN MAXWELL, SUPERINTENDENT).

During the summer a museum and aquarium were installed in the northeast section of the first floor of the laboratory building. The aquaria were made of wood, with glass fronts, and are of the following dimensions and capacity:

Five aquaria, with glass 6 feet 4½ inches long by 2 feet 5 inches wide by 1 inch thick; length, 6 feet 9 inches; capacity, 400 gallons.

Two aquaria, with glass 4 feet 5½ inches long by 2 feet 5 inches wide by 1 inch thick; length, 4 feet 10 inches; capacity, 300 gallons.

The tanks were cased in with ornamental panel work of cypress, and were appropriately decorated in the interior with cement and stone by L. G. Harron, the superintendent of the aquarium at Washington. The total cost of the aquarium, including the purchase of all material and labor, was \$1,080.

Fifteen of the exhibition cases received from the World's Columbian Exposition were placed in the Zoological Museum and two in the hall entrance to the museum. In these were exhibited the various specimens of salt and fresh water fishes and other animals in alcohol and stuffed. A number of changes were made in the system of water supply, and hard-rubber jet-cocks were substituted for brass in the laboratory and hatching-room. The residence, laboratory, water tower, storehouse, and coalhouse were painted and other minor changes made. A brick chimney, 55 feet in height, was built, adding greatly to the efficiency of the steam plant. Four McDonald cod tables were added to the hatching equipment, which increased the hatching capacity about 16,000,000; also 6 tables for hatching lobster eggs. The McDonald cod boxes superseded the Chester jars which had been in use at the station for a number of years.

A southeasterly storm of unusual severity, which occurred on January 26, caused considerable damage to the stone pier at breakwater, which constitutes the harbor of refuge at the station. The work of repairing the wharf was commenced on April 27, under the direction of the Engineer Corps, and was in progress until the end of the fiscal year.

*Cod.*—The first consignment of brood codfish was received from the schooner *Grampus* on October 4, and during the season 1,622 were derived from the same source. In addition to this, 1,700 were purchased from fishing smacks, making a total of 3,322 brood fish. These were kept in live-cars at the station until ready to spawn, being fed daily on sea clams, quahogs, and small fishes caught in the fyke nets,

and examined every other day to note development. The first lot of eggs (80,000) was taken on November 12. The spawning season continued to February 4, during which time 85,505,000 eggs were secured from 1,107 fish. From these 46,672,942 fry, or about 56 per cent, were hatched and planted in adjacent waters. The largest number of eggs taken at one time was 5,327,000, obtained from a consignment received from Block Island. At another time 9,033,000 were taken at one overhauling from two lots of fish brought from different points. On December 17, from a fish weighing 18 pounds, 657,000 eggs were taken before it died. An examination of the roe showed scarcely any diminution, and it was estimated that three-fourths of the original number contained in the sac remained in a comparatively developed state.

Daily record of eggs taken and lost, fry planted, etc.

Date.	Number of eggs.		Number of fry.		Date of hatching.	Average temperature.		Density.
	Taken.	Lost.	Hatched.	Planted.		Air.	Water.	
1894						o	o	
Nov. 12	80,000	50,000	30,000	30,000	Nov. 24	41.5	47	1.0253
16	300,000	230,000	70,000	70,000	Dec. 2	41.5	44	1.0253
19	380,000	300,000	80,000	80,000	Dec. 3	41.5	44	1.0254
22	300,000	135,000	165,000	165,000	Dec. 5	36	43.5	1.0254
24	190,000	65,000	125,000	125,000	Dec. 7	36	43.5	1.0255
26	758,000	758,000						1.0255
27	1,530,000	530,000	1,000,000	1,000,000	Dec. 15	39	42.5	1.0255
28	696,000	124,000	572,000	572,000	Dec. 16	39	42	1.0255
30	2,090,000	1,092,000	1,598,000	1,598,000	Dec. 18	40	40.5	1.0255
Dec. 3	2,832,000	1,610,000	1,222,000	1,222,000	Dec. 20	40	40.5	1.0255
4	1,290,000	300,000	990,000	990,000	Dec. 23	40	40.5	1.0255
5	2,182,000	447,000	1,735,000	1,735,000	Dec. 25	39	39.5	1.0255
6	2,574,000	991,000	1,583,000	1,583,000	do	39	39	1.0255
7	3,340,000	425,000	2,915,000	2,915,000	Dec. 26	39	39	1.0256
8	2,232,000	482,000	1,750,000	1,750,000	do	39	39	1.0256
10	4,470,000	813,000	3,657,000	3,657,000	Dec. 27	39	39	1.0256
11	4,503,000	623,000	3,940,000	3,720,000	do	39	39	1.0256
12	2,528,000	1,000,000	1,528,000	1,528,000	Dec. 30	33.5	36.5	1.0256
13	2,483,000	1,242,000	1,241,000	1,241,000	Dec. 31	33.5	37.5	1.0256
14	2,714,000	1,710,000	1,004,000	1,004,000	Jan. 9	33.5	37	1.0256
15	1,762,000	1,412,000	350,000	350,000	do	33.5	37	1.0250
17	5,327,000	1,969,000	3,358,000	3,300,000	Jan. 10	32	37	1.0257
18	2,018,000	928,000	1,090,000	1,090,000	Jan. 12	30	37	1.0257
19	2,940,000	1,510,000	1,430,000	1,430,000	Jan. 14	30	36.5	1.0257
20	1,918,000	1,168,000	750,000	750,000	Jan. 16	30	36.5	1.0257
21	2,930,000	2,228,000	702,000	702,000	Jan. 20	30.5	36.5	1.0258
22	2,782,000	1,206,000	1,576,000	1,576,000	Jan. 21	30.5	36.5	1.0258
24	3,530,000	2,472,000	1,058,000	1,058,000	Jan. 22	30.5	36.5	1.0258
26	2,850,000	777,000	1,873,000	1,873,000	Jan. 23	30.5	35	1.0258
31	3,482,000	1,315,000	2,167,000	2,167,000	Jan. 28	30	34.5	1.0258
1895								
Jan. 2	2,350,000	358,000	1,992,000	1,992,000	Jan. 29	30	34	1.0257
3	1,200,000	598,000	602,000	602,000	Jan. 30	30	34	1.0257
4	1,300,000	537,000	763,000	763,000	Feb. 2	30	34	1.0257
7	2,350,000	1,631,000	719,000	719,000	Feb. 5	30	33	1.0257
9	2,025,000	531,000	1,494,000	1,494,000	do	30	33	1.0256
11	2,050,000	790,000	1,260,000	1,260,000	do	30	33	1.0257
14	1,250,000	657,000	593,000	593,000	Feb. 19	20	31.5	1.0258
16	1,325,000	727,000	598,000	598,000	Feb. 20	20	31.5	1.0258
18	855,000	503,000	352,000	352,000	do	20	31.5	1.0258
21	700,000	690,000	10,000	10,000	Mar. 13	20	31	1.0258
23	600,000	369,000		* 231,000		20	31	1.0258
24	509,000	468,000		* 41,000		20	31	1.0258
25	470,000	268,000		* 202,000		20	31	1.0258
26	945,000	045,000				20	31	1.0258
28	300,000	183,000		* 137,000		20	30	1.0258
30	816,000	332,000		* 484,000		20	30	1.0259
31	700,000	579,000		* 121,000		20	30	1.0259
Feb. 1	3,852,000	2,674,000		* 1,178,000		20	30	1.0259
1	360,000	360,000				20	30	1.0259
2	1,750,000	1,247,000		* 503,000		20	30	1.0259
3	75,000	75,000				20	30	1.0259
	93,253,000	42,414,000	47,942,000	47,614,000				

\* 2,897,000 eggs planted after a period of incubation of from forty to fifty days.

The majority of the brood fish used at the station were caught in the vicinity of Block Island and Nantucket, and were of three kinds, as recognized by the fishermen, though all belong to the species *Gadus callarias*—school cod, ground cod, and rock cod. The first were taken off Block Island, and the others from Nantucket Shoals. The eggs of the school cod were clear, transparent, and almost crystal; those of the ground cod were much darker, while those of the rock cod were deep orange in color. All of them, however, were subject to slight variations, according to the color of the fish producing them. The eggs of the school cod gave the best results, and this is regarded of more importance as a brood fish. The ground cod possesses few qualities to recommend it for this purpose, and it spawns so late that it is almost certain to be killed by cold weather before it can be used.

The following table gives an idea of the relative value as egg-producers of the fishes from the fishing-grounds referred to:

Locality.	Fish.	Ripe fish.	Per cent.	Eggs per fish.	Eggs to January.
Nantucket .....	2,523	657	26	51,122	33,690,000
Block Island .....	799	450	56.33	79,588	35,915,000

After January 1 the fish became mixed, and it was impossible to keep accurate records. To avoid the loss of fish usually occurring in January from anchor frost, 283 of the best ones were transferred from the live-cars early in the month to tanks under the hatchery. This proved of no use, however, as they died at about the same time as the balance of the stock, which were left in the cars, when the temperature reached 28½°. The loss was of but little importance, as most of the fish had spawned. About 13,600,000 eggs were in the hatchery when the anchor frost appeared, including 7,776,000 received from Kittery Point, Me. Although development seemed almost at a standstill, it was thought the eggs would pull through, but after ten days a change was noted and they began to waste away. They seemed to break up and go to pieces, filling the hatching-box with fragments of shells and premature fish. This wasting process continued until the number was reduced to 2,897,000 good eggs and 10,000 fry. As these had been in the hatchery for fifty-one days, it was deemed advisable to plant them in the harbor. It is interesting to note that at this time there were 20,000 fry ten days old in the hatchery which did not appear to suffer any loss of strength on account of the intense cold, while those hatching had but little sac and were very weak. The 20,000 referred to were held until they were twenty-seven days old, and specimens of them were preserved. The cod work, as a whole, was the most successful ever done at the station, the take of eggs exceeding by 18,000,000 any number secured before, and 11,000,000 more fry were distributed. The number of brood fish was about the same as in previous years, and the increase was largely due to the improved quality of the breeders, also to the favorable weather, which permitted of daily overhauling. As usual, this branch of the work was under the direction of Alex. Jones, the fish-culturist.

*Flatfish.*—Owing to the severe weather which occurred in February, the flatfish were driven from the shallow water of the harbor into the deep water of the sound and bay and did not return until March 14, when the collection of eggs commenced. Between that date and the 22d of April 44 adult fish were taken, which yielded 9,263,000 eggs. From these, 5,940,000 fry were hatched and planted in Vineyard Sound and Buzzards Bay. The eggs were hatched in the Chester jar and the fry were planted within one or two days after hatching.

*Lobster.*—The first eggs were collected on April 15, and by the close of the season 81,800,000 eggs had been taken from 5,499 lobsters, from which were produced 71,000,000 fry, or 86½ per cent of the total number of eggs collected. The fry were planted in Vineyard Sound and Buzzards Bay within forty-eight hours after hatching.

Record of lobster hatching at Woods Hole Station, Massachusetts, season of 1895.

Date.	Number of lobsters.	Number of eggs.		Number of fry planted.	Period of hatching.		Average temperature.		Dens-ity.
		Taken.	Lost.		Began.	Ended.	Air.	Water.	
Apr. 15	4	52,000			May 20	May 23	49	48.5	1.025
16	3	26,000			do	do	49	48.5	1.025
18	2	24,000	23,000	125,000	do	do	49	49	1.025
19	3	46,000			do	do	49	49.5	1.025
24	3	30,000			May 21	May 27	52	51.5	1.0248
25	57	783,000	88,000	975,000	do	May 28	52	52	1.0247
27	22	250,000			do	May 30	52	52.5	1.0246
30	55	707,000	57,000	650,000	May 22	May 29	52	52	1.0246
May 1	47	1,018,000	143,000	875,000	do	May 30	55	52.5	1.0245
3	22	247,000	22,000	225,000	do	May 29	53	52	1.0245
4	130	1,870,000	245,000	1,625,000	do	May 31	56	53	1.0245
6	38	329,000	29,000	300,000	May 23	May 29	53	53.5	1.0245
7	89	1,604,000	104,000	1,500,000	May 24	June 1	56	55.5	1.0245
8	27	548,000	28,000	520,000	May 23	May 29	53	55.5	1.0245
9	37	475,000	50,000	425,000	May 24	June 1	57	55.5	1.0245
10	261	3,585,000	210,000	3,375,000	do	June 2	58	56.5	1.0244
11	174	1,972,000	72,000	1,900,000	May 25	do	58	57	1.0244
13	235	6,179,000	579,000	5,600,000	May 26	June 5	58	58	1.0244
14	134	1,857,000	57,000	1,800,000	May 23	May 30	56	56	1.0243
16	143	1,900,000	200,000	1,700,000	May 24	June 3	58	57.5	1.0243
17	289	4,591,000	591,000	4,000,000	May 25	June 6	58	57.5	1.0243
18	114	956,000			do	June 5	58	57.5	1.0243
20	135	1,690,000	446,000	2,200,000	do	do	58	57.5	1.0243
21	95	1,309,000	109,000	1,200,000	May 26	do	60	58	1.0243
22	213	2,302,000	232,000	2,100,000	do	June 8	60	58	1.0242
23	260	6,073,000	473,000	5,600,000	May 27	June 9	63	58	1.0242
24	82	834,000	84,000	750,000	do	June 8	63	58.5	1.0242
25	99	1,315,000	215,000	1,100,000	May 28	June 10	63	58.5	1.0242
27	216	3,258,000	258,000	3,000,000	May 29	June 10	63	58.5	1.0242
28	144	1,501,000	151,000	1,350,000	May 31	June 12	63	60	1.0242
29	160	2,640,000	299,000	2,350,000	June 2	June 11	63	59	1.0242
30	133	1,595,000	170,000	1,425,000	do	do	63	60	1.0242
31	220	7,265,000	1,090,000	6,175,000	do	do	63	61	1.0242
June 1	62	1,188,000	113,000	1,075,000	do	do	63	61	1.0242
5	263	3,910,000	1,310,000	2,600,000	June 7	June 16	63	62.5	1.0242
6	292	3,362,000	312,000	3,050,000	June 9	June 18	61	62.5	1.0242
8	108	1,620,000	90,000	1,530,000	June 11	June 20	61	62.5	1.0242
11	265	2,771,000	221,000	2,550,000	June 13	June 22	64	63.5	1.0241
12	162	1,790,000	140,000	1,650,000	June 14	June 23	64	64.5	1.024
14	205	1,927,000	277,000	1,650,000	June 16	June 24	64	65.5	1.024
15	40	521,000	51,000	470,000	June 17	June 25	64	65.5	1.024
20	83	700,000	300,000	400,000	June 21	June 26	65	66	1.024
21	289	3,867,000	1,087,000	2,780,000	June 22	June 27	64	66.5	1.0239
22	84	1,304,000	904,000	400,000	June 23	June 28	64	66.5	1.0239
	5,499	81,800,000	10,800,000	71,000,000					

\* June 8, after three days' incubation, found 1,000,000 bad eggs.

† 2,600,000 of these eggs are estimated, as the eggs hatched in the live-cars before they could be brought to the station.

‡ The following shows the number of lobsters obtained at the different localities: Cuttyhunk, 1,640; Robinson Hole, 979; Penikese, 345; Cedar Tree Neck, 159; Hadley Harbor, 93; Woods Hole, 1,094; New Bedford, 884; Menemsha, 147; Tarpanin Cove, 100; South Dartmouth, 58; total, 5,499.



The lobsters collected at New Bedford and Tarpaulin Cove (known by the fishermen as deep-sea lobsters) were caught 12 miles off No Mans Land and brought in in smacks. The greatest number of eggs taken from a single lobster during the season was 85,000. It was taken off No Mans Land and measured 16½ inches. The collection was made as in previous years, by means of a steam launch, which visited the various fishing centers several times a week. The work was under the direct charge of the superintendent until June 3, when C. G. Corliss, fish-culturist at large, was detailed to look out for it.

DELAWARE RIVER STATION, STEAMER *FISH HAWK* (LIEUT. ROBERT PLATT, U. S. N., COMMANDING).

On May 9, 1895, the steamer *Fish Hawk* arrived at Gloucester City, N. J., and immediately began its season's work of collecting shad eggs. Between that date and June 3 eggs were taken from 649 fish secured at the surrounding fishing shores, as follows: Howell Cove, 11,470,000; Bennett's Shore, 12,803,000; Eagle Point, 459,000; Gloucester Point, 449,000; gillers, 5,961,000; total, 31,142,000. From these eggs 19,859,000 fry were hatched and distributed as indicated below:

Lambertville, N. J.....	5,965,000	Lackawaxen, Pa.....	450,000
Delaware Water Gap, Pa.....	1,458,000	Millford, N. J.....	450,000
Port Jervis, N. Y.....	450,000	West Point, N. Y.....	2,000,000
Callicoon, N. Y.....	450,000	Easton, Pa.....	450,000
Seaford, Del.....	504,000	Deep River, Conn.....	2,170,000
Wilmington, Del.....	504,000	Bridgeton, N. J.....	1,800,000
Chestertown, Md.....	504,000	Timber Creek, N. J.....	651,000
Queen Anne, Md.....	504,000		
Salisbury, Md.....	504,000	Total.....	19,859,000
Frenchtown, N. J.....	1,045,000		

In addition to the plants of fry, 321,000 eggs were deposited in the Delaware on June 5, prior to the departure of the vessel from Gloucester. The noon temperatures of air and water were:

Date.	Air.	Water.	Date.	Air.	Water.
May 10.....	88	70	May 23.....	68	61
11.....	85	70	24.....	73	63
12.....	49	69	25.....	75	63
13.....	51	68	26.....	73	64
14.....	56	67	27.....	61	64
15.....	55	66	28.....	62	63
16.....	54	65	29.....	77	65
17.....	64	65	30.....	89	67
18.....	56	64	31.....	90	71
19.....	64	64	June 1.....	91	72
20.....	67	64	2.....	89	73
21.....	47	61	3.....	92	75
22.....	54	60	4.....	70	74

BATTERY STATION, HAVRE DE GRACE, MD.

The station was closed from July 1, 1894, to April, 1895. On April 1, 1895, Alex. Jones, fish-culturist, was detailed from the Woods Hole Station to take charge of the shad work, owing to the assignment of the superintendent, W. de C. Ravenel, to duty in Washington as acting assistant in charge of the Division of Fish-culture. Anticipating a successful season's work from the reports of the large takes of shad in the lower bay, the work of preparation was pushed rapidly, and by April

10 everything was in readiness for the collection of eggs. A new 10-inch water end was put on the large pump, increasing its capacity to 4,000 gallons per hour, thereby adding materially to its effectiveness. Steam launches *Plover* and *Canvasback* were overhauled and repaired, and a new boiler and propeller put in the *Plover*. During the season considerable work was done by the spawn-takers toward repairing the buildings on the main island. The old hatchery was raised and reblocked, and the old tank tower torn down.

The temporary employees, consisting of spawn-takers, assistants in hatchery, etc., reported for duty on April 20, and work was commenced with a force of 35 men, as follows: 2 fish-culturists, 2 assistants in hatchery, 2 machinists and 2 coxswains for launch, 2 firemen for main boiler, 11 first-class and 12 second-class spawn-takers, 1 cook, and 1 boy. Collecting continued until May 22, resulting in a take of 21,606,000 eggs, from which 13,932,000 fry were hatched and distributed. In addition, 852,000 eyed eggs were planted near the station.

The catch of fish was fair at the beginning of the season, but it dwindled and became so small by the middle of May that it was deemed advisable to discharge all of the temporary force except a sufficient number to dispose of the fry on hand, hence all the spawn-takers and other temporary men who could be spared were discharged May 16. It was the original intention to keep the station open until June 1 to receive eggs brought in by the fishermen, but they came in in such small numbers that it was decided to close up all work on the 22d.

The following table gives the number of eggs taken, fry hatched and planted, period of incubation, and meteorological conditions:

Date.	Number of eggs.		Number of fry.			Date of—		Average temperature.	
	Taken.	Lost.	Hatched.	Lost.	Planted.	Hatch- ing.	Plant- ing.	Air.	Water.
Apr. 19	12,000	12,000						o	o
21	20,000	9,000	20,000	20,000					
22	1,564,000	643,000	921,000		921,000	Apr. 28	May 4	59	58.5
23	2,204,000	873,000	1,391,000		1,391,000	May 2	May 0	58	58.5
24	4,007,000	1,108,000	2,830,000		2,830,000	do	May 7-8	58.5	58.5
25	2,691,000	855,000	1,836,000		1,836,000	May 3	May 8	59	56.5
26	2,490,000	748,000	1,751,000		1,751,000	do	{May 9, 10, 11}	58	50.5
27	135,000	86,000	49,000		49,000	May 5	May 11	59	57.5
28	190,000	100,000	96,000		96,000	May 6	do	59	58
29	38,000	19,000	19,000		19,000	do	do	60	59
30	672,000	192,000	480,000		480,000	May 7	May 13	62	60.5
May 2	245,000	55,000	190,000		190,000	do	May 11	64	62.5
3	682,000	94,000	588,000		588,000	do	May 13	65	64
4	453,000	103,000	350,000		350,000	May 8	May 11	67	67
5	444,000	80,000	364,000		364,000	do	May 13	67	68
6	804,000	140,000	664,000		664,000	May 9	do	69	70
7	1,178,000	360,000	818,000		818,000	May 10	do	72.5	72
8	743,000	314,000	429,000		429,000	May 11	May 14	74.5	73.5
9	391,000	170,000	221,000		221,000	May 12	do	72.5	74
10	199,000	110,000	89,000		89,000	May 15	May 16	64	68.5
13	247,000	96,000	151,000		151,000	May 21	May 23	57	60.5
14	607,000	144,000	463,000		463,000	May 22	do	57	59.5
15	300,000	77,000	223,000		223,000	May 23	do	58	59.5
20	353,000	121,000			* 232,000	do	May 24	60	61
21	733,000	213,000			* 520,000	do	do	60	61
22	120,000	20,000			* 100,000	do	do	62	61.5
	21,606,000	6,802,000	13,952,000	20,000	13,932,000				
									* 852,000

\* Distributed as eggs.

