REPORT ON THE PROPAGATION AND DISTRIBUTION OF FOOD-FISHES.

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PROPAGATION OF FOOD-FISHES.

The year's work included the propagation of 32 species of fish and 1 crustacean, and resulted in planting 1,173,833,462 fish and eggs in public and private waters. Operations were conducted on the same general lines as in the past, attention being chiefly directed to keeping up the supply of salmon, shad, white-fish, lake trout, lake herring, pike perch, and other fresh-water fishes, in addition to such important species as the cod, flat-fish, and lobster.

On the Pacific coast the propagation of quinnat salmon was conducted at stations located on tributaries of the Sacramento River in California, on the Rogue River in Oregon, tributaries of the Columbia River in Washington and Oregon, and resulted in the collection of over 23,000,000 eggs. Though the run of salmon on the Sacramento was above the average, the number reaching the headwaters and entering McCloud River and Battle Creek at the points where the stations were located was small. At Baird station 2,139,000 eggs were secured, and at Battle Creek 3,520,000. The fry hatched from these were held for several months and fed before they were planted. On the Rogue River 3,303,000 eggs were secured, from which 1,850,000 young fish were planted at the headwaters of the river and 1,000,000 near its mouth, at Wedderburn. When liberated they were from 2 to 3 inches long, having been fed for several months on canned salmon. For the purpose of maintaining the supply in the Columbia River Basin stations were operated on the Little and Big White Salmon rivers, in Washington, and on the Clackamas River, near Oregon City, Oreg., the work at these points resulting in the collection of more than 14,000,000 eggs and the planting of 10,500,000 young fish between Portland, Oreg., and the Cascades.

At the request of the New Zealand Government, a shipment of 500,000 quinnat-salmon eggs was sent to Littleton, New Zealand, under the care of Mr. G. H. Lambson, superintendent of Baird station. Though the eggs were en route 31 days, and were carried over 7,000 miles, they reached their destination with a loss of only 57,500.

The station at Baker Lake, Washington, was operated as heretofore for maintaining the supply of blueback salmon, which is of great importance commercially on Puget Sound. The run of fish reaching Baker Lake was very small, and owing to the washing away of barriers which had been erected to stop their ascent, only 4,171,000 eggs were secured. From these 3,834,000 fry were hatched and released in Skagit River and Lake. An effort was also made to propagate silver salmon at this station and on the Rogue River, but with slight success.

Very encouraging reports have been received from time to time relative to the successful introduction of steelhead trout in the Great Lakes and other eastern waters, hence all the eggs of this species collected at Elk Creek, a tributary of the Rogue River, were sent to eastern stations, except 65,000, which were hatched and planted in local waters.

The usual arrangements were made during the summer for the collection of lake-trout eggs on Lakes Superior and Michigan by the superintendents of the Michigan and Minnesota stations. The field embraced Port Arthur and Rossport, Ontario, Grand Portage, Minn., Isle Royale, Ontonagon, and other points in Michigan, and yielded 11,900,000 eggs. On Lake Michigan only 200,000 were secured prior to the close of the fishing season; but acting under authority of laws passed by the Michigan legislature, which permit the capture of fish during the closed season for the purposes of artificial propagation, 10,500,000 were collected between November 12 and 28 at Beaver Island from tugs fished by two commercial fishermen. This work was done by the superintendent of the Northville station, under direction of the State fish and game warden and his deputies. The total collection for the season amounted to 22,400,000, from which 19,000,000 fry were hatched and planted in the waters of the Great Lakes.

In addition to collecting white-fish eggs as usual from commercial fishermen, arrangements were made for penning large numbers on the Detroit River and at several points on Lake Erie. The work proved very satisfactory, the Detroit River yielding 203,560,000 eggs and Lake Erie 194,234,000, making a total of 397,794,000. Large consignments were sent to the hatcheries on Lakes Superior and Ontario, with the view to keeping up the supply of this important fish in those waters. The total plants of white-fish fry in all the lakes amounted to 326,106,000.

Great interest having been manifested in the propagation of lake herring, plans were made for extensive operations, but owing to the severity of the weather only 61,000,000 were obtained.

For the purpose of keeping up the supply of pike perch in the Great Lakes and stocking interior waters in the States bordering on them, steps were taken early in April to collect eggs on Lake Erie and on the Missisquoi River, Vermont, a tributary of Lake Champlain. On Lake Erie the season opened propitiously early in April, but violent storms occurred soon after, which not only wrecked the fishing gear,

but roiled the water and drove the fish from the spawning-grounds, so that the season was well advanced before many eggs were obtained. By the close of April 341,000,000 had been taken at the Put-in Bay station. Of these, 10,000,000 were sent to the Missouri commission and 32,000,000 to the Michigan commission; the balance were hatched, producing 160,087,000 fry. Cooperating with the Vermont commission, 160,375,000 pike-perch eggs were collected on the Missisquoi River during April. These were hatched and the fry were planted in May, making a total of 240,887,000 fry planted by the Commission.

At the close of the pike-perch season the propagation of sturgeon was taken up on Lake Champlain, and more than a million eggs were collected. Owing to a sudden change in the temperature and other unavoidable causes only 20,000 fry were hatched and planted, but the experience gained will undoubtedly enable the Commission to conduct on a larger scale in future the propagation of this important fish, which is fast disappearing from the waters of this country.

In October the U. S. Fish Commission steamer *Grampus* was engaged in collecting brood cod for Woods Hole station, and secured 2,933, ranging from 6 to 20 pounds in weight, which were placed in pounds and held until ripe. A considerable number died from natural causes, but more than 2,000 were tagged and liberated, and at the close of the year 46 had been reported as captured along the coast, many of them at long distances from the station.

The collecting stations at Kittery Point and Plymouth were opened in November. The weather for the first two months was very favorable for the work, but the catch of fish was unprecedentedly poor, and after the 1st of January, when fish became abundant, the weather was so rough that for days fishing was impracticable and the collections were therefore small. The brood fish at Woods Hole yielded 140,754,000 eggs, and these, with the eggs obtained at the two field stations, made an aggregate of 311,000,000. They were hatched at the Gloucester and Woods Hole stations, and the fry, numbering 202,871,000, were planted on the spawning-grounds along the coast from Kittery to Block Island.

At the close of the cod work at Woods Hole the propagation of flat-fish (winter flounder) was taken up, and as a result of the season's operations over 44,000,000 fry were liberated south of Cape Cod.

Early in the spring arrangements were perfected for securing the egg-bearing lobsters captured by fishermen along the coast from Maine to Connecticut. The schooner *Grampus*, assisted by a steam smack, made frequent trips along the Maine coast, visiting not only the large dealers at the important fishing centers, but also those on the outlying islands. Agents were stationed at Kittery, Marblehead, Boston, Plymouth, Block Island, and other points, but although the catch of lobsters was greater in Maine than in the previous year, the work was less satisfactory than then. At Woods Hole only 18,262,000 eggs were secured, and at Gloucester 51,213,000, a total of 69,475,000, which

yielded a little over 60,000,000 fry, as against 77,000,000 the previous year. As indicated by the number of egg-bearing lobsters purchased, the decline in this important fishery has been greatest south of Cape Cod, and especially in the vicinity of Woods Hole.

The establishment of the station at Edenton, N. C., permitted the commencement of shad work in March. The run of shad on the Albemarle Sound was not only very large, but the herring catch fell below the average, and as the temperature was slightly below normal the season in that region proved most successful, over 75,000,000 eggs being collected between March 29 and May 15. On the Potomac River conditions were exceedingly unfavorable. The weather was unusually cold and the catch of shad on the upper river very small, and at the end of the season only 33,321,000 eggs had been secured at Bryan Point station. Practically the same conditions existed on the Susquehanna River, and although work was pushed energetically at Battery station the total collections for the season amounted to only 61,000,000. On the Delaware River, where the steamer *Fish Hawk* had been stationed as a floating hatchery, the weather was cool and the catch of fish very large. The season lasted from May 6 to June 13, during which time over 115,000,000 eggs were secured, the largest number ever taken on that river. The total collections for the year amounted to 284,829,000, and the output of fry aggregated 193,287,000, nearly 50,000,000 less than that of the previous year.