*Distribution of fry and eggs from Battery Station, Maryland, season of 1895.*

Date.	Number of fry.	Number of eggs.	Point of deposit.	Stream.
May 4	750,000			Hudson River.
4	171,000		Garrett Island	Susquehanna River.
6	450,000		Port Deposit	Do.
6	941,000		Battery Shoals	Chesapeake Bay.
7	600,000			Swan Creek.
7	600,000		Northeast, Maryland	Northeast River.
8	750,000			Hudson River.
8	889,000		Battery Shoals	Chesapeake Bay.
8	918,000		Port Deposit	Susquehanna River.
8	918,000		Red Bank	Chesapeake Bay.
9	320,000		Carpenter Point	Northeast River.
10	450,000		Port Deposit	Susquehanna River.
11	750,000			Hudson River.
11	585,000		Battery Shoals	Chesapeake Bay.
11	350,000		do	Do.
13	914,000		The Mountains	Do.
13	2,000,000		Deep River Station	Connecticut River.
14	650,000		Athens, N. Y.	Hudson River.
16	89,000		Battery Shoals	Chesapeake Bay.
23	837,000		do	Do.
24		852,000	do	Do.
	13,932,000	852,000		

FISH PONDS, WASHINGTON, D. C. (R. HESSEL, SUPERINTENDENT).

The entire force of the station and an additional laborer were employed during July in cutting and removing injurious plants from the ponds, which had been introduced by the flood of 1893. This work was continued throughout the summer, but it became evident that the plants and injurious insects accompanying them could not be eradicated in this manner, and as the insects were increasing and doing considerable damage to the young fish, it was deemed advisable to use more effective measures. Accordingly, the ponds were laid bare in December and kept dry for three months, during which time the bottoms were scraped to a depth of 3 inches and all plants and roots not killed by the frost cut out. One of the most injurious plants noticed was the cat-tail, the roots of which extend 2 feet under the ground. The only way of eradicating them is to remove every particle of the root, as cutting the plants off at the surface of the ground does not seem to stop their growth.

The output of the station consisted of fish from 6 to 8 months old. The ponds were drawn as usual in the fall, and the fish, with the exception of the shad, were counted, sorted, and transferred to Central Station for distribution by means of cars and messengers to various parts of the country. Following is a list of the species transferred:

Leather carp	22,208	Golden tench	64
Scale carp	14,700	Golden ide	10
Blue-scale carp	485	Young goldfish	6,530
Tench, yearlings	10,240	Goldfish, adults	300
Tench, two years old	1,040	Black bass, large-mouthed	6,552

*Tench.*—Owing to the increased demand for tench, more attention was paid to the production of this species, and as a result 11,286 were distributed in the fall of 1894. The spawners were again placed in the ponds in April, 1895, and all indications point to a large crop at the close of the year.

*Golden ide.*—The golden ide spawned on April 10 and 11, but all of the eggs were killed on the nights of April 14 and 15, owing to the low temperature of the water.

*Spotted catfish.*—Although the brood fish were transferred to a larger pond during the early spring, they did not spawn. They are apparently healthy and take their food regularly, but it appears that they require a pond of greater area and depth.

*Large-mouthed black bass.*—In the spring the brood fish were confined in a small section of the north pond, which had been separated from the balance of the pond by a partition. They spawned as usual about the middle of May, and at the close of the season it was estimated that there were about 60,000 fry in stock. The brood fish were retained in the small section referred to, the fry passing out through a wire grating in the partition into the main body of the pond. This pond has an area of about  $4\frac{1}{2}$  acres, and though abundantly stocked with lilies and other aquatic plants the supply of natural food was so scarce that it soon became necessary to provide additional material. The most serious problem involved in the culture of this species is that of providing a sufficient quantity of suitable food. It is difficult at all times to make bass take artificial food, and in the early stages live food is absolutely essential. The small output of the previous fall (6,552) was undoubtedly due to the fact that the bass lived on each other to a greater or less extent, owing to difficulty in procuring sufficient natural food. During the past season a half million or more of young carp, reared in the ponds, have been utilized as food for the bass, and numbers of young fish of various kinds were obtained in the swamps in the neighborhood of Observatory Hill. They were also fed on young frogs and tadpoles.

*Small-mouthed black bass.*—In the south pond, containing  $1\frac{1}{2}$  acres, similar arrangements were made for rearing the small-mouthed black bass. The brood fish were confined in a small section at the west end of the pond, the fry passing into the body of the pond through a wire gate in the center of the partition. These fish spawned about the same time as the large-mouthed species, and it was estimated at the close of the fiscal year that there were about 8,000 fry in stock.

*Rock bass.*—During the month of February 45 rock bass were transferred from the Wytheville Station and placed in the pond recently constructed between the west pond and Executive avenue. This pond has an area of 17,500 square feet, varies in depth from 2 to 3 feet, and is well supplied with grass and aquatic plants. Mussels, crushed snails, and small fishes were introduced as food, but notwithstanding the fact that all conditions seemed favorable, the fish did not spawn. It is possible that they had not become sufficiently acclimated.

*Shad.*—The shad placed in the west pond were released in the Potomac in October; as they were not counted, it is impossible to state definitely the number liberated, but it is estimated at about 1,000,000. The pond was dry during the winter, and in the spring 2,047,000 fry transferred from Central Station were placed in it. They appear to be doing well, though they suffer slightly from the black water-beetles and their larvæ.

CENTRAL STATION, WASHINGTON, D. C. (S. G. WORTH, SUPERINTENDENT).

In addition to his regular duties, the superintendent was detailed to write the annual report of the Division of Fish-culture for the fiscal year 1892-93, and to examine into the working of the McDonald fishway at Great Falls, Md. He also acted as a member of the Fish Commission board of examiners for the United States Civil Service Commission, and assisted in preparing plans for repairs to the aquarium annex at the station.

The fish-cultural operations consisted in distributing the fishes reared at the fish ponds, Washington, D. C., and in receiving and forwarding consignments of eggs shipped from the Wytheville Station, intended for applicants in New England and foreign countries. The following tabulation shows the number of fish received and distributed:

Species.	Number received.	Number distributed.	Species.	Number received.	Number distributed.
Scale carp.....	14,700	14,450	Golden tench (large).....	15	15
Blue-scale carp.....	485	465	Black bass.....	6,345	6,345
Scale carp (large).....	4	4	Black bass (large).....	207	207
Leather carp.....	22,190	21,748	Rock bass.....	1,600	1,590
Leather carp (large).....	7	7	Rainbow trout.....	6,806	6,757
Mirror carp.....	16	16	Brook trout (large).....	140	140
Goldfish.....	6,058	6,120	Black-spotted trout.....	12	12
Fantail goldfish.....	480	403	Golden ide.....	10	10
Fantail goldfish (gray).....	30	30	Sunfish.....	11	11
Tench.....	10,258	10,171	Landlocked salmon.....	15	15
Tench (large).....	1,028	1,028			
Golden tench.....	49	49	Total.....	71,006	69,593

The shad eggs collected at Bryan Point were hatched at this station as usual, and the output exceeded any previous year except 1888. The total number received was 49,898,000, from which 41,984,000 fry were hatched and distributed, the loss amounting to 7,914,000.

The eggs were packed on trays and transferred from Bryan Point, in charge of a messenger, by the steamers of the Mount Vernon and Marshall Hall Steamboat Company.

Between April 20 and May 29 eggs were daily received in good condition at Central Station, as follows:

Date.	Number.	Date.	Number.
April 20.....	922,000	May 10.....	1,283,000
22.....	2,252,000	11.....	1,231,000
23.....	1,645,000	12.....	804,000
24.....	2,579,000	15.....	977,000
25.....	3,188,000	17.....	788,000
26.....	2,790,000	18.....	2,159,000
27.....	2,643,000	19.....	1,328,000
28.....	2,813,000	20.....	2,101,000
29.....	297,000	21.....	1,096,000
May 1.....	781,000	22.....	1,378,000
2.....	1,020,000	24.....	272,000
3.....	110,000	25.....	1,035,000
4.....	1,293,000	26.....	1,067,000
5.....	2,885,000	27.....	894,000
6.....	3,230,000	29.....	1,021,000
7.....	871,000		
8.....	2,065,000	Total.....	49,898,000
9.....	1,080,000		

Another attempt was made to hatch pike-perch eggs shipped by express from Put-in-Bay Station, but two consignments, amounting to 2,000,000, were lost en route.

A rubber holder for air-liberator plugs was designed by the superintendent during the fall of 1894, and in February arrangements were made to have a number of them manufactured. This holder is made of hard rubber and can be used in either salt or fresh water. It is especially adapted for aerating aquaria and the tanks on the cars; it may also prove valuable for hatching floating eggs.

AQUARIA, CENTRAL STATION (L. G. HARRON, SUPERINTENDENT).

The defective imitation rockwork in the marine annex was removed early in the summer and replaced by galvanized metal, representing rock face. New rubber tubing and a new filter for the salt-water tanks were put in during the month of August, and a new fresh-water filter was purchased in December. This affords double the amount of water filtered by the old one. During the winter the salt water was kept at a temperature of from 50° to 56° by means of a steam drum 3 feet long, 6 inches in diameter, containing 9 feet of coiled 1-inch piping. With an average pressure of 25 pounds per square inch, the water was passed through the pipe at the rate of 350 gallons per hour.

On October 16 200 young shad, about 5 months old and from 2 to 3 inches long, were received from the fish ponds and were put in brackish water, the density of which was gradually increased to 1.020. They were fed on chopped oysters and were apparently healthy until the middle of January, when they were attacked by disease and 75 of them died. Canned roe was then substituted as food, and within two or three days the mortality ceased and the fish became healthy again.

Most of the marine specimens in the aquarium during the year were collected by the steamer *Fish Hawk* off Cape Charles in October, and at Old Point, Va., by the superintendent.

On February 13 a goldfish, which had been held for more than a year in a balance aquarium, spawned and about 100 of the eggs were placed in a McDonald jar, the temperature of the water being kept at 68. Ninety per cent of the eggs hatched and about 20 of the young fish are now alive and beginning to color. In June a 2-year-old paradise fish spawned in a balance aquarium, and the young are now on hand.

The fresh-water fishes in the aquarium suffered heavy losses in May on account of the high temperature of the water, and all of the brook trout and yearling landlocked salmon were lost. The temperature of the salt water from October, 1894, to June, 1895, was as follows:

Time.	Max.	Min.	Mean.	Time.	Max.	Min.	Mean.
1894—October.....	74	48	60	1895—March.....	50	64	55
November.....	66	46	57	April.....	68	50	58
December.....	69	51	53	May.....	78	54	64
1895—January.....	58	51	52	June.....	82	66	73
February.....	58	48	54				

During the year the following marine and fresh-water fishes and other animals were exhibited in the aquarium:

Kind.	No.	Kind.	No.	Kind.	No.
Fresh-water specimens:		Fresh-water specimens—		Salt-water specimens—	
Leather carp .....	7	Continued.		Continued.	
Sculpin carp .....	4	Black-spotted trout		Pompano .....	11
Mirror carp .....	6	(adults) .....	12	Sea-robin .....	10
Golden ide .....	6	Salt-water specimens:		Skate .....	3
Common tench .....	20	Pinfish .....	40	Mummichog .....	200
Golden tench .....	8	Pigfish .....	44	Red drum .....	11
Club sucker .....	6	Bluefish .....	3	Banded drum .....	15
Yellow perch .....	30	Lizard-fish .....	20	Gizzard shad .....	5
Pike .....	5	Swellfish .....	37	Young shad .....	200
Crappie .....	3	Moonfish .....	5	Tautog .....	40
Sunfish .....	40	Starfish .....	30	Conger eel .....	1
Black bass .....	6	Butter-fish .....	10	Striped bass .....	5
Warmouth bass .....	33	Toadfish .....	20	Sea-horse .....	8
Gar pike .....	2	Pipefish .....	6	Blenny .....	1
Common darter .....	100	Squeteague .....	1	Blue crab .....	20
Shiners or fresh-water		Spotted sea trout .....	13	Hermit crab .....	10
smelt .....	35	Croaker .....	13	Lady crab .....	2
Dace or mill roach .....	20	Sea bass .....	155	Lobster .....	7
Brook trout (yearlings) .....	129	Hog choker .....	45	Shrimp .....	12
Brook trout (adult) .....	1	Striped mullet .....	40	Sea-anemone .....	165
Landlocked salmon		Spot or goody .....	120	Spider-crab .....	2
(yearlings) .....	15	Flounder .....	15	Fresh-water terrapin .....	6
Rainbow trout (adults) .....	3	Sheepshead .....	5	Snapping turtle .....	3
Blue rainbow trout		Dogfish .....	14		
(yearlings) .....	3	Yellow-tail .....	40		

#### BRYAN POINT STATION, MARYLAND.

The season's work in the collection of shad eggs proved to be the most satisfactory in the history of the Commission's work on the Potomac. The water was more or less roily while operations were carried on, but the current did not at any time appreciably affect the tides. During the period of seine operations, extending from April 8th to May 21st, 204 hauls of seine were made. The total number of shad caught by the Bryan Point seine was 5,401, 2,663 of which were males and 2,738 females; 185 of these were ripe. The total number of eggs obtained was 66,065,000; of these, 5,261,000 were secured by the seine at Bryan Point, 8,024,000 by the Stony Point seine, 1,501,000 by the Tulip Hill seine, 726,000 by the Freestone Point seine, 177,000 by the Plum Tree Gut seine, and 50,376,000 from gilliers. There were also 268,000 herring caught during the season.

The seine operations by the Commission were more extensive than in any previous season at Bryan Point. During the year, for the first time, the net was fished throughout the season, and a correct estimate of its relative value as an egg-producing source was obtained. After careful consideration the superintendent recommends that seine hauling, carried on for years by the Fish Commission in the Potomac River shad operations, be discontinued, for the reason that the returns at Bryan Point are not satisfactory. The egg collections are limited, and the relative catch of river herring so large that sales to the farming population cause local trap fishermen to lose business, the seine fish being preferred.

Table showing the catch of fish and the production of shad eggs by the Bryan Point seine, from 1892 to 1895, inclusive.

Year.	Period of seine operations.	No. of hauls made by seine.	Shad caught.				No. of herrings caught.	No. of shad eggs obtained.
			Males.	Fe-males.	Total.	Ripe.		
1892.....	Apr. 18-May 4.	155	503	510	1,082	55	86,426	1,816,000
1893.....	Apr. 14-May 20.	169	920	813	1,733	160	326,307	939,000
1894.....	Apr. 5-May 18.	216	2,777	2,442	5,219	253	231,405	4,350,000
1895.....	Apr. 8-May 18.	204	2,603	2,738	5,401	185	268,000	5,261,000

The average product from the Bryan Point seine during the four years just ended was about 3,000,000. The following table shows the sources from which shad eggs were derived from 1892 to 1895, inclusive:

Year.	Bryan Point seine.	Chapman Point seine.	Stony Point seine.	Tulip Hill seine.	Gillers.	Total.
1892.....	1,816,000	798,000	1,067,000	2,503,000	7,262,000	13,446,000
1893.....	939,000	958,000	512,000	683,000	6,321,000	9,423,000
1894.....	4,350,000	2,007,000	2,216,000	573,000	19,763,000	32,393,000
1895.....	5,261,000	.....	8,024,000	1,501,000	50,376,000	66,065,000

NOTE.—In 1894 235,000 eggs were obtained from Tent Landing seine and 3,249,000 from Freestone Point seine. In 1895 726,000 were obtained from Freestone Point seine and 177,000 from Plum Tree Gut seine.

During the operations of the season Mr. L. G. Harron was assistant to superintendent, and Mr. W. T. Lindsey, custodian of the station, was directly in charge of the seine.

WYTHEVILLE STATION, VIRGINIA (GEORGE A. SEAGLE, SUPERINTENDENT).

At the beginning of the year there were estimated to be on hand at the station fish of various kinds, as shown by the following statement:

Species.	1894.	1893.	1892.	1891 or before.
Rainbow trout.....	93,500	1,200	3,400	1,200
Black-spotted trout.....	.....	.....	550	135
Black bass.....	500	.....	45	12
Rock bass.....	20,000	.....	.....	195
Grayling.....	.....	.....	34	10
Carp.....	6,000	.....	.....	200
Goldfish.....	2,500	.....	.....	180

The ponds were drawn in October and distribution commenced November 16. By February 3, when it was completed, the following fishes were furnished to cars and messengers for distribution: 79,387 rainbow trout, 553 large-mouthed black bass, 5,558 rock bass, 1,580 carp, and 3,002 goldfish. Rock bass, numbering 12,752, produced at Neosho, were transferred to this station and distributed at the same time; also 2,295 large-mouthed black bass, 3,500 carp, and 915 tench from the fish ponds in Washington.

*Rainbow trout.*—These trout commenced to spawn November 5, and continued 116 days, the last eggs being taken on February 29. There were obtained from 833 females 513,300 eggs, an average of 616 eggs to the fish. The males used numbered 648. Of these eggs 228,200 were



shipped to applicants in the United States and foreign countries and to other stations of the Commission, as indicated in the following table:

*Distribution of rainbow-trout eggs from Wytheville Station for year ending June 30, 1895.*

Date.	Consignee.	Destination.	No. of eggs.
1894			
Dec. 22	Charles G. Atkins.....	Green Lake, Mo.....	15,000
25	do.....	Bucksport, Me.....	25,000
29	Maj. W. Turner.....	Bertrix, Belgium.....	25,000
31	Mr. Raveret-Wattel.....	Fécamp, France.....	25,000
1895			
Jan. 5	Maj. W. Turner.....	Bertrix, Belgium.....	25,000
7	Rev. H. B. Wolryche-Whitmore.....	Bridgenorth, England.....	25,000
12	S. G. Worth.....	U. S. Fish Commission, Washington, D. C.....	11,000
14	William Burgess.....	Malvern Wells, England.....	25,000
29	Prof. W. K. Brooks.....	Johns Hopkins University, Baltimore, Md.....	200
Feb. 1	D. H. McLinn.....	Plymouth, N. H.....	25,000
4	do.....	do.....	25,000
4	Prof. R. G. Harrison.....	Bryn Mawr, Pa.....	2,000
	Total.....		228,200

The remainder were held at the station and produced 168,000 fry, 118,100 eggs being lost in incubation. Owing to excessive muddy water during the spring very heavy losses were sustained, so that in June there were left on hand only 83,600 fingerlings by actual count. There were 5,500 fry planted in April.

A consignment of 10,000 rainbow-trout eggs was received on May 17 from the California State Fish Commission at Beswick, Cal., but owing to the warm weather and length of time on the way they were all dead when the box was opened, having apparently hatched en route.

The breeding stock at the close of the year was as follows: 600 trout 4 to 10 years old; 1,960 fish 40 months old; 890 28 months old, and 700 16 months old.

*Black bass.*—The stock of brood fish was increased by 52 2-year-old large-mouth bass from the fish ponds, Washington, D. C.; but on April 7 all of the old stock and 28 of the 2-year-old fish were lost in an overflow of the ponds. The remaining 24 spawned early in May, and on June 30 there were estimated to be 5,000 fry in the pond.

Owing to the difficulty in collecting the fry of the bass from breeding ponds, the use of artificial nests is recommended.

*Rock bass.*—The ponds containing these fish were affected in the same way by floods as the black-bass ponds, but the loss of breeders was not so great. They spawned in May. Everything indicates a good crop of fry, but it is impossible to give accurate figures unless the ponds are drawn and the fry counted, which is not deemed desirable.

*Tench.*—During the early winter 50 2-year-old tench were received from the fish ponds, Washington, D. C., and placed in a small pond 60 by 75 feet, fed with water from Tates Run. The fish were noticed spawning on May 31, June 7 and 20, and at the close of the month many fry could be seen in the pond.

*Carp.*—The carp spawned in the ponds early in June, and will yield enough to supply all demands.

*Goldfish.*—The rearing of goldfish was discontinued at the close of the year, and the adults liberated in the neighboring streams.

During the year more than the usual repairs were made to ponds, walks, fences, etc., owing to damage caused by a freshet in April, which resulted in large loss not only of the fry from muddy water, but also the adult bass, tench, and carp. The damage was repaired at once, and was paid for by the State of Virginia from funds received for rental of station. Changes were also made in the raceways leading from the trout ponds, which produced beneficial results.