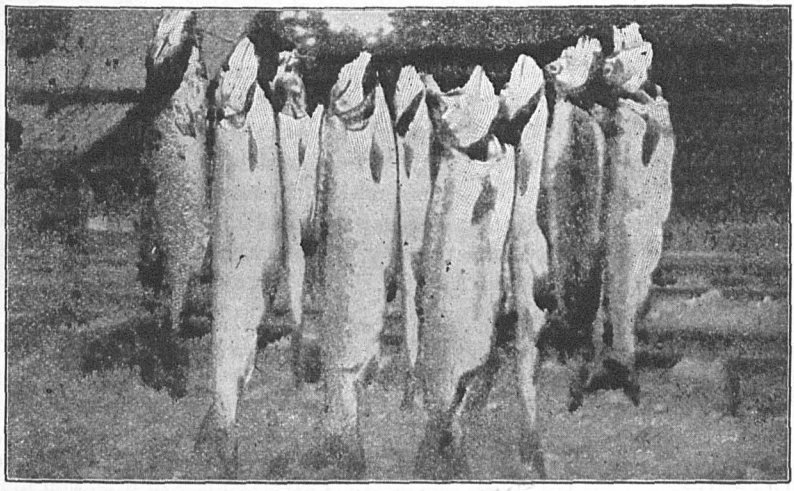
The propagation of the basses and other fish suitable for stocking inland waters was conducted as usual. The results were gratifying, particularly in the increased number of black-spotted trout (*Salmo clarkii*) and brook trout (*Salvelinus fontinalis*) handled.

The Commission operated the following 37 stations and substations, and the work at each is reviewed in detail in the abstracts from the reports of the different superintendents:

Green Lake, Maine.
Craig Brook, Maine.
Grand Lake Stream, Maine.
St. Johnsbury, Vermont.
Nashua, New Hampshire.
Gloucester, Massachusetts.
Woods Hole, Massachusetts.
Cape Vincent, New York.
Steamer *Fish Hawk* (Delaware River).
Battery Station, Maryland.
Fish Lakes, Washington, D. C.
Central Station, Washington, D. C.
Bryan Point, Maryland.
Edenton, North Carolina.
Wytheville, Virginia.
Erwin, Tennessee.
Cold Springs, Georgia.
Put-in Bay, Ohio.
Northville, Michigan.
Detroit, Michigan.
Alpena, Michigan.
Sault Ste. Marie, Michigan.
Duluth, Minnesota.
Quincy, Illinois.
Manchester, Iowa.
Bellevue, Iowa.
Neosho, Missouri.
San Marcos, Texas.
Leadville, Colorado.
Spearfish, South Dakota.
Bozeman, Montana.
Baird, California.
Battle Creek, California.
Clackamas, Oregon.
Rogue River, Oregon.
Little White Salmon River, Washington.
Baker Lake, Washington.

RESULTS OF FISH-CULTURE.

Reports from various parts of the country have been received with reference to the capture of rainbow trout in streams stocked by the Commission, one of the most interesting being a letter from Mr. P. H. Rowell, of Ennis, Ellis County, Tex., in which he states that a 10-pound rainbow trout was taken from a lake near the city, as a result of plants made by the Commission in February, 1899. He also reported that large numbers of small fish had been seen, showing that this species has been successfully introduced even in that latitude. According to a report received from Manton, Mich., a rainbow trout was captured on May 31, measuring 31 inches in length, 15 inches around, and weighing 12¾ pounds.



A catch of rainbow trout from Laurel River, Virginia.

The above reproduction of a photograph is illustrative of the successful introduction of this game fish in Laurel River, Virginia. These specimens were captured near Damascus by Mr. Benjamin T. Clark, of Abingdon, Va.

Although the Commission, in cooperation with the Pennsylvania commission, has liberated annually considerable numbers of Atlantic salmon fry in the upper waters of the Delaware River, and a number of salmon are caught each spring in this river by men fishing with shad and gill nets, it is a matter of regret that there has yet been no regularly established run of this important species reported. During the spring of 1900 seven specimens, weighing 10 pounds and upward, were caught near Gloucester, N. J., in the vicinity of the steamer *Fish Hawk*—one of 10 pounds weight being taken in a gill net almost

under the stern of the vessel. In 1901 nine salmon, ranging from 8 to 15 pounds, were captured at Howells Cove Fishery, the three largest weighing 11, 13, and 14½ pounds. As a result of an investigation made by the Commission, based on a newspaper article, it was learned that three salmon had been taken from the Delaware River at Newcastle. These were captured in gill nets; they weighed 9½, 10, and 11 pounds, and sold for 45 cents per pound. The capture of one weighing 10½ pounds, near Trenton, was also verified.