PUT-IN-BAY STATION, OHIO (J. J. STRANAHAN, SUPERINTENDENT).

The fish-cultural work during the past year was confined to whitefish, cisco or lake herring, lake trout, and pike perch.

*Whitefish.*—The whitefish season opened later than usual, the first eggs being taken November 11, and the last on November 29. The first eye-specks were visible December 16. The fry began hatching April 9, and finished on the 20th. The cone-shaped tube used throughout the hatchery proved very satisfactory, and there was almost no loss of eyed eggs. The few straight tubes used early in the season showed a loss so perceptibly greater than in the case of the cones that they were changed as soon as possible. The total number of eggs collected during the year was 114,435,000. The points of collection and the number taken at each are as follows: Port Clinton, Ohio, 51,822,000; North Bass Island, Lake Erie, 28,341,000; Middle Bass Island, Lake Erie, 10,197,000; Put-in-Bay Island, Lake Erie, 12,060,000; Kelley Island, Lake Erie, 10,989,000; Catawba Island, Lake Erie, 1,026,000; total, 114,435,000.

Of these, the following shipments were made: U. S. Fish Commission Station, Alpena, Mich., 8,000,000; Clayton, N. Y., for the State Fish Commission, 5,000,000; U. S. Fish Commission Car No. 3, for Utah, 2,000,000; total, 18,000,000.

Between April 11th and May 7th 80,198,000 fry were deposited in Lake Erie at the following points: Ballast Island Reef, 11,270,000; Green Island Reef, 2,350,000; Peach Point Reef, 19,258,000; West Sister Island, 2,600,000; North Bass Island Reef, 19,620,000; Moore's Point Reef, 1,600,000; Rattlesnake Island Reef, 3,000,000; Starve Island Reef, 5,050,000; Niagara Reef, 5,050,000; Cone Reef, 5,400,000; Kelley Island Reef, 3,000,000; Port Clinton, 2,000,000; total, 80,198,000.

*Cisco.*—All of the cisco eggs (10,452,000) were taken at Put-in-Bay Island and were of unusually good quality. The catch of fish was light and a dearth of males was noticeable everywhere. All the eggs, except 600,000 retained for hatching, were planted on Rattlesnake Island Reef, Lake Erie, the natural spawning-grounds of the fish, in order to make room for the whitefish eggs. All of the 600,000 retained were hatched and planted at Peach Point Reef, Lake Erie, on April 27.

*Lake trout.*—On December 7th 500,000 lake-trout eggs arrived from Northville, Mich., in fine condition, and on December 18th 150,000 were

taken at Dunkirk, N. Y., by spawn-takers from Put-in-Bay Station. These were in poor condition, owing to the severe weather prevailing during the spawn-taking period. On March 12 the eggs commenced to hatch, finishing April 7, and the 478,500 fry resulting from them were planted in the vicinity of the islands in Lake Erie.

*Pike perch.*—This work, though more successful in the aggregate than last year, was interfered with by frequent storms, some of which were of unusual severity. Eggs of this species aggregating 404,025,000 were collected as follows: Toledo, Ohio, 180,000,000; Port Clinton, Ohio, 77,625,000; Put-in-Bay, Ohio, 60,750,000; North Bass Island, Lake Erie, 55,687,500; Sandusky Bay, Ohio, 17,700,000; East Sister Island, 5,062,500; unknown, 7,200,000.

The first eggs were taken April 16 and the last on April 28. The period of incubation (running from 14 to 21 days) was 10 days shorter than usual, owing to the high temperature of the water. The eggs commenced hatching on May 6 and finished on the 12th. The first eye-specks were visible on April 28, 6 days after the eggs were taken.

An experiment was again made to prevent cannibalism among pike-perch fry. Four tanks of equal capacity were each supplied with 500,000 fry. The fry in two of these were fed regularly three times a day with fine wheat middlings, and once a day with finely chopped liver. Those in the other two tanks were not fed. Although some cannibalism was noticed in the tanks where the fry were fed up to and including the third day, the percentage of loss was very small, while it was great in the other two. On the fourth day, however, the fry refused to take the middlings, and from that time the destruction was so great that the experiment was abandoned and all the fry were planted.

The following deliveries of eggs and fry were made:

Eggs.	Number.	Fry.	Number.
Sandusky, Ohio, State Fish Commission ..	25,000,000	May 9, U. S. F. C. Car No. 2 .....	10,000,000
U. S. F. C. Car No. 1 .....	14,400,000	May 16, U. S. F. C. Car No. 2 .....	5,000,000
Clayton, N. Y., State Fish Commission .....	5,000,000	May 18, U. S. F. C. Car No. 2 .....	3,700,000
Washington, D. C., U. S. F. C. ....	2,000,000		
	46,400,000		18,700,000

Between the 8th and 20th of May 183,680,000 fry were deposited in Lake Erie.

Great difficulty was experienced in keeping the screens in the fry tanks free on account of the large accumulation of shells from the eggs, and with the large hatch of whitefish and pike perch it was found almost impossible to prevent the tanks overflowing. In order to remedy this a three-fourths-inch iron pipe, pierced with small holes at intervals of 5 inches, was connected with an air-pump and placed across the ends of the main tank on the inside, close to the bottom and near the screens. The continuous flow of air resulting from this not only prevented the clogging of the screens, but also proved beneficial to the fry by thoroughly aerating the water.

NORTHVILLE STATION, MICHIGAN (F. N. CLARK, SUPERINTENDENT).

Early in the fiscal year the outsides of the rearing-house and hatchery were painted, a new floor laid in the hatchery, twelve new rearing-ponds completed, alleys graded, etc. The water in the ponds which had contained diseased fish was drawn off, the sides of the ponds white-washed, and the bottoms given a thorough sprinkling of salt. The main feed raceway to the large ponds was taken out and replaced with new sides and bottom throughout. The severe weather of the past winter did considerable damage to the ponds and raceways, causing the upheaval of ties, collapse of sides, and sinking of bottoms.

*Lake trout.*—The lake-trout eggs collected by Alpena spawn-takers, amounting to 8,746,000, were transferred as usual to this station. Of these, 2,750,000 were shipped to other stations of the Commission, State Fish Commissions, and private applicants. From the balance retained at the station (5,996,000) 1,390,000 fry were hatched and distributed. The poor results were probably due to the fact that it was necessary to hold the eggs on trays for a number of days before shipping at many of the field stations, owing to their being located at isolated points, which could not be reached by the boats in the inclement weather prevailing during the fall. The distribution of eggs and fry is given below:

Consignee.	Address.	Number.
<i>Eggs.</i>		
California Fish Commission.....	Truckee, Cal.....	100,000
Vermont Fish Commission.....	Roxbury, Vt.....	300,000
New York Fish Commission.....	Caledonia, N. Y.....	1,500,000
E. M. Robinson, for Green Lake Station.....	Green Lake, Me.....	100,000
J. J. Strahan, for Put-in-Bay Station.....	Put-in-Bay, Ohio.....	500,000
Henry Studor.....	White Lake, N. Y.....	50,000
Massachusetts Fish Commission.....	Winchester, Mass.....	100,000
J. W. Titcomb, for St. Johnsbury Station.....	St. Johnsbury, Vt.....	50,000
Nebraska Fish Commission.....	South Bend, Nebr.....	50,000
Total.....		2,750,000
<i>Fry.</i>		
Chas. H. Grate.....	Manston, Wis.....	5,000
C. C. De Long.....	Pelican Lake, Wis.....	5,000
D. F. Chandler.....	Antigo Lake, Wis.....	5,000
Fred J. Vine.....	Lac du Flambeau, Wis.....	5,000
H. W. Bent, State Line.....	State Line, Wis.....	10,000
Geo. M. Brown.....	Saginaw, Mich.....	100,000
H. B. Roney.....	Gogebic Lake, Mich.....	40,000
Daniel W. Green.....	Ligonier, Ind.....	20,000
Lake Huron.....	Alpena, Mich.....	400,000
Do.....	Cheboygan, Mich.....	200,000
Do.....	East Tawas, Mich.....	200,000
Lake Michigan.....	Frankfort, Mich.....	200,000
Do.....	Manistique, Mich.....	200,000
Do.....	Charlevoix, Mich.....	200,000
Total.....		1,590,000

*Brook trout.*—From October 7 to December 15 there were 198,804 eggs taken from 812 female trout on hand. From these eggs, 177,000 fry were hatched and shipped to parties in Ohio, Michigan, Wisconsin, and Iowa, the distribution commencing March 26 and closing May 4.

In addition to this 5,500 fingerling brook trout were furnished to Michigan applicants.

*Von Behr trout.*—The total number of eggs taken was 58,370. Of these, 25,925 were taken from 105 2-year-old fish and the remainder from 40 old trout. Two shipments of eggs of 5,000 each were made, and 10,000 fry were distributed.

*Loch Leven trout.*—The spawning season opened November 6 and ended December 8, during which time 43,378 eggs were secured from the 44 females available. Ten thousand of these eggs were sent to the Leadville Station and 5,000 were furnished to the Minnesota Fish Commission. Of the fry hatched at the station 10,000 were shipped to J. C. Pond, Milwaukee, Wis.

*Rainbow trout.*—The 7,000 rainbow trout on hand at the beginning of the fiscal year were carried in a single pond until the middle of February, being fed three times a day on beef liver. When delivered to car No. 2, on February 14, the count was 6,234 healthy yearlings. On January 22 a consignment of 20,000 eggs of this species was received from Neosho Station. The fry hatched from them were distributed to parties in Wisconsin and Iowa.

*Steelhead trout.*—On March 20 a consignment of 22,000 eggs was received from Fort Gaston Station and another of 66,500 on April 3. Both shipments were in excellent condition when received and it was intended to hold all the fry for distribution as yearlings. The daily losses became so great in June, however, that it was deemed advisable to dispose of the greater part of the stock, and on the 23d of June 40,000 were delivered to car No. 2, to be distributed equally in the Baldwin and Pere Marquette rivers. Only 5,000 were retained for rearing.

*Pike perch.*—On May 20th 200,000 pike-perch fry were delivered at the station by car No. 2. It was intended to rear these to the yearling stage, and they were placed in tanks and small rearing-ponds with the finest perforated tin obtainable inserted at the overflows. Notwithstanding this precaution, the entire consignment made their escape through the screens inside of ten days into the North Branch of Rouge River.

*Black bass.*—Owing to the increased demand for black bass an attempt was made to rear both the large-mouthed and small-mouthed varieties. A consignment of 56 large-mouthed bass, collected in the Illinois River, were received April 24 and placed in the station ponds. They apparently arrived in excellent condition, but later on fungus developed, probably caused by injuries received in transportation. On May 20 a consignment of 24 small-mouthed bass was received from Put-in-Bay, Ohio. These were placed in suitable ponds, but, owing to the fact that they had been transferred too late for them to become acclimated, they failed to spawn, and at the close of the season there were no fry on hand.

The accompanying table shows the number of fishes of various kinds on hand at the close of the fiscal year:

Species.	Calendar year in which hatched.				
	1895.	1894.	1893.	1892.	1891 or before.
Brook trout.....	42,041		90	621	
Von Behr trout.....			1,120	869	
Loch Leven trout.....			934		227
Steelhead trout.....	3,608				
Black bass.....				36	
Goldfish.....			201		
Total.....	46,549		2,345	1,526	227

ALPENA STATION, MICHIGAN (F. N. CLARK, SUPERINTENDENT).

Previous to the opening of the spawning season the superintendent and foreman made a tour of Lakes Michigan, Superior, and Huron for the purpose of preparing for the fall work. Every fishery of importance was visited from Saginaw Bay, north through the Straits of Mackinac, down the eastern shore of Lake Michigan to Frankfort, the north shore of Lake Michigan, through Detour Passage and along Lake Superior as far as Whitefish Point. At the different grounds all possible arrangements were made for the use of tugs and nets.

*Lake trout.*—Of eggs of this species, there were collected during the season 8,746,000, more than three times the number collected in the fall of 1893, and twice as many as were ever handled before at the station. The season opened October 18, and the last eggs were taken on December 10. Following are the points at which the eggs were taken and the number taken at each point: Au Sable, 565,000; Alpena and vicinity, 451,000; Caribou Island, 1,000,000; Detour, 1,930,000; Manistique, 1,350,000; Beaver Island, 1,800,000; Charlevoix, 1,650,000; total, 8,746,000. All of these eggs were shipped to Northville Station to be hatched and distributed from that point.

*Whitefish.*—In former years not less than 70 per cent of whitefish eggs were collected from fish caught in pound nets, but this year most of the pound nets were blown out at the opening of the spawning season, and only 6,581,000 eggs were thus secured. The balance were taken from fish caught in gill nets in December, and the poor percentage hatched (57) is due to this fact, as gill-net fish usually yield very poor eggs.

A total of 49,299,000 whitefish eggs were collected at the following points: Charity Islands, 640,000; Miller Point, 300,000; Alpena and vicinity, 2,989,000; Warehouse, 640,000; Naubinway and Schelien, 2,030,000; Seulchoix, 200,000; Charlevoix (Manitou Island), 6,800,000; Cross Village, 880,000; Beaver Island, 12,080,000; Manistique, 14,740,000; Put-in-Bay, 8,000,000; total, 49,299,000.

From these, 28,000,000 fry were hatched and planted as follows:

Date.	Where planted.	Number of fry.
Apr. 20	North Point, near Alpena, Mich., Lake Huron.....	4,000,000
20	Scarecrow Island, Thunder Bay, Lake Huron.....	2,000,000
22	Miller Point, near Oscoda, Mich., Lake Huron.....	2,000,000
29	North Point, near Alpena, Mich., Lake Huron.....	1,000,000
30	Sturgeon Point, near Oscoda, Mich., Lake Huron.....	2,000,000
30	Near East Tawas, Mich., Lake Huron.....	2,000,000
May 1	Detour Passage, Lake Huron.....	2,000,000
6	North Point, near Alpena, Mich.....	500,000
Apr. 17	Charlevoix, Mich., Lake Michigan.....	2,000,000
23	Mackinac City, Straits of Mackinac, Lake Michigan.....	2,000,000
26	Near Manistique, Mich., Lake Michigan.....	2,000,000
May 1	Epoufette, Lake Michigan.....	1,000,000
1	Naubinway, Lake Michigan.....	1,000,000
6	Near Frankfort, Mich., Lake Michigan.....	2,000,000
Apr. 26	E. A. Davis, Whitefish Lake, Michigan.....	2,000,000
May 6	Hubbard Lake, Michigan.....	500,000
	Total.....	28,000,000

DULUTH STATION, MINNESOTA (S. P. WIRES, SUPERINTENDENT).

During the year the usual repairs were made to the hatching apparatus. The carpenter shop and reservoir building were painted, the hatching-room, office, halls, and bedrooms calcimined, and other minor repairs were made to the interior of the building. A platform 41 feet long was constructed at the east side of the station for use in sending out shipments of fry and eggs. Seventy-six troughs, 7 feet 10 inches long, 14 inches wide, and 10 inches deep, were built on the outside of the hatchery, and a picking-trough 23 feet long, 15½ inches wide, and 5½ inches deep, at the rear of the hatching-room. The old mess-house, on the northeast corner of the grounds, was taken down, and the six unserviceable ponds on the west side of the station were filled with gravel and earth.

*Lake trout.*—The collection of lake-trout eggs began in September and closed in November. Following are the points at which collections were made:

Locality.	Number.
Vicinity of Port Arthur, Ontario.....	1,000,000
Vicinity of Grand Portage, Minn.....	255,000
Fish Island, near Isle Royale, Mich.....	200,000
Todd Harbor, near Isle Royale, Mich.....	990,000
Washington Harbor, near Isle Royale, Mich.....	425,000
Rock Harbor, near Isle Royale, Mich.....	175,000
Vicinity of Bayfield, Wis.....	1,880,000
Total.....	5,125,000

These eggs produced 4,250,000 fry, which were deposited between May 6 and June 24 in Lake Superior, near the shores of Michigan, Minnesota, and Wisconsin.

*Whitefish.*—During the months of October and November 1,500,000 whitefish eggs were collected at Pipestone Falls, Minn., and 10,000,000 more were received from the Michigan Fish Commission.

The fry resulting from them were planted as follows:

Date.	Locality.	Number.
Apr. 17	Raspberry Bay, near Bayfield, Wis .....	2,250,000
19	Lake Superior, near Bayfield, Wis .....	2,250,000
22	Lake Superior, near Iron River, Wis .....	2,250,000
25	Lake Superior, near Isle Royale, Mich .....	2,000,000
29	Siskowit Bay, near Isle Royale, Mich .....	1,500,000
May 2	do .....	500,000
7	Lake Superior, near station .....	250,000
	Total .....	11,000,000

*Pike perch.*—Between the 23d and 26th of April 25,000,000 pike-perch eggs were collected in the vicinity of Pike River, Minn. From these, 13,000,000 fry were hatched and distributed between May 26 and 31 to parties in Wisconsin, Minnesota, Iowa, and South Dakota.

*Steelhead trout.*—In April 100,000 steelhead-trout eggs were received from Redwood, Cal., and nearly all of the 75,000 fry resulting from them were deposited in Lake Superior, near Washington Harbor.

*Rainbow trout.*—In February 20,000 rainbow-trout eggs were received from the station at Mammoth Spring, Ark., and 22,680 from Neosho Station. Part of the eggs from Mammoth Spring were too far advanced for successful shipment, and were in poor condition on arrival. From the two consignments 18,000 fry were hatched and distributed to parties in Minnesota and Michigan.

The water temperatures were as follows:

Year.	Month.	Average or range.	Temperature.
1894.....	October .....	Range ...	50 to 40
	November .....	Average ..	34
	December .....	do .....	32½
1895.....	January .....	do .....	34
	February .....	do .....	34
	March .....	do .....	33
	April .....	Range ...	33 to 45
	May .....	do .....	45 to 62
	June .....	Average ..	57

QUINCY STATION, ILLINOIS (S. P. BARTLETT, SUPERINTENDENT).

The season of 1894 was an unfortunate one, and had not the free use of a steamboat been obtained the work would have been even more of a failure than it was. The absence of the usual spring overflow of the Mississippi and Illinois rivers and the extreme and protracted drought of the spring and summer caused the ponds which usually furnished the supply of fish to dry up, and therefore extra and more expensive efforts had to be made in the collection. In addition to this the temperature of the water in the rivers was so high that the fish in the live-boxes rapidly developed fungus, and many thousands were lost.

At the opening of the season Mr. Ray, the owner of Meredosia Bay, a body of water about 5 miles in length and with an average width of 1,000 feet, offered the Commission the use of it, together with a pond just built and such land as might be needed for other ponds, practically



without compensation. This offer was accepted for a term of two years. Large black bass for spawning purposes were taken from the bay and put in the pond, and later collections of young bass were made and placed in it. The pond, which is about 400 feet long and from 50 to 75 feet wide, is fed by a spring, and, although a crude affair, is much better than the ordinary live-boxes for holding the fish collected.

The superintendent of the station secured the use of a large surface water pond at Baldwin Park, near Quincy, into which several hundred spawning crappie were put. The pond is well filled with young, but owing to its nature and location it has been difficult to remove the adult fish, and the ultimate success of the experiment is problematical.

The distribution of fish from the station during the fiscal year was as follows:

Species.	Fry.	Year- lings.
Black bass .....		21,820
Crappie .....	50,000	5,075
Catfish .....		5,916
Yellow perch .....		3,325
Warmouth bass .....		1,090
Sunfish .....		221
Pike perch .....		299
Pike .....		82
White bass .....		12
Total .....	50,000	38,440

In addition to these, large numbers of bass, crappie, perch, sunfish, catfish, and hundreds of thousands of the coarser species were saved by removing them from the drying ponds and returning them to the Mississippi and Illinois rivers. The usual method of collecting has been to use a small-meshed seine in the ponds and lakes formed by the receding waters of the rivers after an overflow. The fish wanted for distribution were selected from the catch, and when practicable the residue were returned to the river.

The seines used are 100 yards long, 6 feet deep, and one-fourth, one-half, and three-fourths inch in mesh. A two-wheeled cart, built with a platform like a railroad truck, is used to carry the small boat, cans, and seines out into the bottoms, and to bring the cans of fish from the ponds to the river. Large skiffs with three pairs of oars are used to transport the entire outfit from Meredosia or Quincy to such points as may be determined for the work. The cans are made of galvanized iron and hold 30 gallons each. Crabs are used to haul the seines, as the moss is often so heavy as to make work by hand very difficult.

#### NEOSHIO STATION, MISSOURI (W. F. PAGE, SUPERINTENDENT).

During the fiscal year there were constructed at the station two ponds for the culture of bass, one with an area of 23,000 square feet and the other 4,500. A woodshed, 10 by 20 feet, for the storage of fuel and heavy outdoor tools was built, and the railroad spur was converted into a double-end switch. Certain necessary repairs were also made to the ponds, flume, hatching-house, and residence.

The following table shows the number and kinds of fish on hand at the beginning of the year:

Species.	Calendar year in which hatched.				
	1894.	1893.	1892.	1891.	1890 or before.
Rainbow trout .....	91,688		1,000		650
Rainbow trout (red-banded) .....	1,709				
Von Behr trout .....	10,312				
Black bass .....	5,687				47
Rock bass .....	57,283				99
Goldfish .....	7,857				8
Tench .....	275				25
Mud catfish .....	1,965				
Total .....	176,776		1,000		829

These fish were held at the station and cared for in the rearing-ponds until late in the fall. The distribution commenced in December and lasted until January 22, during which time 73,930 yearling rainbow trout, 3,440 Von Behr trout, 53,619 rock bass, 3,761 black bass, 3,970 tench, 340 carp, 1,965 catfish, and 7,857 goldfish were distributed. The net output of the basses and trout was very discouraging in view of the fact that these fish were carefully assorted each month and the different sizes kept separate. The loss of the bass was undoubtedly due to cannibalism, though enormous quantities of *Coriza* were collected as food for them. This food is very acceptable to the rock bass, but the black bass have been observed to eat each other when the bottom of the pond was covered with young *Coriza*. In view of these losses it is strongly recommended that the distribution hereafter be made during the months of September and October, as it is believed that a much larger percentage of the fish can be saved by so doing. In addition to this better results can be obtained by planting fish in the early fall, when the water is full of natural food.

*Rainbow trout.*—The brood stock consisted of 362 2-year-old and 503 5-year-old fish. The spawning of this species extended from December 8 to February 24, during which time 782,000 eggs were obtained. Of these, 448,000 were shipped to State Fish Commissions and to the other stations of the United States Commission, as indicated in the following table:

Consignee.	Number.
George T. Mills, for Nevada Commission .....	27,720
Dr. E. E. Tolhurst, Salt Lake City, Utah .....	12,880
J. G. Bailey, Silver Springs, Ark. ....	5,040
J. E. Sherlock, Salt Lake City, Utah .....	21,000
A. Lauth, Cuba, Mo. ....	23,800
F. N. Clark, for Northville Station .....	20,720
H. D. Dean, for Leadville Station .....	124,740
H. W. Bailey for Vermont Commission .....	52,080
Cold Springs Stock Company, Aurora, Wyo. ....	20,880
Gustave Schmitger, for Wyoming Commission .....	64,680
S. P. Wires, for Duluth Station .....	22,680
D. H. McLinn, for New Hampshire Commission .....	46,200
Total .....	448,420

There were 146,000 retained at the station for hatching and rearing; the balance were lost owing to lack of fertilization. From the eggs retained at the station, 118,978 fry were hatched, 20,000 of which were lost in the hatchery and 98,112 counted out into the pools for rearing. At the close of the fiscal year there remained on hand 84,012.

The following table shows in detail the eggs lost in incubation, the fry lost in the hatching-house, and the number placed in the rearing-pools:

*Eggs retained.*

Number of eggs.	Eggs lost in incubation.	Fry lost in troughs.	Total loss in house.	Fry counted out into pools.	Per cent of loss.
14,424	1,210	2,202	3,412	11,012	23
13,851	1,990	1,691	3,681	9,970	28
13,271	2,083	2,023	4,700	8,565	35
17,191	1,862	3,639	5,501	11,690	32
11,573	1,678	2,505	4,183	7,390	36
13,478	2,468	859	3,427	10,051	25
19,386	4,437	2,349	6,786	12,600	34
14,459	4,420	1,674	5,994	8,465	41
12,507	2,253	1,521	3,774	8,823	29
16,012	4,263	2,303	6,566	9,446	41
146,242	27,264	20,966	48,230	98,012	32.4

25,000 of this lot were delivered at the hatchery as fry.

In view of the desirability of increasing the output of rainbow trout, arrangements were made with Mrs. M. B. Murrell, of Little Rock, Ark., for the Commission to collect eggs from the Mammoth Springs (Ark.) fish ponds on shares. Mr. Neill, an employee of Neosho Station, was detailed for this purpose and conducted the work under the direction of the superintendent. Only 73,000 eggs were obtained from the 104 females handled, 31,000 of which were shipped to Duluth. The balance were turned over to Mrs. Murrell. On May 12 a case containing 12,590 rainbow-trout eggs was received from the California Fish Commission. They commenced hatching immediately and finished May 19. The fry began to take food on May 26, when only two weeks old. On June 8 there remained on hand 9,925 of these fish. They will be retained at the hatchery and reared as brood stock.

*Brook trout.*—On December 8, 1894, a consignment of 20,000 brook-trout eggs was received from Leadville Station. The eggs commenced hatching on December 13 and finished December 21. They appeared to do well until April 10, when an epidemic, described by Livingston Stone as black-gill fever, made its appearance. From that time until the close of the year the death rate was very heavy, and by the end of June only 829 remained. Dissections and microscopic examinations were made. Every organ was normal except the gills, which presented a dark pasty appearance, like the lungs of an animal dead from pneumonia. A feature of the disease was its quick action; a fish would appear in perfect health and be dead in five minutes. The temperature of the water could not be changed, and the other remedies in general use, salt and muck, would obviously have aggravated the trouble.

*Von Behr trout*.—On July 1, 1894, the stock on hand was estimated at 10,312. They were counted on August 20 and found to number 6,500. The fish were never healthy, apparently, but the loss was comparatively light until January 15, when an epidemic occurred which reduced the number to 3,440.

*Black bass*.—As in past years, ponds Nos. 10 and 11 were reserved as breeding-ponds, and ponds Nos. 2, 4, 5, 6, and the new one, No. 14, as rearing-ponds. Fifteen breeders were put in No. 10 and 35 in No. 11. Early in April they commenced nesting, and by April 13 several schools were observed in No. 11. These fry could not have been over ten days old, and were three-quarters of an inch long. By the end of June 7,500 fry,  $\frac{3}{4}$  to  $1\frac{1}{2}$  inches in length, had been transferred from pond No. 11 to Nos. 4, 6, and 14. Besides furnishing them *Coriza* and other insects as food, the eggs of the common goldfish and suckers were collected from the neighboring branches and utilized for this purpose.

*Rock bass*.—As heretofore, ponds Nos. 7 and 8 were used as breeding-ponds. The first nest was found on April 13, and by June 12 the older fry were  $1\frac{1}{2}$  inches long. At this time some of the adult fish were still occupying nests. All indications point to a successful season, but it is impossible to give the number on hand at the close of the year, as the ponds had not been drawn and the fish counted at that time.

*Carp*.—The propagation of carp has been discontinued at this station, and all of the breeding carp on hand were disposed of in May, 1894.

*Tench*.—At the beginning of the year but 275 young fish were found in the ponds, but the breeders apparently spawned again on August 22, and a second crop of 4,600 was harvested in the fall. In the spring the spawning of the tench occurred on April 12, and again on June 12, but it is improbable that any results will be secured, as a number of bass escaped from pond No. 10 into the tench pond.

*Goldfish*.—The brood stock of this species consists of 8 adult fish, which produced during the previous year 7,857. They spawned as usual in the spring, but the indications are that most of the young have been killed by boat-flies, snakes, and crawfish.

*Enemies of fish-culture*.—The enemies of fish killed at the station during the year are as follows: Kingfishers, 24; ducks, 33; grebe, 24; water-hens, 3; fishhawks, 3; snakes in ponds, 75; frogs in ponds, 18; muskrats, 18; owls, 1; turtles, 32; cormorant, 1; bitterns, 29; herons, 2; opossums, 2; water rats, 28; crawfish, 1,555 pounds.

Following is a summary of temperatures of the water during the year to which the various fishes were subjected:

Species.	Maximum.	Minimum.
Trout, yearlings and older.....	69	38
Trout, yearlings and loss.....	78	47
Black bass.....	90	55
Rock bass.....	86	42
Goldfish and tench.....	80	40

LEADVILLE STATION, COLORADO (H. D. DEAN AND E. A. TULIAN, SUPERINTENDENTS).

The work at this station during the fiscal year was directed by H. D. Dean and E. A. Tulian, superintendents, the latter relieving Mr. Dean on February 7, 1895.

*Repairs, etc.*—During the year 400 feet of 6-inch wood pipe was laid from the large spring and connected with a 3-inch pipe to the hatchery, thereby increasing the water supply to 90 gallons per minute. A new waste overflow from the reservoir was also put in, the old one not being adequate. A substantial fishtrap was constructed in the creek connecting Upper and Lower Twin Lakes at a cost of \$500 and a watchman's shanty built near it. A flagpole 65 feet high was erected at the station and much other work done toward improving the grounds and buildings.

The following table shows the stock of fish and eggs on hand at the beginning of the fiscal year:

Species.	Eggs.	Fry.	Yearlings.	Adults.
Brook trout.....		145,500	3,445	1,123
Rainbow trout.....		570		26
Loch Leven trout.....		2,000	1,580	27
Black-spotted trout.....	55,000	13,500		424
	55,000	161,570	5,025	1,600

There were heavy and unaccountable losses of fry and adult fish during the summer months. Every possible effort was made to check the death rate, but without avail. The adult fish were apparently suffering from diseases of the gills, but there was no visible cause for death in the case of the fry. A number of the specimens sent to headquarters were carefully examined, but failed to show any disease of the organs.

The regular distribution was commenced by car No. 3 on October 27 and finished December 4, though a small part of the stock was disposed of in July, August, and September.

The total number of fish distributed was 70,325 brook trout, 570 rainbow trout, 1,475 black-spotted trout, and 870 Loch Leven trout; in all, 73,240, less than 50 per cent of the stock on hand at the beginning of the year.

*Brook trout.*—During the summer arrangements were made with the owners of Wellington, Uneva, and Aspen lakes for the collection of trout eggs on shares, the owners to get one-half of the fry resulting from the eggs collected, and the United States Fish Commission to pay all expenses. The first eggs were taken at Uneva Lake on August 11, and at Wellington on November 8. By the close of the season 1,754,700 eggs had been collected from all sources, as indicated in the accompanying table.

Table showing collections of brook trout eggs, etc.

Point of collection.	Adult fish.	Eggs.
Wellington Lake .....	695	592,000
Uneva Lake .....	396	530,900
Station .....	522	444,100
Lower Lake .....	163	42,100
Aspen Lake .....		145,600
Total .....	1,776	1,754,700

The eggs taken at Uneva Lake turned out much better than those collected at any of the other points or from the brood fish at the station, the loss during incubation being only 72,400. From the remainder 100,000 eyed eggs were shipped to Northville, and 358,500 fry were hatched. The Wellington Lake trout eggs were probably injured by the long haul over rough roads. Of the 592,000 collected there, 182,000 were lost in the hatchery, 50,000 eyed eggs transferred to other stations, and 359,700 fry hatched. The advantage of spring water over creek water was clearly demonstrated this season, the eggs from Uneva and Wellington lakes hatching in from 72 to 73 days, whereas in previous years, when creek water was used, the eggs were frequently in the troughs from 140 to 160 days.

The following table shows the number of eggs shipped from the station and the number received during the year:

Eggs shipped.

Date.	Consignee.	Address.	Kind.	Number sent.
1894. Dec. 3	W. F. Page, for Neosho Station.....	Neosho, Mo.....	Brook trout.....	20,000
1895. Jan. 8	F. W. Child.....	Brattleboro, Vt.....	do.....	25,000
8	F. N. Clark, for Northville Station .....	Northville, Mich.....	do.....	100,000
15	J. G. Bailey.....	Silver Spring, Ark.....	do.....	5,000
15	S. S. Watkins.....	St. Paul, Minn.....	do.....	20,000
15	Geo. E. Delavan.....	Estherville, Iowa.....	do.....	20,000
24	C. G. Atkins, for Craig Brook Station...	Bucksport, Me.....	do.....	50,000
	Total .....			240,000

Eggs received.

Sent from—	Species.	Number.	Condition.
Neosho Station .....	Rainbow trout.....	126,000	102,800 very poor fish hatched from them. Loss to July 1 was 69,650.
Northville Station .....	Loch Leven trout.....	10,000	Loss on eggs 600. Loss on fry to July 1, 6,400.

During the month of May 254,700 brook-trout fry were delivered to the owners of Wellington, Uneva, and Aspen lakes, and 230,000 brook and 30,000 rainbow trout fry were distributed to applicants in Colorado; the balance of the stock was retained for the fall distribution.

*Native and rainbow trout.*—A substantial trap having been built at Twin Lakes, it was hoped that a large collection of eggs of the black-spotted, yellow-finned, and rainbow trouts would be secured. Very few fish were taken, however, either by the State or the station trap, probably because of very cold and rough weather prevailing during the spawning season. The total egg collections were 62,600 black-spotted (43,100 from Twin Lakes and 19,500 from the station fish), 26,500 yellow-finned from Twin Lakes, and 13,500 rainbows (11,000 from Uneva and 2,500 from the station stock.

At the close of the year the stock of eggs and fish was as follows:

Species.	Eggs.	Fry.	Adults.
Brook trout.....		112,200	1,002
Rainbow trout.....	9,916	4,400	
Loch Leven trout.....		3,000	475
Black-spotted trout.....	36,580		40
Yellow-finned trout.....	11,304		
Total.....	57,796	119,600	1,517

BAIRD STATION, CALIFORNIA (LIVINGSTON STONE, SUPERINTENDENT).

Work at this station during the year was confined, as in past years, to the quinnat salmon (*Oncorhynchus tshawytscha*). There are two runs of this salmon each year, one in the summer and one in the fall. The summer run spawn from about August 20 to September 20; the fall run spawn from about October 25 to the first week in December. By reason of the fact that the close season in California does not begin (according to the law of that State) until September 1, thereby permitting the operation of seines until that time, very few, comparatively, of the summer run of salmon reach this station.

On August 24 the summer fishing and spawning season opened with the taking of 90,000 eggs and continued until September 30. The total number of eggs taken from the 816 fish secured was 3,294,300, an average yield of 4,037 eggs per fish. The fall run began October 22 in the midst of seven days' storm, which commenced on the 17th and lasted until the 24th. The McCloud River rose rapidly, and on the night of the 23d a portion of the rack was carried away, notwithstanding the fact that several men were kept on it day and night to keep it clear of leaves and dirt. This caused a large number of breeding salmon to escape through the breach. The river was closed again on the 27th, but it was too late to retrieve the great loss of breeders occasioned by the accident to the rack.

The total number of eggs taken up to November 23, when the fall run ceased, was 1,098,800, an average of 4,300 per fish.

During the fiscal year 3,526,300 eggs were sent to the State hatchery at Sisson, Cal., and 150,000 to the Société d'Acclimatation, Paris, France. From the remainder, 400,000 young salmon were deposited in McCloud

River from October 24 to 26, and between January 7 and February 7 100,000 fry were deposited in Garden Brook, a tributary of the McCloud River.

During the year some extensive repairs and improvements were made at the station, including the building of an aqueduct for bringing the water supply to the hatching-house by gravity from a stream near by. This will render unnecessary the use of the wheel as a means of supplying the hatching-house with water during fall and winter, and, in consequence, much labor, expense, and risk of life will be avoided. A rack and footbridge were also constructed across McCloud River and the mess-house repaired.

The hatching apparatus used at the station is the Williamson trough, fitted with deep trays, which is undoubtedly one of the best appliances for hatching eggs of the *Salmonida* on a large scale. The trays used are made of wire netting, 10 inches wide by 24 inches long, and deep enough to bring the tops of the trays an inch or two above the water, which is 5 or 6 inches deep. Into these trays 2 gallons of salmon eggs are poured at a time, making the eggs 12 or 15 tiers deep. They are not injured by being so piled up because the water is continually forcing its way up through and loosening them, thus lightening the weight of those above them and at the same time furnishing them a supply of fresh air.

The advantages of this method are—

(1) The top of the tray is above the water and always entirely dry, consequently it is convenient to handle.

(2) The white eggs can be forced to the top by tilting one end of the tray a little or by lifting it up and setting it gently back in its place. By this means no feather is required to pick over the eggs, and thus the injuries often inflicted upon them in that way are obviated.

(3) The top of the tray being above water, the eggs can not escape in any way.

(4) It economizes space, as 50,000 eggs can be kept on a superficial area of 2 square feet. Two troughs, 20 feet long and 1 foot wide, will, by this method, carry 1,000,000 salmon eggs.

The maximum and minimum temperatures of air and water at the station during each month are shown by the following table:

1894.	Air.		Water.		1895.	Air.		Water.	
	Max.	Min.	Max.	Min.		Max.	Min.	Max.	Min.
July .....	0	0	0	0	January .....	84	30	49	43
August .....	112	50	02	55	February .....	88	28	49	40
September .....	116	46	02	50	March .....	87	25	50	48
October .....	108	32	58	46	April .....	100	30	52	44
November .....	102	38	55	49	May .....	108	40	65	48
December .....	98	28	50	38	June .....	115	44	58	50
	38	26	47	39					



FORT GASTON AND SUBSTATIONS, CALIFORNIA (CAPT. WM. E. DOUGHERTY, U. S. A., SUPERINTENDENT).

During July and August only routine work was performed at the station and substation (Redwood). In September timbers were taken out for the construction of piers at the substation, and in October three piers were built in the bed of Redwood Creek just above the mouth of Minor Creek, and stringers and racks erected on the structure. The greatest care was taken to make this barrier substantial, yet the first high water that came (on December 1) undermined the pier and disabled the structure for the remainder of the season. It is believed that the pier system, or any system by which a considerable body of water is displaced, can not be made successful as a means of stopping the passage of fish in any of the streams of the Coast Range. The causes of this are that the streams all run in synclinal axes, the bed rock being from 80 to 200 feet beneath the bed of the stream (it is about 80 feet at Redwood), and that the current is so rapid and the volume of water so great during a rise that the undermining of the piers by the displaced water is inevitable. This system is successful at the Baird Station because McCloud River has a firm bottom.

The salmon began to run early in December, but hardly any were taken until the water was low enough to put a temporary dam in the creek. Eggs were taken during the season as follows: Salmon (from 80 females), 221,000; steelhead (from 138 females), 557,500; Von Behr trout (from 31 females), 20,800; rainbow trout (from 33 females), 16,321. Most of the salmon and steelhead eggs were taken at the substation, as there was no run of either kind in Trinity River, all the fish having been taken at the cannery at the mouth of Klamath River. Fishing and spawn-taking were suspended on May 6.

Fish and eggs were distributed during the year as follows:

*Eggs distributed.*

Consignee.	Species.	Number.
The consul of Japan at San Francisco, Cal.....	Steelhead .....	30,000
F. N. Clark, for Northville Station .....	do .....	91,850
S. P. Wires, for Duluth Station .....	do .....	100,000
J. W. Titcomb, for St. Johnsbury Station .....	do .....	25,000
Total .....		246,850

*Fry distributed.*

Applicant.	Point of deposit.	Species.	Number.
Humboldt Sporting and Recreation Club, Eureka, Cal.	Elk River .....	Rainbow trout.....	1,000
Do .....	Yager Creek.....	Von Behr trout.....	1,000
Country Club, San Francisco, Cal.	Streams in Marin County, Cal.	do .....	3,000
U. S. F. C. assignment .....	Trinity River, California (60 miles from the ocean).	Chinook and silver salmon.	150,000
Do .....	Redwood Creek, California (30 miles from the ocean).	do .....	70,000
Do .....	do .....	Steelhead .....	277,500

*Brood stock and fry on hand June 30, 1895.*

Species.	Calendar year in which hatched.		
	1895.	1894.	1893.
Rainbow trout.....	14,000	6,000	200
Von Behr trout.....	10,000	800	12
Eastern trout.....	200	.....	A few.

During the year the station grounds were extended and inclosed by a fence; two ponds, 15 by 60 feet, were constructed; a dam 5 feet high and 20 feet long was erected in Hospital Creek, and a flume 3,060 feet in length was constructed, which gives the station an independent water supply from Hospital Creek. At the substation a new hatchery, 18 by 42 feet, with a finished room for the keeper, 12 by 18 feet, and porch full length, storeroom, etc., was constructed. The large ponds were also subdivided.

KORBEL.

The station was closed from July 1 to September 15. On the 16th work was begun procuring timbers for the construction of a dam, to consist of log piers and stringers for the placing of the racks. Three triangular piers and two abutments, 6 feet in height, were erected, the largest pier having a base of 16 feet on the sides and 10 feet in rear, the two center spans being 40 feet wide, and the shore spans 30 feet. These structures were filled with loose rock, faced on the sides with rough material, and reinforced all round by a revetment of loose rock 2 feet in height. Every precaution was taken in order to make the structure permanent.

The water being low in October and November, no salmon reached the station, although great numbers were taken at the mouth of the river. On November 26 the first rain came, and early in December chinook and silver salmon became very plentiful. During December 7 and 8 the water rose rapidly, making a breach under the dam in the deepest part of the current 18 feet wide and nearly 10 feet deep, and letting down one side of the largest pier. A temporary dam of wire netting was put in as soon as the water subsided sufficiently, the breach was repaired by inserting bags of sand, and the pier carried up by means of timbers and rock. These repairs were completed on the 29th. In February the water again rose so high that the whole structure had to be dismantled, causing much loss of time. During March the water became so low that the fishing had to be done in the main channel of Mad River, 2 miles distant from the station.

Fishing ceased May 1 and spawn-taking on May 10. Eggs were taken during the season as follows: Chinook and silver salmon (from 180 females), 471,500; steelhead trout (from 105 females), 594,000.