Favorable reports continue to come in from Lake Superior and the inland waters of Minnesota, regarding the adaptability of the steelhead trout for that section. Mr. H. H. Marks, of the Michigan Fish Commission, forwarded in June, 1901, a steelhead taken from a pound net near Salt Point, Lake Superior, which measured 30 inches in length. Mr. R. C. Mason, writing from Winona, Minn., reports that they are well adapted to Lake La Belle, and that, as a result of six cans of fry planted in 1898, specimens weighing 2½ pounds have been taken by the anglers. The steelhead is not only an excellent game fish, but its food qualities are highly regarded, as indicated by numerous letters received from residents of Pickwick, Minn. In Vermont the fish are apparently so well established in Willoughby Lake that arrangements were made to operate a field station in March, but only two ripe fish were captured; these yielded 2,000 eggs.

Following is an interesting extract from a letter written by the superintendent of the St. Johnsbury station, with reference to the presence of lake trout in Big Averill Pond, Vermont:

> Four years ago we planted some lake trout in Big Averill Pond and have sent some there every year since. This year they are getting very good fishing in that lake, catching most of the fish by trolling. The 4-year-old trout weigh 3½ pounds, the 3-year-olds 2¾ pounds, the 2-year-olds 1¼ pounds, and the 1-year-olds are 11 inches long; the weight was not taken, as those under 12 inches in length are not kept. I went out for a couple of hours Sunday morning and caught one 3-year-old, two 2-year-olds, and one 1-year-old laker. I give you this information to let you know another lake where good results have followed the planting of artificially hatched trout. No lake trout ever lived in this lake until those introduced by the Commission. From Big Averill I went to Little Averill to catch some of the golden trout. I succeeded in catching seven with hook and line, ranging from a yearling to 3 pounds in weight. I had a gill net put in one night, but caught only three fish in it—one landlocked salmon and two golden trout. The salmon is one which must have been put in by the Commission three years ago. Below the outlet of Little Averill, and between Big and Little Averill ponds, I fished about fifteen minutes and caught one yearling and one 2-year-old landlocked salmon. There is every indication that the series of lakes known as Big and Little Averill and Little Leach will make a good field station in the early future. They are all easily accessible and can be operated from one central field station. They contain brook trout, lake trout, golden trout, and landlocked salmon.

Mr. H. B. Handy, under date of January 20, 1901, refers to the successful stocking of Nine Mile Pond (which is 9 miles in circumference), near Centerville, Mass., with black bass, under very unfavorable conditions, several years ago. A few hundred fish from 2 to 4 inches

long were placed in this pond through a hole cut in ice. As the pond was thoroughly stocked with pickerel and perch, his neighbors were very skeptical of ever seeing any of the bass; but they now catch large numbers of black bass, some weighing as high as 3½ pounds.

INSPECTION OF STATIONS.

During the month of December the Fish Commission stations at Neosho, Mo., and San Marcos, Tex., were inspected by the assistant in charge of the division of fish-culture, as a result of urgent recommendations by the superintendents that arrangements be made for an increased water supply and additional property for the construction of more ponds for the propagation of black bass.

After carefully considering the condition of affairs at Neosho, it was found that not only was a greater supply of water essential, but that the hatchery would have to be rebuilt and enlarged and that land should be acquired for the construction of bass ponds, in order to increase the output of this important species. Preliminary arrangements were made for obtaining additional water from the City Water Works Company, and an option was secured on property adjacent to the Government lands. An estimate was submitted to Congress for a special appropriation of $7,500 to cover the cost of the improvements referred to, which was favorably acted upon. The condition of this station was excellent, reflecting credit on the superintendent and his assistants.