*Distribution of fish and eggs complete.*

Applicant.	Point of deposit.	Species.	Eggs.	Fry.
Consul of Japan at San Francisco, Cal.....		Steelhead.....	30,000.....	
U. S. F. C. assignment.....	Mad River.....	Salmon.....		470,000.....
Do.....	do.....	Steelhead.....		550,000.....

## CLACKAMAS STATION, OREGON (W. F. HUBBARD, SUPERINTENDENT).

On account of the poor results attained on Clackamas River in the past few years, it was decided to discontinue operations there and to depend on Sandy River for the supply of eggs; also to operate, as an auxiliary station, the hatchery on the Siuslaw River, belonging to the Oregon Fish Commission.

## SANDY RIVER.

A rack 400 feet long was built across the river to prevent the ascent of the salmon. Much difficulty was experienced in carrying on this work on account of sawlogs and cordwood, and it was found necessary to make a gate in the rack through which the logs and wood could be passed, also to build a boom 600 feet above the rack to direct them to the gate. A small, temporary hatchery was built and hatching-troughs erected, which were supplied with water from a spring brook not far distant. Heavy rains in the first part of September brought down an immense quantity of wood and logs, which broke the boom and carried away a large part of the rack, thus permitting the salmon collected to escape. The rack was repaired, and on the 18th of September 23,000 eggs were collected from six salmon. Additional rains caused a rise in the river, and on the 1st of October the rack was taken away again. As all of the salmon below the rack had passed up, operations were suspended. The 23,000 eggs were placed in a small brook emptying into the Sandy and left to hatch.

## SIUSLAW RIVER.

The hatchery on the Siuslaw River is located at Seaton, 25 miles above the mouth of the river, and is well furnished with troughs and everything necessary for carrying on salmon work, being supplied with excellent water from a brook near by. In July arrangements were made for the construction of a rack across the river about a mile above the hatchery. This was completed on July 24 and the station placed in charge of S. S. Bass, assisted by George H. Tolbert. About the middle of August salmon appeared in the river in fairly large numbers, but very few of them succeeded in getting up as far as the station, as the fishermen set their nets below, clear across the stream. No eggs were taken, and operations were abandoned about the middle of September, as the run of quinnat salmon was over.

## CAR AND MESSENGER SERVICE (J. F. ELLIS, SUPERINTENDENT).

In July cars Nos. 2, 3, and 4 were placed in the shops of the Harlan & Hollingsworth Company, Wilmington, Del., where they were repainted, revarnished, and generally overhauled. A new steel range was placed under car No. 4, a permit having been obtained from the New York Board of Railroad Commissioners to use a range of that character in the State. In December Allen paper wheels were placed under this car, as many of the railroads object to hauling a car equipped with iron wheels. During the month of November car No. 1 was thoroughly repaired, painted, varnished, and a new tin roof put on. It was also equipped with a storage tank of 600 gallons capacity, pressure tanks, new boiler and circulating pumps, and connections were made for hatching apparatus.

*Trout, salmon, etc.*—The first work undertaken was the continuation from last year of the distribution of fingerling trout from the Northville Station. This was finished by car No. 1, which made two trips, traveling 1,100 miles and distributing 6,500 trout, with a loss of 325. The distribution at Green Lake was commenced on October 1 and finished on November 16, the output consisting of 36,023 trout and 53,015 landlocked salmon. Car No. 4 made seven trips in carrying these fish, traveling 5,318 miles. The number of trout lost was 1,525 and the number of salmon 946. Car No. 3 made the distribution from Leadville, commencing October 27 and finishing December 4, during which time it made five trips, traveling 8,818 miles. The number of trout moved was 53,424 and the total loss was 351. The largest number taken on one trip was 16,000. The trout distribution from Neosho Station was begun December 11 and completed on January 30, the number of fish moved being 63,190, on which there was a loss of 4,430. The number of trips made was ten and the number of miles traveled 9,862.

Considerable difficulty was experienced, as heretofore, in moving the rainbow trout. Various experiments were made in order to remedy this trouble, but without avail. The car captains received instructions to conduct a series of experiments with the view to determining the best temperature in which to carry them, and to ascertain, if possible, the cause of the large losses. On car No. 3 they were carried in water varying in temperature from 40 to 60°, and on car No. 2 from 35 to 55°. The loss on car No. 3 was the same in all cases, but on No. 2 they did better, apparently, at a temperature varying from 40 to 42°. The difference in loss, however, was too slight to justify the conclusion that the temperature of the water was the cause of death. Many other theories have been advanced, but the evidence furnished is not sufficient to account for the loss.

The trout distribution from Wytheville Station was made by cars Nos. 1 and 4, and lasted from December 9 to February 3, 80,460 fish being moved, with a loss of 6,358. The number of miles traveled was 9,026. Between March 26 and June 22, 1,634,000 trout fry were distrib-

uted from Northville Station, the loss being 15,000. Ten trips were made, and 6,426 miles traveled. In addition to this distribution, 3,300 adult wild trout were transferred from Grayling, Mich., to Northville, with a loss of 76. From Duluth Station 200,000 trout fry were planted in streams in Minnesota.

The summary of distribution by cars and messengers is as follows:

Number of trout carried.....	2,332,658
lost.....	85,500
trips made.....	52
miles traveled.....	47,380
Average temperature.....	42
Cost of distribution.....	\$7,201.48

*Native food-fishes.*—The distribution of these fishes commenced July 16 from Quincy, Ill., cars Nos. 1, 2, and 3 being utilized for the purpose. The loss on the 40,723 fish moved was 3,338, and the number of miles traveled was 24,500. The average temperature of the water during this distribution was 71° F. on car No. 1, 57° on car No. 2, and 60° on car No. 3. The loss on those moved at 70° was much less in proportion to the number handled than on those carried at a lower temperature.

*Carp.*—The distribution of carp from Central Station was commenced October 19, all four of the cars taking part in it. The number moved was 55,950, the loss being 639. Thirteen trips were made and 5,813 miles traveled.

*Whitefish.*—The distribution of eggs of this species commenced from Put-in-Bay Station on March 11, when 2,000,000 eggs were shipped on car No. 3 to Salt Lake City, Utah. The eggs were hatched en route and the fry deposited in Utah waters. At Alpena Station the first whitefish fry were distributed on April 17. The output consisted of 28,500,000 fry, and the last of them were shipped May 6. Ten trips were made and 7,020 miles traveled. The average temperature of the water in which they were carried was 43°.

*Pike perch.*—The distribution of eggs of this species commenced April 27, when 14,400,000 were shipped from Put-in-Bay Station on car No. 4, to be hatched at Knoxville and planted in the waters of Kentucky and Tennessee. The first fry were moved from that station on May 15 and the last on May 17. One trip with this species was also made from Duluth Station. Four trips were required to move the 38,100,000 fry shipped, and the number of miles traveled was 3,967. The loss was 9,400,000, of which 6,200,000 were eggs lost in process of hatching. The average temperature of the water was 51°.

*Shad.*—The shad distribution from Central Station commenced on May 1, and from the steamer *Fish Hawk*, stationed at Gloucester, N. J., on May 17. The work closed on June 6, the cars having distributed 27,459,000 fry, 270,000 of which were lost. Seven trips were made and 3,841 miles traveled. The average temperature in which the fish were carried was 60°.

The total number of miles traveled by the cars during the year in the distribution of fishes was 93,377, of which 28,188 were paid for and 65,189 were free. The whole number of trips made by the cars was 100, and the number of days engaged in the actual distribution of fish was 653. The number of miles traveled by detached messengers was 75,384, of which 59,445 were paid for and 16,389 were free. The total number of fish and eggs handled by the cars was 96,565,088, of which 9,762,448 were lost en route (6,000,000 pike-perch eggs).

FREE TRANSPORTATION FURNISHED BY RAILROADS.

The Commission is under continued obligations to various railroad companies in the United States for free transportation furnished during the year, as indicated by the following statement:

*Summary showing total number of miles of free transportation furnished United States Fish Commission cars and messengers during the fiscal year ending June 30, 1895.*

Name of railroad.	Cars.	Messen- gers.	Total.
Atchison, Topeka and Santa Fe.....	4,071	1,586	5,657
Atlantic and Pacific.....	1,558		1,558
Baltimore and Ohio.....	776		776
Burlington and Missouri River in Nebraska.....	382		382
Burlington, Cedar Rapids and Northern.....	2,546		2,546
Canadian Pacific.....	278		278
Chicago and Northwestern.....	1,791		1,791
Chicago and West Michigan.....	419		419
Cincinnati and Ohio.....	2,011		2,011
Chicago, Burlington and Quincy.....	2,142	448	2,590
Chicago, St. Paul, Minneapolis and Omaha.....	273		273
Cleveland, Cincinnati, Chicago and St. Louis.....	2,933		2,933
Delaware and Hudson Canal.....	710	626	1,336
Denver and Rio Grande.....	1,602	3,042	5,244
Denver, Leadville and Gunnison.....		1,523	1,523
Detroit, Bay City and Alpena and Detroit and Mackinac.....	1,918		1,918
Detroit, Lausling and Northern.....	153		153
Duluth and Iron Range.....	456	192	648
Duluth, South Shore and Atlantic.....	573		573
Fremont and Pere Marquette.....	3,780		3,780
Fremont, Elkhorn and Missouri Valley.....	200		200
Fort Worth and Denver City.....		1,336	1,336
Grand Rapids and Indiana.....	615	149	764
Great Northern.....	762	184	946
Gulf, Colorado and Santa Fe.....	271		271
International and Great Northern.....	686		686
Kansas City, Fort Scott and Memphis.....	1,769	1,189	2,958
Kansas City, Pittsburg and Gulf.....	343	40	383
Lexington and Eastern.....		56	56
Michigan Central.....	5,315		5,315
Minneapolis, St. Paul and Ste. Marie.....	404		404
Missouri, Kansas and Texas.....	1,331		1,331
Missouri Pacific.....	1,686	58	1,744
Mobile and Ohio.....	280	304	584
Montana Union.....	7		7
Northern Pacific.....	1,522	615	2,137
Oregon Railway and Navigation Company.....	404		404
Pennsylvania R. R.....		18	18
Philadelphia, Reading and New England.....		58	58
Rio Grande Western.....	50		50
Santa Fe, Prescott and Phoenix.....	120		120
Southern Pacific.....	1,780	1,056	2,836
St. Louis and Santa Fe.....	2,167	900	3,067
St. Louis, Iron Mountain and Southern.....	1,285		1,285
Texas Pacific.....	634	1,269	1,903
Toledo, Ann Arbor and North Michigan.....	368		368
Union Pacific.....	10,809	214	11,023
Union Pacific, Denver and Gulf.....	698	562	1,170
Wabash.....	1,271	304	1,635
West Virginia, Pittsburg and Gulf.....	208		208
Wisconsin Central.....	1,022		1,022
Total.....	65,189	16,389	81,578

## AID TO STATE AND TERRITORIAL COMMISSIONS.

As in the past, aid was furnished to the fish commissions of the various States and Territories, and the extent of this work is exhibited in the following tabulation:

Statement showing the kinds and numbers of eggs and fish furnished to State and Territorial fish commissions during the fiscal year 1894-95.

State or Territory.	Species.	Eggs.	Fry.	Adults and yearlings.
Arizona	Catfish			45
	Black bass			100
California	Quinnat salmon	3, 526, 000		
	Landlocked salmon	10, 000		
	Lake trout	100, 000		
	Whitefish	25, 000		
	Black bass			2, 500
	White bass			12
	Sunfish			12
	Crappie		50, 000	
Colorado	Black bass			100
Connecticut	Shad		3, 800, 000	
Delaware	Carp			500
	Goldfish			300
	Black bass			100
Georgia	Carp			1, 355
	Tench			400
	Goldfish			150
	Rainbow trout			75
Iowa	Carp			550
	Goldfish			200
Kansas	Brook trout	20, 000		
	Tench			100
	Goldfish			600
	Yellow perch			25
Maryland	Carp			500
	Goldfish			375
Massachusetts	Lake trout	100, 000		
Michigan	Goldfish			700
Minnesota	Carp			500
	Goldfish			200
Nebraska	Brook trout	20, 000		
	Rainbow trout			2, 000
	Lake trout	50, 000		
	Von Behr trout			1, 000
Nevada	Rainbow trout	20, 500		
New Hampshire	do	95, 500		
New York	Shad		4, 900, 000	
	Atlantic salmon	20, 000		
	Lake trout	1, 500, 000		
	Whitefish	5, 000, 000		
	Pike perch	5, 000, 000		
Ohio	Tench			800
	Goldfish			500
	Von Behr trout			200
	Pike perch	25, 000, 000		
	Rock bass			3, 900
Utah	Carp			100
	Goldfish			100
Vermont	Whitefish		2, 000, 000	
	Goldfish			500
	Brook trout			400
	Rainbow trout	52, 000		
	Lake trout	300, 000		
Wisconsin	Loch Leven trout	5, 000		
Wyoming	Rainbow trout	64, 500		
	Von Behr trout	5, 000		

Statement of fish and fish eggs furnished to the States and Territories during the fiscal year 1894-95.

State or Territory.	Species.	Eggs.	Fry.	Adults and yearlings.
Alabama.....	Carp.....			485
	Tench.....			80
	Goldfish.....			60
	Black bass.....			469
Arizona.....	Rock bass.....			660
	Catfish.....			300
	Carp.....			19
	Tench.....			50
	Brook trout.....			1,225
	Yellow perch.....			25
Arkansas.....	Black bass.....			225
	Rock bass.....			2,000
	Crappie.....			100
	Catfish.....			100
	Carp.....			555
	Tench.....			30
	Goldfish.....			181
	Rainbow trout.....	5,000		17,000
Von Behr trout.....			500	
California.....	Brook trout.....	5,000		
	Black bass.....			725
	Rock bass.....			2,525
	Catfish.....			10
	Quinnat salmon.....	3,526,000	500,000	
	Silver salmon.....	910,000	560,000	
	Landlocked salmon.....	20,000		
Steehead trout.....		852,500	332,000	
Rainbow trout.....		1,000	577	
Colorado.....	Von Behr trout.....		4,000	
	Lake trout.....	100,000		
	Whitefish.....	25,000		
	Black bass.....			2,650
	White bass.....			12
	Sunfish.....			48
	Crappie.....		50,000	
	Tench.....			85
	Goldfish.....			100
	Loch Leven trout.....			870
	Rainbow trout.....		30,000	570
Brook trout.....		229,500	35,450	
Von Behr trout.....			1,475	
Yellow perch.....			100	
Black bass.....			647	
Warmouth bass.....			25	
Connecticut.....	Crappie.....			25
	Carp.....			485
	Goldfish.....			24
	Shad.....		3,800,000	
	Von Behr trout.....			1,810
	Brook trout.....			2,400
Delaware.....	Black bass.....			300
	Carp.....			530
	Goldfish.....			306
	Shad.....		3,976,000	
District of Columbia.....	Black bass.....			200
	Carp.....			336
	Tench.....			140
	Goldfish.....			2,136
	Golden tench.....			16
	Shad.....		6,195,000	1,000,000
	Rainbow trout.....			20
	Black bass.....			363
Florida.....	Rock bass.....			590
	Carp.....			84
	Tench.....			50
Georgia.....	Goldfish.....			144
	Carp.....			2,374
	Tench.....			650
	Goldfish.....			388
	Shad.....		2,021,000	
Idaho.....	Rainbow trout.....			475
	Black bass.....			327
	Rock bass.....			1,448
	Carp.....			270
Illinois.....	Catfish.....			1,105
	Carp.....			210
	Tench.....			30
	Goldfish.....			1,970
	Rainbow trout.....			660
	Yellow perch.....			120



## 54 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

*Fish and fish eggs furnished to States and Territories during fiscal year 1894-95—Cont'd.*

State or Territory.	Species.	Eggs.	Fry.	Adults and yearlings.
Illinois .....	Pike perch.....		1,000,000	
	Black bass.....			089
	Rock bass.....			300
Indiana.....	Crappie.....			135
	Carp.....			150
	Tench.....			25
	Goldfish.....			88
	Rainbow trout.....			2,950
Indian Territory.....	Lake trout.....		20,000	
	Pike perch.....		6,800,000	
	Black bass.....			100
	Rock bass.....			1,445
	Carp.....			290
Iowa.....	Tench.....			10
	Carp.....			740
	Tench.....			100
	Goldfish.....			280
	Rainbow trout.....		5,000	2,950
Kansas.....	Von Behr trout.....			500
	Brook trout.....	20,000	20,000	
	Pike perch.....		3,000,000	
	Rock bass.....			450
	Catfish.....			1,302
	Carp.....			2,276
	Tench.....			805
	Goldfish.....			767
	Rainbow trout.....		4,000	0,050
	Yellow perch.....			275
Kentucky.....	Pike perch.....			217
	Black bass.....			5,844
	Rock bass.....			3,575
	Warmouth bass.....			58
	Sunfish.....			170
	Crappie.....			2,219
	Catfish.....			150
	Carp.....			690
	Tench.....			80
	Goldfish.....			58
Louisiana.....	Rainbow trout.....			1,000
	Yellow perch.....			225
	Pike perch.....		3,600,000	
	Black bass.....			777
	Rock bass.....			200
	Warmouth bass.....			452
	Carp.....			220
	Tench.....			50
	Goldfish.....			254
	Maine.....	Carp.....		
Goldfish.....				16
Atlantic salmon.....				180,241
Landlocked salmon.....				101,856
Loch Leven trout.....				12,512
Rainbow trout.....			350	
Von Behr trout.....				2,614
Maryland.....	Brook trout.....			600
	Carp.....			1,179
	Tench.....			175
	Goldfish.....			470
	Shad.....	852,000	18,073,000	
	Rainbow trout.....	200	8,000	7,800
	Black bass.....			721
Massachusetts.....	Rock bass.....			400
	Carp.....			518
	Goldfish.....			43
	Shad.....		200,000	
	Von Behr trout.....			700
	Brook trout.....			600
	Lake trout.....	100,000		1,600
	Black bass.....			200
	Rock bass.....			300
	Cod.....	2,897,000	57,318,000	
Michigan.....	Flatfish.....		5,940,000	
	Lobster.....		72,253,000	
	Carp.....			620
	Goldfish.....			1,012
	Steelhead trout.....		105,000	
	Rainbow trout.....		12,000	1,800
	Von Behr trout.....		10,000	800
	Brook trout.....		35,000	5,440
	Lake trout.....		3,124,500	
	Whitefish.....		32,250,000	

Fish and fish eggs furnished to States and Territories during fiscal year 1894-95—Cont'd.

State or Territory.	Species.	Eggs.	Fry.	Adults and yearlings.
Michigan	Pike perch		3,700,000	
Minnesota	Catfish			50
	Carp			700
	Goldfish			200
	Steelhead trout		5,000	
	Rainbow trout		0,000	2,700
	Brook trout	20,000		
	Lake trout		1,375,000	
	Yellow perch			50
	Pike perch		4,000,000	
	Black bass			75
	Rock bass			250
	Crappie			75
Mississippi	Carp			639
	Tench			690
	Goldfish			88
	Rainbow trout			900
	Black bass			100
	Rock bass			1,150
Missouri	Catfish			2,840
	Carp			1,885
	Tench			1,995
	Goldfish			2,739
	Rainbow trout	23,500	10,000	23,070
	Yellow perch			50
	Black bass			1,278
	Rock bass			5,800
	Warmouth bass			110
	Crappie			1,005
Montana	Carp			1,105
	Brook trout			3,000
Nebraska	Carp			460
	Tench			206
	Goldfish			91
	Golden ide			6
	Rainbow trout			2,500
	Von Behr trout			1,000
	Brook trout			1,950
	Lake trout	50,000		
	Rainbow trout	29,500		
Nevada	Carp			150
New Hampshire	Goldfish			6
	Landlocked salmon			1,000
	Rainbow trout	95,500		
	Brook trout			400
	Black bass			100
New Jersey	Carp			210
	Tench			1,630
	Goldfish			60
	Shad	321,000	9,911,000	
	Rainbow trout			5,000
	Brook trout			2,500
	Black bass			425
New Mexico	Catfish			57
	Carp			1,249
	Tench			390
	Brook trout			3,150
	Yellow perch			175
	Black bass			775
	Rock bass			250
	Crappie			125
New York	Carp			580
	Goldfish			93
	Golden tench			15
	Golden ide			4
	Shad		5,800,000	
	Atlantic salmon	20,000		
	Landlocked salmon			19,824
	Rainbow trout			3,410
	Von Behr trout			1,400
	Brook trout			800
	Lake trout	1,550,000		
	Whitefish	5,000,000		
	Pike perch	5,000,000		
	Black bass			614
	Carp			3,230
	Tench			1,553
	Goldfish			215
	Shad		2,060,000	
	Rainbow trout			13,340
	Black bass			680
North Carolina				

56 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Fish and fish eggs furnished to States and Territories during fiscal year 1894-95—Cont'd.