No fish-cultural work was in progress at San Marcos when visited. The ponds were being drained, preparatory to cleaning and restocking for the breeding season, which usually commences in February. The general appearance of the station, including the buildings, was excellent, and bore evidence of careful and judicious management. The artesian well was supplying only a fair amount of water, but as the majority of the ponds are now supplied by a ram and by a 27-foot overshot wheel, operated by the San Marcos River. this was not regarded as of great importance.

The demands for fish of all kinds in the State of Texas are constantly increasing, and as the present output is all that could be expected from the ponds in use, it was recommended that a special appropriation be made for securing more water and constructing ponds on lands belonging to the Government. In providing the water supply it was apparently necessary to acquire property on the river front for the erection of overshot wheels or other appliances for lifting water from the San Marcos River, and an option was secured on a desirable piece of property and an estimate submitted to Congress for the funds necessary in carrying out the recommendations referred to. This resulted in obtaining a special appropriation of $8,000.

STATION REPORTS.

GREEN LAKE STATION, MAINE (E. E. RACE, SUPERINTENDENT).

The following are the principal improvements at the station during the past fiscal year: The dam at Rocky Pond has been thoroughly overhauled, repaired, and raised 5 feet; the eastern and western wings lengthened 82 feet, making the dam 310 feet long and giving a 9-foot head of water at the inlet of the main supply flume, thereby nearly doubling the station water supply. The main supply flume has been put in good condition, 485 feet of it being rebuilt, and 360 new yokes put on. A coal shed has been constructed at Maddocks Landing for the storage of coal for the steamer *Senator*, and a number of minor repairs and improvements made to the cottages of the foreman and superintendent. The cottages for the laborers at the station have been completed and two of the men provided with comfortable homes for their families. Changes have been made in the water supply and sewer systems, the station force rendering material assistance in all this work when not engaged in caring for the stock of fish on hand.

The landlocked salmon on hand at the beginning of the year were held until September, when 177,899 were distributed to applicants in Maine and other New England States.

During the summer and fall the usual arrangements were made for establishing collecting stations at various points. As reports indicated that large numbers of brook trout and landlocked salmon could be secured in Lakes Onawa and Sebec, in Piscataquis County, the superintendent investigated those waters and established a station at the head of Lake Onawa. Two pound nets and a slat trap were fished until November 24, but only 21 brook trout and 16 salmon were captured. All the lakes and streams within a radius of 10 miles were examined, but without result. In October a trap was placed between Lake Onawa and Sebec Lake on Ship Pond Stream, but though large numbers of salmon were found above and below the Cowyard Falls, only 105 were captured, 4 of which were females.

The work resulted in the collection of 6,000 brook-trout eggs and 15,000 salmon eggs, which were transferred to Green Lake.

The following table shows the fish and eggs obtained at the stations operated in connection with Green Lake.

Point of collection.	Brook and lake trout.		Landlocked salmon.	
	No. of fish.	Eggs obtained.	No. of fish.	Eggs obtained.
Winkempaugh Brook (Branch Pond)	84	65,500	75	108,000
Patten Pond	162	74,000	10	14,500
Green Lake	5	2,000	96	160,500
Cold Stream Pond	386	*717,000	25	38,000
Lake Onawa	21	6,000	121	15,000
Total	658	864,500	327	336,000

* Lake-trout eggs.

Of the lake-trout eggs, 358,500 were turned over to the Maine Fish Commission at Enfield. The balance were shipped to Green Lake and produced 329,827 fry, which were planted during the spring.

In addition to the 147,500 brook-trout eggs collected, 400,000 purchased from dealers in Massachusetts were delivered at the station in excellent condition. They hatched in March and were planted during April, May, and June, the losses being comparatively light.

Of the 336,000 landlocked-salmon eggs, 15,855 were transferred to the Maine Fish Commission. The balance yielded 280,231 fry, which, instead of being held until fall, were planted in June, owing to the bursting of the reservoir dam early in that month.