State or Territory.	Species.	Eggs.	Fry.	Adults and yearlings.
North Carolina	Rock bass			2,000
North Dakota	Catfish			400
	Carp			315
	Yellow perch			375
	Pike perch			4
	Black bass			2,150
Ohio	Rock bass			1,050
	Catfish			75
	Carp			641
	Tench			880
	Goldfish			1,028
	Rainbow trout			2,000
	Von Behr trout			600
	Brook trout		10,000	
	Lake trout		26,000	
	Whitefish		447,500	
	Yellow perch		79,198,000	
	Pike perch	25,000,000		100
	Lake herring	9,852,000	190,680,000	
	Black bass		600,000	
	Rock bass			357
Oklahoma	Crappie			5,615
	Catfish			36
	Carp			1,810
	Tench			360
	Rainbow trout			300
	Yellow perch			100
	Black bass			150
	Rock bass			800
	Warmouth bass			50
	Crappie			25
Oregon	Quinnat salmon	23,000		
Pennsylvania	Brook trout			1,600
	Carp			780
	Tench			330
	Goldfish			511
	Golden tench			20
	Shad		2,358,000	
	Rainbow trout	2,000		26,670
	Black bass			508
Rhode Island	Rock bass			5,235
	Goldfish			31
	Von Behr trout			475
South Carolina	Brook trout			400
	Carp			426
	Tench			1,229
	Goldfish			178
	Shad		2,362,000	
	Black bass			648
South Dakota	Rock bass			1,400
	Catfish			275
	Carp			522
	Brook trout			5,700
	Goldfish			12
	Yellow perch			750
	Pike perch			
	Black bass		2,050,000	
	Rock bass			1,065
	Crappie			1,200
Tennessee	Crappie			26
	Carp			511
	Catfish			50
	Tench			100
	Goldfish			276
	Rainbow trout			4,663
	Pike perch		4,400,000	
	Black bass			600
	Rock bass			1,300
	Crappie			109
Texas	Catfish			450
	Carp			1,477
	Tench			1,480
	Goldfish			168
	Rainbow trout			2,280
	Yellow perch			505
	Pike perch			52
	Black bass			2,390
	Rock bass			2,600
	Warmouth bass			16
	Crappie			172
Utah	Carp			1,394

*Fish and fish eggs furnished to States and Territories during fiscal year 1894-95—Cont'd.*

State or Territory.	Species.	Eggs.	Fry.	Adults and yearlings.
Utah .....	Goldfish .....			124
	Rainbow trout .....	33,500		
	Brook trout .....			2,325
	Whitefish .....		3,000,000	
Vermont .....	Black bass .....			100
	Crappie .....			25
	Carp .....			90
	Goldfish .....			500
	Landlocked salmon .....			2,000
	Steelhead trout .....		4,000	
Virginia .....	Rainbow trout .....	52,000		
	Brook trout .....	25,000		1,400
	Lake trout .....	300,000		
	Carp .....			2,848
Washington .....	Tench .....			690
	Goldfish .....			1,907
	Shad .....		16,540,000	
	Rainbow trout .....		5,000	10,832
	Black bass .....			1,050
	Rock bass .....			4,276
	Carp .....			197
West Virginia .....	Brook trout .....			4,978
	Yellow perch .....			450
	Black bass .....			500
	Carp .....			120
Wisconsin .....	Goldfish .....			80
	Rainbow trout .....			2,600
	Catfish .....			300
	Carp .....			105
	Goldfish .....			25
	Loch Loven trout .....	5,000	10,000	
Wyoming .....	Rainbow trout .....		8,000	9,000
	Brook trout .....		96,000	
	Lake trout .....		1,330,000	
	Whitefish .....		6,750,000	
	Pike perch .....		2,000,000	
	Crappie .....			300
	Black bass .....			500
	Carp .....			60
	Rainbow trout .....	91,000		
	Von Behr trout .....	5,000		
Brook trout .....			10,300	
Black bass .....			50	

## Details of distribution, 1894-95.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
<i>Catfish:</i>			
Stourmans Lake near Flagstaff, Ariz.			25
Mormon Lake near Flagstaff, Ariz.			25
Marshall Lake near Flagstaff, Ariz.			25
City reservoir, Prescott, Ariz.			25
Clear Creek near Winslow, Ariz.			50
Arizona Fish Commission			45
Applicants in Arizona			105
Arkansas			100
California			10
Thorn Creek near Thornton, Ill.			25
Channel Lake near Antioch, Ill.			100
Cedar Lake near Cedar Lake, Ill.			200
Fox River near Elgin, Ill.			780
Saline River near Salina, Kans.			25
Neosho River near Chanute, Kans.			45
Osage River near Ottawa, Kans.			20
Marais des Cygnes near Ottawa, Kans.			25
Little River near Wellington, Kans.			50
Slate River near Wellington, Kans.			175
Lake View near Lawrence, Kans.			105
Solomon River near Solomon City, Kans.			25
Applicants in Kansas			802
Lake Ellerslie near Lexington, Ky.			50
Applicants in Kentucky			100
Shetek Lake near Tracy, Minn.			50
Benton Park Lake near Independence, Mo.			825
Hickory Creek near Neosho, Mo.			1,985
Applicants in Missouri			50
New Mexico			57
Devils Lake near Devils Lake, N. Dak.			100
Stump Lake near Michigan, N. Dak.			300
Applicants in Ohio			75
Oklahoma			50
Lake Kampeska near Watertown, S. Dak.			175
Pickerel Lake near Webster, S. Dak.			100
Beaver Creek near Huntington, Tenn.			50
Spring Creek near Amorilla, Tex.			50
Katy Lake near Hillsboro, Tex.			50
Picnic Lake near Sulphur Springs, Tex.			75
Lake McDonald near Austin, Tex.			100
Saluda Creek near San Antonio, Tex.			75
Applicants in Texas			100
Browns Lake near Burlington, Wis.			300
<i>Carp:</i>			
Applicants in Alabama			485
Arizona			19
Arkansas			555
Naugatuck River near Torrington, Conn.			199
Applicants in Connecticut			286
Delaware			30
Delaware Fish Commission			500
Applicants in District of Columbia			336
Florida			84
Georgia			989
Ogeechee River near Midville, Ga.			30
Georgia Fish Commission			1,355
Applicants in Idaho			270
Illinois			210
Indiana			130
Indian Territory			200
Iowa			240
Iowa Fish Commission			500
Applicants in Kansas			2,241
Clark Creek near White City, Kans.			35
Kinniconick River near Vanceburg, Ky.			60
Applicants in Kentucky			000
Louisiana			220
Maine			60
Maryland			079
Maryland Fish Commission			500
Applicants in Massachusetts			518
Michigan			020
Minnesota Fish Commission			500
Applicants in Minnesota			200
Mississippi			039
Missouri			085
Marais des Cygnes near Katy, Mo.			800
Hickory Creek near Amoret, Mo.			000
Applicants in Montana			1,105
Nebraska			460
New Hampshire			150

Details of distribution, 1894-95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
<i>Carp—Continued.</i>			
Applicants in New Jersey .....			210
New Mexico .....			1,249
New York .....			880
North Carolina .....			1,105
Catawba River near Marion, N. C. ....			2,125
Applicants in North Dakota .....			315
Ohio .....			641
Oklahoma .....			1,810
Pennsylvania .....			780
South Carolina .....			426
South Dakota .....			522
Tennessee .....			411
Ball Creek near Lone Mountain, Tennessee. ....			100
Applicants in Texas .....			1,477
Utah .....			1,294
Utah Fish Commission .....			100
Applicants in Vermont .....			90
Virginia .....			2,408
Tates Run near Wytheville, Va. ....			440
Applicants in Washington .....			107
West Virginia .....			120
Wisconsin .....			195
Wyoming .....			60
<i>Tench:</i>			
Applicants in Alabama .....			80
Arizona .....			50
Arkansas .....			30
Colorado .....			85
District of Columbia .....			140
Florida .....			50
Georgia .....			259
Georgia Fish Commission .....			400
Applicants in Illinois .....			30
Indiana .....			25
Indian Territory .....			10
Iowa .....			100
Kansas .....			705
Kansas Fish Commission .....			100
Applicants in Kentucky .....			80
Louisiana .....			50
Maryland .....			175
Mississippi .....			690
Missouri .....			495
Maramee River near Moselle, Mo. ....			1,500
Applicants in Nebraska .....			206
Musconetcong River near Washington, N. J. ....			1,600
Applicants in New Mexico .....			100
Manco Buncoc Creek near Raton, N. Mex. ....			200
Applicants in North Carolina .....			915
Catawba River near Marion, N. C. ....			638
Ohio Fish Commission .....			800
Applicants in Ohio .....			80
Oklahoma .....			360
Pennsylvania .....			330
South Carolina .....			299
Congaree River near Columbia, S. C. ....			1,000
Applicants in Tennessee .....			100
Texas .....			280
Longview Pond near Longview, Tex. ....			1,000
Palestino Club Lake near Palestine, Tex. ....			200
Tates Run near Wytheville, Va. ....			440
Applicants in Virginia .....			250
<i>Goldfish:</i>			
Applicants in Alabama .....			60
Arkansas .....			181
Colorado .....			100
Connecticut .....			24
Delaware .....			6
Delaware Fish Commission .....			300
Applicants in District of Columbia .....			2,136
Florida .....			144
Georgia .....			238
Georgia Fish Commission .....			150
Applicants in Illinois .....			1,070
Indiana .....			88
Iowa .....			80
Iowa Fish Commission .....			200
Applicants in Kansas .....			167
Kansas Fish Commission .....			600
Applicants in Kentucky .....			58
Massachusetts .....			43

## Details of distribution, 1894-95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
<i>Goldfish</i> —Continued.			
Applicants in Michigan			312
Michigan Fish Commission			700
Applicants in Louisiana			254
Maine			16
Maryland			104
Maryland Fish Commission			375
Applicants in Minnesota			6
Minnesota Fish Commission			200
Applicants in Mississippi			88
Missouri			168
Hickory Creek near Neosho, Mo.			2,571
Applicants in Nebraska			91
New Hampshire			6
New Jersey			66
New York			93
North Carolina			215
Ohio			528
Ohio Fish Commission			500
Applicants in Pennsylvania			511
Rhode Island			31
South Carolina			178
South Dakota			12
Tennessee			276
Texas			168
Utah			24
Utah Fish Commission			100
Vermont Fish Commission			500
Applicants in Virginia			442
Tates Run near Wytheville, Va.			1,465
Applicants in West Virginia			80
Wisconsin			25
<i>Golden tench</i> :			
Applicants in District of Columbia			16
New York			15
Pennsylvania			20
<i>Golden ide</i> :			
Applicants in Nebraska			6
New York			4
<i>Shad</i> :			
Connecticut Fish Commission		3,800,000	.....
Indian River near Millsboro, Del.		448,000	.....
Blackbird River near Middletown, Del.		480,000	.....
Smyrna River near Clayton, Del.		360,000	.....
St. Jones Creek near Dover, Del.		456,000	.....
Leipsic River near Felton, Del.		600,000	.....
Murderkill Creek near Ellendale, Del.		144,000	.....
Brandywine River, Wilmington, Del.		504,000	.....
Nanticoke River, Seaford, Del.		504,000	.....
Mispillion Creek near Milford, Del.		480,000	.....
Potomac River, Washington, D. C.		4,384,000	1,000,000
Eastern Branch of Potomac River, Washington, D. C.		1,811,000	.....
U. S. F. C. Ponds, Washington, D. C.		2,047,000	.....
Ocmulgee River near Macon, Ga.		450,000	.....
Ogeechee River near Midville, Ga.		450,000	.....
Savannah River, Augusta, Ga.		1,121,000	.....
Patuxent River near Laurel, Md.		1,826,000	.....
Potomac River near Point of Rocks, Md.		1,788,000	.....
Wenorton, Md.		454,000	.....
Washington Junction, Md.		1,796,000	.....
Hancock, Md.		366,000	.....
Patapsco River at Relay Station, Md.		1,347,000	.....
Susquehanna River at Port Deposit, Md.		1,368,000	.....
Garrott Island, Md.		621,000	.....
North East River, Red Bank, Md.		1,518,000	.....
Carpenter Point, Md.		320,000	.....
Chesapeake Bay, Battery Island, Md.	852,000	4,543,000	.....
Spesutia Island, Md.		914,000	.....
Swan Creek near Plum Point, Md.		600,000	.....
Wicomico River near Salisbury, Md.		504,000	.....
Tackahoe Creek near Queen Anne, Md.		504,000	.....
Chester River near Chestertown, Md.		504,000	.....
Parker Mill Pond near Wareham, Mass.		200,000	.....
Delaware River near Lambertville, N. J.		5,965,000	.....
Frenchtown, N. J.		1,045,000	.....
Milford, N. J.		450,000	.....
Cohansey River near Bridgeton, N. J.		1,800,000	.....
Timber Creek near Gloucester, N. J.		651,000	.....
Delaware River near Gloucester, N. J.	321,000		.....
Callicoon, N. Y.		460,000	.....
Port Jervis, N. Y.		450,000	.....
New York Fish Commission		4,000,000	.....

Details of distribution, 1894-95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
<i>Shad</i> —Continued.			
Lumber River near Lumberton, N. C.		409,000	
Yadkin River near Salisbury, N. C.		225,000	
Catawba River near Morgantown, N. C.		225,000	
Pasquotank River near Elizabeth City, N. C.		410,000	
Roanoke River near Goldsboro, N. C.		400,000	
Rockfish Creek near Wallace, N. C.		400,000	
Delaware River near Delaware Water Gap, Pa.		1,458,000	
Lackawaxen, Pa.		450,000	
Easton, Pa.		450,000	
Ashpoo River near Colleton, S. C.		360,000	
Ashley River near Charleston, S. C.		442,000	
Combahee River near Yemassee, S. C.		960,000	
Peedee River near Peedee, S. C.		400,000	
Santee River near Lanes, S. C.		400,000	
Santee Canal near Moncks Corner, S. C.		409,000	
Cedar Run near Catletts, Va.		1,399,000	
Rapidan River near Rapidan, Va.		1,852,000	
Little River near Taylorsville, Va.		684,000	
Ocoquan River near Woodbridge, Va.		2,286,000	
Rappahannock River near Fredericksburg, Va.		1,353,000	
Remington, Va.		448,000	
Otter River near Evington, Va.		461,000	
Rockfish River near Rockfish, Va.		446,000	
Mattaponi River near Milford, Va.		1,355,000	
Meherrin River near Bedford, Va.		907,000	
Tye River near Tye River Station, Va.		465,000	
Stoney Creek near Stoney Creek, Va.		883,000	
Chappawansic Creek near Quantico, Va.		1,829,000	
Nansemond River near Suffolk, Va.		802,000	
Potomac River near Widewater, Va.		306,000	
Chain Bridge, Virginia.		820,000	
North Anne River, near Dosmoe, Va.		444,000	
<i>Quinnat salmon:</i>			
California Fish Commission	3,526,000		
McCloud River, near Baird, Cal.		500,000	
Tributary of Sandy River, near Troutdale, Oreg.	23,000		
Société d'Acclimatation, Paris, France.	150,000		
<i>Silver salmon:</i>			
Redwood Creek in Humboldt County, Cal.			400,000
Trinity River in Humboldt County, Cal.			100,000
Supply Creek in Humboldt County, Cal.		150,000	
Redwood Creek in Humboldt County, Cal.		140,000	
North Fork of Mad River in Humboldt County, Cal.		470,000	
Trinity River in Humboldt County, Cal.		150,000	
<i>Atlantic salmon:</i>			
Tributary Alamoosook Lake near Orland, Me.			65,245
Toddy Pond in Hancock County, Me.			82,998
Heart Pond in Hancock County, Me.			10,519
Narransissic River in Hancock County, Me.			27,479
New York Fish Commission	20,000		
<i>Landlocked salmon:</i>			
Country Club, San Francisco, Cal.	10,000		
California Fish Commission	10,000		
Long Pond in Hancock County, Me.			1,000
Jones Pond in Hancock County, Me.			1,000
Flanders Pond in Hancock County, Me.			1,000
Phillips Pond near Lake House, Me.			2,000
Toddy Pond in Hancock County, Me.			6,000
Green Lake in Hancock County, Me.			35,930
Green Lake in Hancock County, Me.			10,000
Rocky Brook in Hancock County, Me.			2,000
Branch Pond in Hancock County, Me.			4,000
Branch Pond near East Dedham, Me.			2,000
Winkempanugh Brook near East Dedham, Me.			3,000
Hatcase Pond near Holden, Me.			600
Varnum Pond near Temple, Me.			500
Clearwater Pond near Industry, Me.			2,000
Sweets Pond near Temple, Me.			1,000
Blunts Pond near Franklin Roads, Me.			2,000
Ducks Lake near South Springfield, Me.			7,814
Madwaska and Square lakes near Caribou, Me.			2,000
Squaw Pond Lake near Presque Isle, Me.			5,000
Long Pond near Southwest Harbor, Me.			5,000
Mooso Lake near Hartland, Me.			2,000
Wright Pond near Penobscot, Me.			1,000
City Reservoir near Belfast, Me.			5,000
Donnells Pond near Franklin, Me.			12
Applicants in Maine			1,000
Blackwater and Green Hill brooks near Dover, N. H.			
Lake Champlain, off Port Henry, Port Douglas, and Westport, N. Y.			9,770
Lake George near Caldwell, N. Y.			10,054



Details of distribution, 1894-95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
<i>Landlocked salmon</i> —Continued.			
Lake Morey near Fairlee, Vt.			2,000
Government of Japan	60,000		
Redwood Creek in Humboldt County, Cal.		277,500	32,000
Trinity River in Humboldt County, Cal.		25,000	300,000
Mad River in Humboldt County, Cal.		550,000	
Lake Superior near Isle Royale, Mich.		70,000	
Marquette River near Baldwin, Mich.		17,500	
Baldwin Creek near Baldwin, Mich.		17,500	
Lake Superior near French River, Minn.		5,000	
<i>Loch Leven trout:</i>			
Wisconsin Fish Commission	5,000		
Pear Creek in Waupaca County, Wis.		2,000	
Caley Creek in Waupaca County, Wis.		2,000	
Rashonnans Creek in Waupaca County, Wis.		2,000	
Shadow Creek in Waupaca County, Wis.		2,000	
Webb Creek in Waupaca County, Wis.		2,000	
Lake Creek in Lake County, Colo.			795
Applicants in Colorado			75
Onawa Lake near Monson, Me.			500
Moraney Pond near Sorrento, Me.			1,000
Rowe Pond near Bingham, Me.			500
City Reservoir, Belfast, Me.			500
Seal Cove Pond near Tremont, Me.			1,000
Branch Pond near Ellsworth, Me.			250
Winkempangh Brook near East Dedham, Me.			1,750
Floods Pond, Floods Pond, Me.			3,000
Spitical Pond near Aurora, Me.			4,000
Applicants in Maine			12
<i>Van Bahr trout:</i>			
Wyoming Fish Commission	5,000		
Larrabee Creek near Hydeville, Cal.		1,000	
Country Club of San Francisco, Cal.		3,000	
Mill Creek near Harrisville, Mich.		10,000	
Muskingum River in McConnellsville, Ohio.		10,000	
Applicants in Arkansas			500
Comstock Brook near Wilton, Conn.			200
Cold Spring and brooks near South Norwalk, Conn.			410
Brook near Norwalk, Conn.			400
Norwalk River near Norwalk, Conn.			800
Mink Creek near Wadena, Iowa.			500
Branch Pond near Ellsworth, Me.			2,000
Applicants in Maine			614
Madway Pond near Hyannis, Mass.			175
Blue Hill River near Randolph, Mass.			350
Applicants in Massachusetts			175
Big Black Creek near Muskegon, Mich.			800
Nobraska Fish Commission			1,000
Ockerman Brook near Chenango Forks, N. Y.			400
Indian Lake near North Creek, N. Y.			1,000
Applicants in Ohio			400
Ohio Fish Commission			200
Gould Pond near Georgiaville, R. I.			300
Applicants in Rhode Island			175
<i>Black-spotted trout:</i>			
Middle Evergreen Lake near Leadville, Colo.			1,475
<i>Rainbow trout:</i>			
J. G. Ballev, Silver Springs, Ark.	5,000		
Johns Hopkins University, Baltimore, Md.	200		
A. Lanth, St. Louis, Mo.	23,500		
Nevada Fish Commission	29,500		
New Hampshire Fish Commission	85,500		
R. G. Harrison, Bryn Mawr, Pa.	2,000		
C. E. Tolhurst, Salt Lake City, Utah	12,500		
J. E. Sherlock, Salt Lake City, Utah	21,000		
Vermont Fish Commission	62,000		
Wyoming Fish Commission	64,500		
Win. E. Carlin, Aurora, Wyo.	26,500		
Maj. W. Turner, Bortrix, Belgium	50,000		
Midland Counties Fish-cultural Establishment, Malvern Wells, England	25,000		
Rev. H. B. Wolryche-Whitmore, Bridgenorth, England	25,000		
M. Raverot-Wattel, Fécamp, France	25,000		
Elk River near Eureka, Cal.		1,000	
Silver Lake near Ruedi, Colo.		10,000	
Lake Loveland near Loveland, Colo.		10,000	
Applicants in Colorado		10,000	
Temploton Pond near Riceville, Iowa		5,000	
Applicants in Kansas		4,000	
Great Brook near Green Lake, Mo.		850	
Stream near Randolph, Md.		8,000	
Washington River near Lake Royale, Mich.		12,000	

Details of distribution, 1894-96—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
<i>Rainbow trout</i> —Continued.			
Otter Creek near Duluth, Minn.....		6,000	
Spring River near Joplin, Mo.....		5,000	
Applicants in Missouri.....		6,000	
Wolf Creek near Burkes Garden, Va.....		5,000	
Manston Mill Pond, near Manston, Wis.....		4,000	
Long Creek near Pratt, Wis.....		4,000	
Cave Spring Pond near Cannon, Ark.....			500
Park Lake near Sulphur Springs, Ark.....			2,000
Frog Bayou near Chester, Ark.....			1,500
Sugar Creek near Brightwater, Ark.....			1,000
Clear Fork of Illinois River near Johnsons.....			1,500
West Fork of White River near West Fork Brentwood, Ark.....			1,000
Illinois River near Siloam Springs, Ark.....			4,000
White River near Harris, Ark.....			800
Thompson, Ark.....			800
St. Paul, Ark.....			800
Spring River near Mammoth Springs, Ark.....			1,000
Applicants in Arkansas.....			1,100
Elk River near Eureka, Cal.....			177
Fish Tang-a-tang Creek on Trinity Mountain, California.....			200
Summit Lake Creek on Trinity Mountain, California.....			200
Middle Evergreen Lake in Lake County, Colo.....			570
Applicants in District of Columbia.....			20
Georgia.....			400
Georgia Fish Commission.....			75
Applicants in Illinois.....			310
Spring Lake near Mount Summit, Ind.....			500
Hillsdale Lake near New Castle, Ind.....			500
Allison Creek near Westville, Ind.....			500
Poll Run near Warsaw, Ind.....			450
Artificial Lake near Hartford City, Ind.....			500
Carroll Creek near Hartford City, Ind.....			500
Applicants in Illinois.....			350
Bacon Creek near Lansing, Iowa.....			750
Silver Stream near Decoriah, Iowa.....			800
Spring Creek near Riceville, Iowa.....			400
Otter Creek near West Union, Iowa.....			1,000
Rock Creek near Atchison, Kans.....			400
Duck Creek near Elk City, Kans.....			1,000
Higgies Park Pond near Girard, Kans.....			1,000
Walnut Creek near Great Bend, Kans.....			300
Lyons Creek near Junction City, Kans.....			1,000
Zimmerman Pond near Dodge City, Kans.....			600
Applicants in Kansas.....			1,750
Sinking Creek near London, Ky.....			1,000
Big Tree Run near Bentley Springs, Md.....			500
Indian Spring near Frederick, Md.....			300
Monocacy River near Frederick, Md. (Junct.).....			500
Marsh Run near McHenry, Md.....			800
Western Run near Glyndon, Md.....			1,000
Little Gunpowder River near Glencoe, Md.....			900
Stream near Glyndon, Md.....			500
Horsev Stream near Hebron, Md.....			500
Lake Brown near Oakland, Md.....			490
Stream near Finksburg, Md.....			500
Savage Stream near Lonaconing, Md.....			500
Applicants in Maryland.....			1,400
Boitner Creek near Muskegon, Mich.....			800
Ellis Brook near Battle Creek, Mich.....			500
Brandywine Creek near Niles, Mich.....			500
Eagle Nest Lake near Eagle Nest, Minn.....			1,200
Chub Brook near Cloquet, Minn.....			500
Union Creek near Wadena, Mich.....			1,000
Lake near Booneville, Miss.....			900
Spring River near Aurora, Mo.....			1,000
Verona, Mo.....			500
Williams Creek near West Vernon, Mo.....			1,000
Grove Creek near Scotland, Mo.....			1,000
Tributary of Five Mile Creek near Hornot, Mo.....			250
Lake near Columbia, Mo.....			1,000
Clinton Spring near Wilson, Mo.....			1,000
Roubidoux Creek near Waynesville, Mo.....			1,000
Cowskin River near Lanagan, Mo.....			4,000
Grove Creek near Webb City, Mo.....			1,000
Indian Creek near Harmony, Mo.....			1,000
Lanagan, Mo.....			1,220
Hickory Creek near Neosho, Mo.....			1,000
Shoal Creek near Allens Ford, Mo.....			1,000
Chilcopee, Mo.....			3,000
Applicants in Missouri.....			4,100

## Details of distribution, 1894-95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
<i>Rainbow trout</i> —Continued.			
Nebraska Fish Commission.....			2,000
Spring Brook Ponds near Omaha, Nebr.....			500
Pequest River near Rockburg, N. J.....			1,000
Stream near Far Hills, N. J.....			1,000
Pohatcong Creek near Washington, N. J.....			1,000
Adams Pond near Somerville, N. J.....			500
Artificial lake near Eatontown, N. J.....			500
Musconetcong River near Changelwater, N. J.....			1,000
Millsbrook Creek near Millbrook, N. Y.....			400
Oriskany Creek near Waterville, N. Y.....			550
Bennett Creek near Canisteo, N. Y.....			412
Tributaries of Unadilla River near West Winfield, N. Y.....			500
North Creek near North Creek, N. Y.....			900
Applicants in New York.....			648
Reims Creek near Asheville, N. C.....			500
Big Hungary Creek near Baxter, N. C.....			500
Scott Creek near Beta, N. C.....			490
Fishers Creek near Addie, N. C.....			500
Little Hungary Creek near Edneyville, N. C.....			500
Dicks Creek near Dillsboro, N. C.....			500
Fisher Creek near Beta, N. C.....			490
Dills Creek near Beta, N. C.....			490
Upper Green River near Zirconia, N. C.....			500
Head of Fisher Creek near Beta, N. C.....			400
Buck Creek near Marion, N. C.....			500
Buck Knob Creek near Beta, N. C.....			490
Little Buck Creek near Marion, N. C.....			500
Mill Creek near Marion N. C.....			500
Carlogochayoe Creek near Franklin, N. C.....			1,500
Clear Creek near Edneyville, N. C.....			500
Carnecross Creek near Highlands, N. C.....			500
Tributaries of Mills River near Hendersonville, N. C.....			500
Green River near Zirconia, N. C.....			500
Cano Creek near Asheville, N. C.....			500
Fisher Creek near Addie, N. C.....			500
Winchester Creek near Balsam, N. C.....			490
Broad River near Bat Cave, N. C.....			500
Bluff Creek near Addie, N. C.....			500
Roanoke River near Weldon, N. C.....			400
Rauney Run near Akron, Ohio.....			500
Rockwell Mill Pond near Bellevue, Ohio.....			500
Applicants in Ohio.....			1,000
Walnut Spring Pond near Guthrie, Okla.....			300
Spring Brook near Pittston, Pa.....			1,000
Bellman Run near Blossburg, Pa.....			348
Tioga River near Blossburg, Pa.....			600
Stoney Creek near Ashland, Pa.....			300
Little Pine Creek near Muncanaqua, Pa.....			300
Leona Creek near Troy, Pa.....			1,000
Lotort Spring near Carlisle, Pa.....			1,300
Morgan Run near Troy, Pa.....			800
Staruoca Creek near Brandt, Pa.....			250
Aukney Run near Jenner Cross Roads, Pa.....			300
Collins Brook near Cherry Ridge, Pa.....			270
Spring Brook near Wilkesbarre, Pa.....			400
Mill Creek near Tioga, Pa.....			330
Deloe's dam near Elk City, Pa.....			200
Musquito Creek near Williamsport, Pa.....			500
West Branch of Dyberry Run near Honesdale, Pa.....			945
Allegheny River near Coudersport, Pa.....			720
Tub Mill Creek near Latrobe, Pa.....			300
Cowaneseque Creek near Knoxville, Pa.....			500
Lick Run near Lockhaven, Pa.....			412
Outlet of Beech Lake near Honesdale, Pa.....			225
Middle Creek near Honesdale, Pa.....			180
Hoffman Run near Maytown, Pa.....			400
Dingman Run near Coudersport, Pa.....			240
East Creek near Blossburg, Pa.....			261
East Branch of Lackawaxen River near Seeleysville, Pa.....			270
Sullivan Run near Mount Pocono, Pa.....			285
Lackawaxen River near Pleasant Mount, Pa.....			400
Lake Ida and Shades near Wilkesbarre, Pa.....			1,000
Rocky Run near Palmyra, Pa.....			225
Blockhouse near Blossburg, Pa.....			201
Cedar Run near Wilmore, Pa.....			500
Hemlock Creek near Brandt, Pa.....			250
Elk Run near Gaines, Pa.....			250
Lake near Colmar, Pa.....			200
Tub Mill Creek near Johnstown, Pa.....			500
Taylor Run near Blossburg, Pa.....			435
Quakake Creek near Doylestown, Pa.....			300

REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Details of distribution, 1894-95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
<i>Rainbow trout—Continued.</i>			
Trout Run near Wintersetown, Pa.			300
Pipes Creek near Wilkesbarre, Pa.			400
South Branch near Scranton, Pa.			500
Stoney Creek near Shenandoah, Pa.			500
Bees Run near Coudersport, Pa.			240
Lick Run near Lockhaven, Pa.			825
Roaring Brook near Brandt, Pa.			250
Spring Meadow near Bedford, Pa.			500
Piney Creek near Williamsburg, Pa.			500
Boggs Run near North Bend, Pa.			412
Stafford Meadow Brook near Scranton, Pa.			500
Mill Creek near Coudersport, Pa.			240
Stream near Entlerville, Pa.			100
Jamison Creek near Sabinsville, Pa.			600
Allegheny River near Coudersport, Pa.			240
Carpenter Run near Blossburg, Pa.			261
Spruce Creek near Tyrone, Pa.			500
Outlet of Beech Lake near Berlin, Pa.			270
Brandywine Creek near Reading, Pa.			375
Applicants in Pennsylvania.			1,300
Ball Creek near Lone Mountain, Tenn.			383
Piney River near Spring City, Tenn.			780
Reservoir near Monterey, Tenn.			300
Fountain Spring near Knoxville, Tenn.			400
Turkey Creek and Lake near Concord, Tenn.			300
South Indian Creek near Johnson City, Tenn.			1,600
Mill Creek near Athens, Tenn.			400
Stoney Creek near Elizabeth, Tenn.			500
Salino Creek near Tyler, Tex.			1,000
Cantonment Creek near Mobeotie, Tex.			900
Clark Tank near Schulenberg, Tex.			300
Wilson Creek near Edgewater, Va.			500
Chinch River near Steelburg, Va.			200
Mill Creek near Nace, Va.			200
Artificial pond near Aldie, Va.			100
South Fork of Holston River near Marion, Va.			500
Middle Fork of Holston River near Rural Retreat, Va.			500
Stream near Rural Retreat, Va.			500
White Top Creek near Abingdon, Va.			500
Kenilworth Creek near Stephenson's, Va.			30
Elk Garden Creek near Elk Garden, Va.			400
Stoney Creek near Lantz Mills, Va.			500
Four Mile Run near Alexandria, Va.			500
Big Cedar Creek near Lebanon, Va.			500
Duffs Creek near Abingdon, Va.			400
Wrights Pond near Winchester, Va.			500
Abrams Creek near Winchester, Va.			500
Falling Creek near Christianburg, Va.			500
Crab Creek near Christianburg, Va.			500
Stony Run near Harrisonburg, Va.			500
Roaring Run near Craig City, Va.			500
Burton Creek near Lynchburg, Va.			475
Sandy River near Danville, Va.			927
Lates Run near Wytheville, Va.			600
Applicants in Virginia.			500
Beaver Pond Creek near Bluefield, W. Va.			1,000
Gauley River near Camden-on-Gauley, W. Va.			1,000
West Fork Monongahela River near Weston, W. Va.			1,100
Lake Osceola near Osceola Mills, Wis.			900
<i>Brook trout:</i>			
John G. Bailey, Silver Springs, Ark.	5,000		
Iowa Fish Commission.	20,000		
Minnesota Fish Commission.	20,000		
Fish and Game Club, Brattleboro, Vt.	25,000		
North Fork of St. Vrain River near Denver, Colo.		10,000	
North Fork of Platte River near Estabrook, Colo.		10,000	
Upper Lake Creek near Twin Lakes, Colo.		35,000	
Lake Lenore near Ouray, Colo.		10,000	
Derrys Lake in Lake County, Colo.		10,000	
Naylor Lake near Georgetown, Colo.		10,000	
Boulder Creek and tributaries, Colo.		10,500	
West Fork of South Platte River near Webster, Colo.		40,000	
South Platte, Colo.		40,000	
Jenny Lind Creek near Central City, Colo.		10,000	
Mammoth Building near Central City, Colo.		10,000	
Applicants in Colorado.		25,000	
Spring Creek near Oange, Iowa.		5,000	
Canoe Creek near Decorah, Iowa.		10,000	
Clear and Van Cooley Creeks near Lansing, Iowa.		5,000	
Cranberry Creek near Muskegon, Mich.		2,500	
Gordon Creek near Muskegon, Mich.		2,500	

## Details of distribution, 1894-95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
<i>Brook trout</i> —Continued.			
Silver Creek and Pine River near Au Sable, Mich.		5,000	
Fleming and Walting Creeks near Ypsilanti, Mich.		5,000	
Bear, Dowd, Sand, and Townline Creeks near Allegan, Mich.		5,000	
Stream near Kalamazoo, Mich.		5,000	
Chamberlain Stream near Schoolcraft, Mich.		5,000	
Wright Creek near Schoolcraft, Mich.		5,000	
Rockwell Springs near Clyde, Ohio.		10,000	
Macocheek Creek near West Liberty, Ohio.		7,000	
Itanney Run near Hudson, Ohio.		7,000	
Applicants in Ohio.		2,000	
Pike River near Amberg, Wis.		8,000	
McEldawney Creek near West Salem, Wis.		5,000	
Garvin Creek near Elroy, Wis.		5,000	
Kawan Creek near Elroy, Wis.		5,000	
Crawfish River near Columbus, Wis.		5,000	
Big Wausaukee River near Wausaukee, Wis.		5,000	
Riders Creek near Maunton, Wis.		5,000	
Fountain, Brower, and Little Lomonwiew Creeks near New Lisbon, Wis.		8,000	
Iron River near Marinette, Wis.		10,000	
Tributaries of Brulo River near Marinette, Wis.		5,000	
Iron River near Marinette, Wis.		5,000	
South Branch of Pike River, Wis.		5,000	
Big Plover River near Stevens Point, Wis.		20,000	
Spring Creek near Turtle Lake, Wis.		5,000	
Cataract River near Williams, Ariz.			1,075
Applicants in Arizona.			150
North Fork of St. Vrain River near Lyons, Colo.			750
Platte River near Meadows, Colo.			2,500
Baileys, Colo.			1,000
Estabrook, Colo.			1,500
Cliff, Colo.			1,500
Pine Grove, Colo.			2,375
Dawson, Colo.			2,000
Grant, Colo.			1,500
Elk Creek and Eagle River near Red Cliff, Colo.			1,200
Texas Creeks near West Cliff, Colo.			375
Valley View Lakos near Leadville, Colo.			1,500
Box Creek in Lake County, Colo.			500
Uneva Lake in Lake County, Colo.			1,500
Crystal Lakes near Malta, Colo.			500
Diamond Lakos near Leadville, Colo.			1,000
Deer Creek near Bailey, Colo.			750
Lake Creek in Lake County, Colo.			1,500
Los Pinos Creeks near Los Pinos, Colo.			2,250
Twin Lakes in Lake County, Colo.			1,500
Lake near Farnham, Colo.			400
Upper Evergreen Lake in Lake County, Colo.			1,400
Rio Grande River near Wagonwheel Gap, Colo.			3,750
Applicants in Colorado.			3,900
Brook near Norwalk, Conn.			300
Lockwood Creek near Norwalk, Conn.			300
Farmington River near Litchfield, Conn.			400
Little and Big Jacks Brook near Litchfield, Conn.			300
Lake Wampenaw near New Canaan, Conn.			300
Cold Spring Brook near North Wilton, Conn.			300
Saugatuck stream near Saugatuck, Conn.			200
Comstock Brook near Wilton, Conn.			300
Doles Brook near Arrington, Me.			200
Cathance stream near Topsham, Me.			400
Brook near North Plymouth, Mass.			400
Applicants in Massachusetts.			200
Macon Creek near Macon, Mich.			840
Branch of Tobacco River near Farwell, Mich.			1,125
Baldwin Creek near Baldwin, Mich.			1,125
Bowman Creek near Winghamton, Mich.			1,125
Sweetwater Creek near Branch, Mich.			1,125
Beartooth Lake near Red Lodge, Mont.			1,500
Little Rocky Creek near Townsend, Mont.			750
Tributaries of Lump Gulch near Helena, Mont.			750
Long Pine Creek near South Bend, Nebr.			1,500
Spring Brook near Omaha, Nebr.			450
Trout Brook near Claremont, N. H.			400
Stantz Spring in Somerset County, N. J.			2,500
Brook and Gallinas River near East Las Vegas, N. Mex.			1,500
San Jose River near Laguna, N. Mex.			750
Chicarrica Creek near Raton, N. Mex.			750
Applicants in New Mexico.			150
Streams on Long Island near Bay Shore, N. Y.			400
Willay, McMaaster, and Kerschero brooks near Sherburne, N. Y.			400
South Fork of Unatilla River near Gibbons, Oreg.			800

Details of distribution, 1894-95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
<i>Brook trout—Continued.</i>			
Tributary of Dead Point Stream near Hood River, Oreg.			800
Cold Spring Brook near Westerly, R. I.			200
Bedford Blim Brook near Westerly, R. I.			200
White Clay Creek near Pine Ridge, S. Dak.			1,500
French Creek near Custer, S. Dak.			750
Spearfish Creek near Spearfish, S. Dak.			1,500
Higgins Gulch Creek near Spearfish, S. Dak.			750
Limo Creek near Rapid City, S. Dak.			750
Applicants in South Dakota			450
Miller Creek near Price, Utah			375
Utah Lake in Salt Lake County, Utah			1,800
Applicants in Utah			150
Vermont Fish Commission			400
Ottachees River near Proctor, Vt.			1,000
Twin Lake near Olga, Wash.			375
Mountain Lake near Olga, Wash.			750
Kelly Lake near Sumner, Wash.			750
Lake Hooker near Leland, Wash.			750
Cranberry Creek near Shelton, Wash.			1,150
Johns Lake near Shelton, Wash.			1,150
Lake Washington near Lowell, Wash.			61
Lake tributary to Platte River near Glenrock, Wyo.			375
Beaver Creek near New Castle, Wyo.			3,050
Clear Creek in Johnson County, Wyo.			762
Powder River in Johnson County, Wyo.			762
North Fork of Powder River in Johnson County, Wyo.			763
Red River in Johnson County, Wyo.			763
Big Goose Creek in Johnson County, Wyo.			1,537
Wolf Creek in Johnson County, Wyo.			1,538
Applicants in Wyoming			750
<i>Lake trout:</i>			
California Fish Commission	100,000		
Massachusetts Fish Commission	100,000		
Nebraska Fish Commission	50,000		
Adirondack League Club, in Herkimer County, N. Y.	50,000		
New York Fish Commission	1,500,000		
Vermont Fish Commission	300,000		
Diamond Lake near Ligonier, Ind.		20,000	
Lake Huron off North Point, Mich.		19,500	
Thunder Bay, Mich.		200,000	
East Tawas, Mich.		200,000	
Alpena, Mich.		195,000	
Straits of Mackinac near Mackinaw City, Mich.		200,000	
Crooked Lake in Clare County, Mich.		39,000	
Eight Point Lake near Harrison, Mich.		20,000	
Star Lake near Baldwin, Mich.		30,000	
Budd Lake near Baldwin, Mich.		20,000	
Lake Michigan near Charlevoix, Mich.		200,000	
Manistique, Mich.		195,000	
Frankfort, Mich.		200,000	
Gogebic Lake near Gogebic, Mich.		40,000	
Lake Superior near Isle Royale, Mich.		1,250,000	
Washington Harbor, Mich.		225,000	
Lake Superior off Little Boat Harbor, Mich.		100,000	
Lake Superior near Grand Marais, Minn.		300,000	
Grand Portage, Minn.		360,000	
Duluth, Minn.		125,000	
Two Harbors, Minn.		100,000	
Chicago Bay, Minn.		200,000	
Burntside Lake near Ely, Minn.		75,000	
Eagle Nest Lake near Mesaba, Minn.		25,000	
Trout Lake near Tower, Minn.		100,000	
French River near Duluth, Minn.		50,000	
Beaver Bay near Two Harbors, Minn.		100,000	
Lake Erie near Put-in-Bay, Ohio		447,500	
Thousand Island Lake near State Line, Wis.		10,000	
Pelican Lake near Pelican Lake, Wis.		5,000	
Moose Lake near Antigo, Wis.		5,000	
Sand and Pokoginn Lakes near Lac du Flambeau, Wis.		5,000	
Manston Mill Pond near Manston, Wis.		5,000	
Lake Superior off Rice Island, Wis.		150,000	
Willeys, Wis.		150,000	
Sand Island near Bayfield, Wis.		275,000	
Magdalena Island near Bayfield, Wis.		250,000	
Baeswood Island near Bayfield, Wis.		125,000	
Onk Island near Bayfield, Wis.		125,000	
Caspberry Bay near Bayfield, Wis.		225,000	
Monponsett Lake near Halifax, Mass.			320
Nice Mill Pond near Centerville, Mass.			320
Applicants in Massachusetts			960
<i>Whitefish:</i>			
California Fish Commission	25,000		
New York Fish Commission	5,000,000		