During the freshets in April there was a surface wash around the western wing of the dam, but this was filled with gravel and the embankment raised, making it impossible for the water to pass around the extreme end. It was noticed shortly afterwards, however, that the old wing had gone to the south about 5 inches, and a close examination showed that the old timbers pressed hard against the bolts in the ledge, causing this sag. The water at the time was running over the dam between the flush boards 6 inches, but the log gate was opened and the water reduced 3 feet. The pond was never full again, and the head was 14 inches less when the dam gave way. A careful examination has since shown that the new wing gave way at a point where it had been connected with the old dam, which was apparently the strongest spot in the whole structure. The piling put in to secure the wing rested on hard clay bottom, but 2½ feet under the ends of these pilings a layer of quicksand extended directly under the wing for 15 or 20 feet. The water had probably worked its way underneath the foundation and the quicksand washed out, causing the wing to collapse. As the supply flume was carried away for a considerable distance, the water supply to the station was completely cut off, which necessitated the planting not only of all the brook trout and landlocked salmon fingerlings, but also the adult fish held in the ponds and reservoirs.

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

The Atlantic salmon received, as usual, the greater share of attention, this being the most important feature of the work at the station. The 194,572 on hand at the beginning of the year were carried until fall and distributed with very slight loss. The food for all fishes at the station, including the older stock of nearly 5,000, consisted almost wholly of hog-plucks purchased from an abattoir in the vicinity of Boston. Of the various kinds of food 17,231 pounds were consumed, costing $212.30, including transportation.

In addition to the yearlings on hand at the beginning of the year, 210 adult salmon were confined at Dead Brook for breeding purposes. This lot spawned in October, but by that time they had been reduced to 150, of which 66 were males. They yielded 665,000 eggs, 205,000 of

which were distributed and 354,977 hatched. Of the fry, 10,000 were distributed in June and 300,295 remained on hand at the close of the year, to be reared to the yearling stage for distribution in the late fall.

At the beginning of the year preparations for the capture of salmon at Hunt Logan, Mattagamon, were well advanced. The leader of the weir was thrown across the river so as to intercept the ascent of salmon by July 3, and a few days later salmon were observed in the outer pond. A number of other improvements were in progress, but a heavy rainfall brought on an unprecedented freshet for July. On July 18 the main rack was swept away, liberating the fish inclosed by it and disabling the weir for a time. By the time the repairs were made it was apparent that all of the fish had escaped during the flood. The rest of the season was devoted to improving the weir and inclosure and in preparing for another attempt in 1901. In April work was again commenced on the weir, and by the end of the year the river was practically closed. The rack has been much improved, and it is believed will be an effectual barrier to the ascent of salmon.

The landlocked salmon held at Grand Lake Stream for distribution in the fall were seriously reduced in numbers in July by a disease which made its appearance late in June. The cause of this disease is unknown, but it is thought to have been due to the presence of large quantities of hemlock bark in the canal. This bark with some other rubbish was removed from the water supply early in July, and no further trouble was experienced. From June 21 to 29 inclusive the temperature of the water reached 69° or 70° each afternoon, and it is possible that this long-continued warm weather may have proven too much for the young fish, though they subsequently stood a temperature of 75° or more without injury. This was later in the season, however, and they had become older and stronger. It was estimated that 53,715 fry were in the troughs on July 1, but this estimate was evidently too large, as the count in October showed only 33,862. Of these, 8,000 were liberated in Sysladobsis Lake, a tributary of Grand Lake, and the others were deposited in Grand Lake and Grand Lake Stream, near the natural spawning-grounds. During the last days of October the trap was put in condition for the capture of adult salmon, and on November 21, when fishing operations ceased, 819 salmon—322 males and 497 females—had been caught. From these, 409,290 eggs were obtained, an average of about 847 eggs to each female. This, though a very small average, was better than that of the preceding year, which amounted to only about 700. The eggs were carried through the winter until ready for shipment in March with a total loss of 95,000, leaving on hand 314,200 good eggs. Half of these were transferred to Craig Brook for distribution to other stations and private applicants; the remainder were retained at Grand Lake Stream and hatched practically without loss; 76,692 of the fry were planted during June, leaving on hand 75,201 for rearing to the yearling stage.

Of the eggs sent to Craig Brook, 130,000 were transferred to other points and 25,000 were hatched at the station. On June 30 there remained on hand 24,194 fingerlings.