## Details of distribution, 1894-95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
<i>Whitefish</i> —Continued.			
Midland Counties Fish-cultural Establishment, Malvern Wells, England	25,000		
Whitefish Lake near Corinne, Mich.		2,000,000	
Lake Michigan near Charlevoix, Mich.		2,000,000	
Manistique, Mich.		2,000,000	
Epoufette, Mich.		2,000,000	
Frankfort, Mich.		2,000,000	
Lake Huron near North Point, Mich.		5,500,000	
Alpena, Mich.		2,000,000	
Miller Point, Mich.		2,000,000	
Detour Passage, Mich.		2,000,000	
Sturgeon Point, Mich.		2,000,000	
East Tawas, Mich.		2,000,000	
Lake Superior near Isle Royale, Mich.		2,000,000	
Duluth, Minn.		250,000	
Mackinac Straits near Mackinaw City, Mich.		2,000,000	
Siskowit Bay, Isle Royale, Mich.		2,000,000	
Hubbard Lake near Ossineke, Mich.		500,000	
Lake Erie off Green Island Reef, Ohio.		2,350,000	
Peach Point Reef, Ohio.		20,948,000	
West Sister Island, Ohio.		2,601,000	
North Bass Island Reef, Ohio.		18,620,000	
Ballast Island Reef, Ohio.		11,270,000	
Moore Point Reef, Ohio.		1,600,000	
Cone Reef, Ohio.		5,400,000	
Rattlesnake Island Reef, Ohio.		3,000,000	
Kelley Island Reef, Ohio.		3,000,000	
Port Clinton, Ohio.		2,000,000	
Sterne Island, Ohio.		5,050,000	
Niagara Reef, Ohio.		3,300,000	
Utah Lake near Geneva, Utah.		2,000,000	
Lake Superior near Bayfield, Wis.		2,250,000	
Iron River, Wis.		2,250,000	
Raspberry Bay near Bayfield, Wis.		2,250,000	
<i>Lake herring</i> :			
Lake Erie off Peach Point Reef, Ohio.	9,852,000	600,000	
<i>White bass</i> :			
California Fish Commission			12
<i>Yellow perch</i> :			
Applicants in Arizona			25
Stevens Lake near Cucharas, Colo.			100
Fox River near Elgin, Ill.			20
Vermilion River near Danville, Ill.			100
Kansas Fish Commission			25
Little River near Wichita, Kans.			50
Cow Creek near Hutchinson, Kans.			75
Applicants in Kansas			125
Walnut Lake near Wells, Minn.			25
Lake Ellerslie near Lexington, Ky.			125
Applicants in Kentucky			100
Shetek Lake near Tracy, Minn.			50
Spring Lake near Bolivar, Mo.			25
Applicants in Missouri			25
Cherry Valley Lake near Las Vegas, N. Mex.			50
Applicants in New Mexico			125
Devils Lake near Devils Lake, N. Dak.			100
Stump Lake near Michigan, N. Dak.			275
Park Lake, Cincinnati, Ohio.			40
Applicants in Ohio			60
Oklahoma			100
Lake Kampeska near Watertown, S. Dak.			600
Pickeral Lake near Webster, S. Dak.			100
Cochran Lake near Gary, S. Dak.			50
Picnic Lake near Sulphur Springs, Tex.			25
Lake McDonald near Austin, Tex.			100
Saluda Creek near San Antonio, Tex.			50
Thorne Lake near Longview, Tex.			255
Applicants in Texas			75
South Palouse River near Guy, Wash.			200
Loon Lake near Tacoma, Wash.			50
Lake St. Clair near Tacoma, Wash.			100
Silver Lake near Castle Rock, Wash.			100
<i>Pike perch</i> :			
New York Fish Commission	5,000,000		
Ohio Fish Commission	25,000,000		
Illinois Central Railroad Reservoir, Vandalia, Ill.		1,000,000	
East Fork of Whitewater River near Richmond, Ind.		1,200,000	
Loon Lake near Columbus City, Ind.		1,500,000	
Lost River, Patoka River, and Lick Creek near Paoli, Ind.		1,000,000	
Huntingburg Waterworks near Huntingburg, Ind.		600,000	
Spring Lake near La Porte, Ind.		1,500,000	
Applicants in Indiana		1,000,000	
Turkey River near West Union, Iowa		1,000,000	

Details of distribution, 1894-95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
<i>Pike perch</i> —Continued.			
Spirit Lake, Spirit Lake, Iowa.....		2,000,000	
Cedar River near Cedar Rapids, Iowa.....		1,000,000	
North Fork Kentucky River near St. Helens, Ky.....		1,000,000	
Lake Ellerslie near Lexington, Ky.....		1,000,000	
Clear Lake near Shelbyville, Ky.....		1,000,000	
Ludlow Lagoon near Ludlow, Ky.....		600,000	
Prospect Lake near Prospect Lake, Mich.....		2,000,000	
Whitmore Lake near Whitmore Lake, Mich.....		1,500,000	
North Branch of River Rough near Northville, Mich.....		200,000	
Bear Lake and Hanging Horns Lake near Barnum, Minn.....		1,000,000	
Chub Lake near Carlton, Minn.....		2,000,000	
Lake Vermillion near Tower, Minn.....		1,000,000	
Black Pond near Akron, Ohio.....		1,500,000	
Phalanx Pond near Leavittsburg, Ohio.....		1,500,000	
Olentangy Stream near Cardington, Ohio.....		1,000,000	
Tuscarawas River near Zoar, Ohio.....		38,980,000	
Lake Erie off Ballast Island Reef, Ohio.....		11,200,000	
Middle Bass Island Reef, Ohio.....		15,400,000	
Rattlesnake Island Reef, Ohio.....		30,800,000	
North Bass Island Reef, Ohio.....		25,760,000	
Green Island Reef, Ohio.....		30,240,000	
Port Clinton Reef, Ohio.....		6,500,000	
Put-in-Bay Reef, Ohio.....		20,800,000	
Maumee Bay near Toledo, Ohio.....		1,000,000	
Lake Hendrick near Brookings, S. Dak.....		1,000,000	
Wall Lake near Sioux Falls, S. Dak.....		1,000,000	
Pigeon River near Henderson Springs, Tenn.....		400,000	
Holston River near Burems Store, Tenn.....		1,000,000	
Tennessee River, Sweetwater and Pond Creeks in Loudon County, Tenn.....		1,000,000	
Coalhulla Creek near Cleveland, Tenn.....		1,000,000	
Clinch and Powells River near Russellville, Tenn.....		1,000,000	
Lake near State Line, Wis.....		1,000,000	
Lemonweir River near Manston, Wis.....		1,000,000	
Lake View near Lawrence, Kans.....			217
Devils Lake near Devils Lake, N. Dak.....			4
Lake McDonald near Austin, Tex.....			52
<i>Black bass</i> :			
Jackson Lake near Montgomery, Ala.....			50
Street Lake near Montgomery, Ala.....			50
Honston Pretty Pond near Selma, Ala.....			70
Blackwell Lake near Selma, Ala.....			120
Cypress Creek near Florence, Ala.....			100
Applicants in Alabama.....			70
Clear Creek near Winslow, Ariz.....			100
Arizona Fish Commission.....			100
Applicants in Arizona.....			25
Ouachita River near Malvern, Ark.....			100
Mayaville Fish Pond near Bentonville, Ark.....			25
St. Francis River at crossing of St. Louis, Iron Mountain and Southern Railroad, St. Francis, Ark.....			100
Spring Lake near Mammoth Springs, Ark.....			100
Applicants in Arkansas.....			400
Bienu Vista Lake near Bakersfield, Cal.....			50
California Fish Commission.....			2,500
Reservoir near San Diego, Cal.....			50
Elsinore Lake near Elsinore, Cal.....			50
Lake San Cristoval near Lake City, Colo.....			200
Lake near Fort Collins, Colo.....			50
Rocky Ford, Colo.....			100
Colorado Fish Commission.....			100
Applicants in Colorado.....			137
Lake Whitney near Whitneyville, Conn.....			100
Saitonstall Lake near East Haven, Conn.....			100
Applicants in Connecticut.....			100
Delaware and Chesapeake Canal near Delaware City, Del.....			100
Delaware Fish Commission.....			100
Rock Creek in Rock Creek Park, D. C.....			363
Texas Valley Creek near Rome, Ga.....			100
Applicants in Georgia.....			227
Channel Creek near Antioch, Ill.....			300
Thorn Creek near Thornton, Ill.....			25
Vermilion River near Danville, Ill.....			100
Cedar Lake near Lake Villa Station, Ill.....			400
Fox River near Elgin, Ill.....			64
Applicants in Illinois.....			100
Grand Calumet River near Miller, Ind.....			100
Big Blue River near Blue Rapids, Kans.....			75
Little Beaver Creek near Atwood, Kans.....			100
Cow Creek near Hutchinson, Kans.....			100
Parker Pond near Atchison, Kans.....			25
Slate Creek near Wellington, Kans.....			125
Woods Run near Wellington, Kans.....			25



## Details of distribution, 1894-95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
<i>Black bass</i> —Continued.			
Pawnee Creek near Great Bend, Kans.			100
Saline and Smoky Hill rivers near Salina, Kans.			800
Saline River near Beverly, Kans.			200
Lincoln Center, Kans.			1,200
Solomon River near Beloit, Kans.			600
Lake Chanute near Olathe, Kans.			100
Pleasure Lake near Salina, Kans.			100
Tributary of Blue River near Blue Rapids, Kans.			50
Neosho River near Chanute, Kans.			20
Osage River (Marais des Cygnes) near Ottawa, Kans.			30
Lake View near Lawrence, Kans.			1,224
Lyon Creek near Junction City, Kans.			100
Tributary of Smoky Hill River near Wilson, Kans.			100
Mulberry Creek near Ford City, Kans.			35
Applicants in Kansas			735
North Elkhorn Creek near Georgetown, Ky.			100
Lake near Covington, Ky.			100
Lake Ellerslie near Lexington, Ky.			125
Green River near Liberty, Ky.			200
Applicants in Kentucky			252
Louisiana			200
Lake near Halpin, Md.			100
Winters Dam near Westminister, Md.			100
Potomac River near Woodmont, Md.			100
Chesapeake and Ohio Canal above Great Falls, Md.			91
Applicants in Maryland			130
Nine Mile Lake near Springfield, Mass.			100
Loverett Pond near Loverett, Mass.			100
Walnut Lake near Wells, Minn.			20
Shetek Lake near Tracy, Minn.			55
Boonville Fish Lake near Boonville, Miss.			100
Lake near Centralia, Mo.			50
Spring Lake near Bolivar, Mo.			25
Creek near Hornet, Mo.			100
Crystal Lake near Marshall, Mo.			150
Snodgrass Lake near Webb City, Mo.			548
Applicants in Missouri			405
Waterworks Pond near Hanover, N. H.			100
Good Interest Pond near Blackwood, N. J.			125
Pohatcong Lake near Tuckerton, N. J.			100
Applicants in New Jersey			200
Una de Gato River near Raton, N. Mex.			100
Lake near Maxwell, N. Mex.			250
Mangas Lake near Silver City, N. Mex.			50
Cherry Valley Lake near Las Vegas, N. Mex.			25
Applicants in New Mexico			350
Stony Point Creek near Stony Point, N. Y.			100
Schroon Lake near Taylors on Schroon, N. Y.			100
Applicants in New York			414
Ararat River near Mount Airy, N. C.			55
Tributary of Ararat River near Mount Airy, N. C.			55
Ponders Branch near Grover, N. C.			50
Lake Lucella near Reidsville, N. C.			55
Applicants in North Carolina			485
Devils Lake near Devils Lake, N. Dak.			200
Stump Lake near Michigan, N. Dak.			1,650
Hankinson Lake near Hankinson, N. Dak.			200
Fish Lake near Bottineau, N. Dak.			100
Little Miami River near Loveland, Ohio.			75
Stone Lake near North Bond, Ohio.			25
Applicants in Ohio			257
Carizo Creek near Mineral City, Okla.			50
Applicants in Oklahoma Territory			100
Krieder Dam near Annville, Pa.			200
Quittapahilla Creek near Annville, Pa.			100
Waterworks Pond near Annville, Pa.			100
Conodoquinetto Creek near Carlisle, Pa.			48
Lakemont Lake near Altoona, Pa.			100
Applicants in Pennsylvania			100
Area of swamp near Grahamville, S. C.			100
Goose Creek near Otranto, S. C.			198
Little River near Souca, S. C.			100
Applicants in South Carolina			250
Oakwood Lake near Brookings, S. Dak.			100
Pickeral Lake near Webster, S. Dak.			100
Lake Cochran near Gary, S. Dak.			50
Lake Kampeskan near Watertown, S. Dak.			665
Applicants in South Dakota			150
Tributary of Cumberland River in Putnam County, Tenn.			100
Sulphur Fork Creek near Cedar Hill, Tenn.			100
Nolechucky River near Johnson City, Tenn.			100
Beaver Creek near Huntingdon, Tenn.			200
Applicants in Tennessee			100

Details of distribution, 1894-95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
<i>Black bass—Continued.</i>			
Salado Creek near San Antonio, Tex.			40
Lake Creek near San Antonio, Tex.			60
Spring Creek near Amorilla, Tex.			100
Lake near Hillsboro, Tex.			200
Nebo Lake near Blooming Grove, Tex.			25
Lake McDonald near Austin, Tex.			100
Picnic Lake near Sulphur Springs, Tex.			25
Housley Lake near Housley, Tex.			50
Hit Lake near Tylor, Tex.			150
Lake Park near Tylor, Tex.			150
Roebuck Lake in Lamar County, Tex.			50
Applicants in Texas.			1,440
Utah Lake in Salt Lake County, Utah.			100
Catoctin Creek near Waterford, Va.			100
Lakeside Park near Marion, Va.			50
Headwaters Johnymore Run near Clifton, Va.			100
James River near Buchanan, Va.			100
Joy Creek near Lynchburg, Va.			100
Blackwater River near Heckman, Va.			100
City Reservoir, Petersburg, Va.			100
Smith River near Martinsville, Va.			300
Applicants in Virginia.			500
Browns Lake near Burlington, Wis.			50
Applicants in Wyoming.			100
<i>Craypie:</i>			
Applicants in Arizona.			50,000
California Fish Commission.			25
Stevens Lake near Cucharas, Colo.			25
Thorn Creek near Thornton, Ill.			50
Vermilion River near Danville, Ill.			50
Fox River near Elgin, Ill.			25
Cow Creek near Hutchinson, Kans.			125
Slate Creek near Wellington, Kans.			25
Woods Run near Wellington, Kans.			100
Saline and Smoky Hill Rivers near Salina, Kans.			85
Solomon River near Beloit, Kans.			127
Saline River near Lincoln Center, Kans.			100
Hickory Head Ponds near Brazilton, Kans.			250
Neosho River near Chanute, Kans.			200
Waterworks Lake near Garnett, Kans.			225
Osage River near Ottawa, Kans.			225
Marais des Cygnes near Ottawa, Kans.			363
Lake View near Lawrence, Kans.			50
Lyon Creek near Junction City, Kans.			319
Applicants in Kansas.			25
Walnut Lake near Wells, Minn.			50
Shetek Lake near Tracy, Minn.			880
Benton Park Lakes near Independence, Mo.			125
Applicants in Missouri.			50
Una de Gato River near Raton, N. Mex.			25
Conquilla Creek near Clayton, N. Mex.			50
Applicants in New Mexico.			30
Stone Lake near North Bond, Ohio.			25
Applicants in Oklahoma.			26
Lake Cochrane near Gary, S. Dak.			100
Dyer Lake near Huntingdon, Tenn.			15
Pollock Creek near San Antonio, Tex.			25
Lake McDonald near Austin, Tex.			132
Applicants in Texas.			25
Utah Lake in Salt Lake County, Utah.			300
Browns Lake near Burlington, Wis.			
<i>Warmouth bass:</i>			
Stevens Lake near Cucharas, Colo.			25
Hickory Head Ponds near Brazilton, Kans.			10
Osage River near Ottawa, Kans.			6
Applicants in Kansas.			40
Lake Ellerslie near Lexington, Ky.			152
White Oak Creek near Junction City, Ky.			125
Applicants in Kentucky.			175
Benton Park Lakes near Independence, Mo.			85
Applicants in Missouri.			25
Oklahoma.			50
Texas.			16
<i>Rock bass:</i>			
Mattox Pond near Clanton, Ala.			260
Choccolocco Pond near Choccolocco, Ala.			400
Mormon Lake near Flagstaff, Ariz.			1,250
Marshall Lake near Flagstaff, Ariz.			250
Applicants in Arizona.			500
Silver Springs Fish Farm, Silver Springs, Ark.			600
Three Elms River near Russellville, Ark.			500
Applicants in Arkansas.			1,525
Rock Creek in Rock Creek Park, D. C.			590

## Details of distribution, 1894-95—Continued.

Species and disposition.	Eggs.	Fry.	Adults and yearlings.
<i>Rock bass</i> —Continued.			
Texas Valley Creek near Rome, Ga.			300
Applicants in Georgia			1, 148
Echo Lake near Moline, Ill.			300
Applicants in Indiana			700
Lake Kurtz near Riley, Ind.			500
Springdale Lake near Cayuga, Ind.			245
Applicants in Iowa			250
Cedar River near Cedar Rapids, Iowa			200
South Branch of Little River near Wichita, Kans.			500
Mill Creek near Maple Hill, Kans.			250
Cow Creek near Hutchinson, Kans.			250
Dry Creek near Salina, Kans.			300
Applicants in Kansas			2, 275
North Elkhorn Creek near Georgetown, Ky.			100
Applicants in Kentucky			100
Benastico Creek near Weverton, Md.			200
Patapsco River near Westminster, Md.			200
Lake Cochituate near Natick, Mass.			300
Walnut Lake near Wells, Minn.			250
Lake near Booneville, Miss.			500
Applicants in Mississippi			650
Lake near Osceola, Mo.			200
Forland Pond in Webster County, Mo.			1, 300
Cedar Gap Pond near Cedar Gap, Mo.			2, 000
Mountain Grove Pond near Mountain Grove, Mo.			1, 700
Applicants in Missouri			600
New Mexico			250
North Carolina			2, 900
Stump Lake near Michigan, N. Dak.			450
Hankinson Lake near Hankinson, N. Dak.			600
Mineral Lake near Middlefield, Ohio			185
McMahon Creek near Lewis Mill, Ohio			400
Mahoning River near Leavittsburg, Ohio			300
Ohio Fish Commission			3, 900
Applicants in Ohio			850
Brush Creek near Guthrie, Okla.			200
Applicants in Oklahoma			600
Lake Grinnell near Bethlehem, Pa.			300
Wissahickon Creek near Chestnut Hill, Pa.			300
Conodoquit Creek near Kimberton, Pa.			2, 500
Whites Lake near Yardley, Pa.			300
Brandywine Creek in Berks County, Pa.			1, 535
Applicants in Pennsylvania			300
Goose Creek near Otranto, S. C.			500
Applicants in South Carolina			900
Lake Kampeska near Watertown, S. Dak.			500
James River near Huron, S. Dak.			500
Lake View near Chattanooga, Tenn.			200
Nolachucky River near Erwin, Tenn.			200
Applicants in Tennessee			900
Spring Lake near Weatherford, Tex.			300
Oil Mill Lake near Marlin, Tex.			250
Applicants in Texas			2, 050
Holston River near Marion, Va.			200
Hatshead Creek near Church Road, Va.			200
Miller's Mill Pond near Rice Depot, Va.			300
Smith River near Martinsville, Va.			300
Lafferty Lake near Crozet, Va.			300
Applicants in Virginia			2, 970
<i>Sunfish:</i>			
California Fish Commission			12
Elsinore Lake near Elsinore, Cal.			18
Balsa Chico River near Westminster, Cal.			18
Solomon River near Solomon City, Kans.			100
Lake View near Lawrence, Kans.			10
Applicants in Kansas			60
<i>Cod:</i>			
Vineyard Sound off Massachusetts coast	2, 897, 000	39, 735, 000	
Buzzards Bay off Massachusetts coast		4, 654, 000	
Boston Bay off Massachusetts coast		12, 929, 000	
<i>Flatfish:</i>			
Buzzards Bay off Massachusetts coast		670, 000	
Vineyard Sound off Massachusetts coast		5, 270, 000	
<i>Lobster:</i>			
Vineyard Sound off Massachusetts coast		67, 725, 000	
Buzzards Bay off Massachusetts coast		3, 875, 000	
Magnolia Harbor off Massachusetts coast		100, 000	
Boston Bay off Massachusetts coast		553, 000	
Total	55, 408, 200	561, 804, 350	2, 613, 302

NOTE.—0, 500 hybrids of Von Behr trout and landlocked salmon fry were hatched and distributed as an experiment, but not being a distinct species are not included in any of the tables.