From the brood Scotch sea trout 108,940 eggs were collected in October and November. Of these, 12,000 were shipped, and the balance produced 42,010 fry, but they were of inferior quality and at the end of the year only 8,902 remained. It is noticeable that Scotch sea trout have deteriorated greatly since their introduction at this station, and few, if any, healthy eggs are obtained from them, though in the early experiments they appeared to be exceptionally strong and thrifty. Whether this is due to deprivation of sea water and sea food, to which in a state of nature they have access, is a question yet unsolved.

The following table shows the stock of fish of all kinds on hand June 30, 1901:

Species.	Calendar year in which fish were hatched.					Wild fish inclosed.
	1901.	1900.	1899.	1898.	1897.	
Atlantic salmon	300,295	.....	411	.....	.....	238
Quinnat salmon	.....	.....	.....	.....	51	.....
Landlocked salmon	24,229	100	969	727	.....	.....
Scotch sea trout	8,902	.....	47	.....	177	.....
Steelhead trout	419	150	942	.....	124	.....
Brook trout	2,137	.....	.....	.....	.....	.....
Rainbow trout	3,768	1,395	38	.....	.....	.....
Total	339,750	1,645	2,407	727	369	238

At Grand Lake Stream, landlocked salmon, 72,312.

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

During the summer preparations were made for conducting field stations in Canada for collecting brook-trout eggs, and at Lakes Mitchell and Dunmore, in Vermont, for brook and lake trout eggs respectively. Prior to undertaking work in Canada the superintendent visited the preserve of the St. Bernard Club, between September 14 and 24, when he made a hurried inspection of the so-called Red Lakes, Lakes Saccacomi, Willie, Tumble, St. Bernard, Big and Little Thunder, Papineau, and Madam Henry. Trout were abundant in these waters, and there were indications that some of them would spawn in October in the tributary streams. Arrangements were made with Mr. C. H. Simpson to build a new hatchery at Bark River, which was placed under the direction of the superintendent.

Active operations were commenced in October, and the probable spawning-grounds on all the lakes were carefully watched, fish being frequently caught and examined. Very rough and windy weather prevailed throughout November, but inspections were made at night by jack-light when it was impossible to inspect by daylight.

In spite of very persistent work, the station was closed on December 1, a total failure so far as the collection of eggs was concerned. From the data obtained and further investigations by the superin-

tendent from the 7th to the 12th of December the following facts were developed: That the trout in the various lakes controlled by the St. Bernard Club do not ascend the streams to spawn, but spawn around the shores of the lakes; that while the fish in some of the smaller lakes may spawn as early as the latter part of October, the principal period of spawning extends from November 15 late into January, after the waters over the beds are covered with ice; furthermore, that it would be unprofitable to collect eggs on these lakes by catching the fish after they have arrived on the spawning-beds; that if the work is to be conducted there, the fish should be caught before the cold windy weather of October and November sets in, and retained in pens to ripen; that there is a great abundance of trout and a tremendous waste of eggs in the natural process of reproduction.

At Lake Willie the trout spawned November 16 to 30, after the lake was frozen over, but before the ice was sufficiently strong to bear a man. Here one bed, a foot in diameter, was watched for half a day, and 26 male trout, 8 egg-bearing females, and 14 spent females were caught from it. Most of these fish were there to eat eggs, as was seen on opening them.

At the request of Mr. W. H. Parker, the manager of the Laurentian Club, Lac La Peche, Province of Quebec, the superintendent, in June, made a reconnoitering trip of the preserves controlled by the Laurentian and Shawenegan clubs, in Canada. It is recommended that another attempt be made to collect eggs of the brook trout and the so-called red trout, in cooperation with the clubs referred to. The red trout inhabits four lakes in the township of St. Alexis Des Monts, county of Maskinonge, Province of Quebec, and though it is impossible to judge as to their abundance, except during the spawning season, it is believed that their eggs can be successfully collected. The spawning season is from about the 20th to the 31st of December. This trout averages about the same in size as the brook trout, being about 9 inches long when matured. The largest of which the superintendent had reliable information weighed 4 pounds, though some have been reported weighing 7 pounds. As food they are excellent, the flesh being red in color and not dry, more like the salmon than the speckled trout. They are usually caught by "still fishing," with minnows or angleworms, though there are authentic reports that two have been taken on Lake Saccacomi with the fly and one by trolling.

The field station for the collection of lake-trout eggs at Lake Dunmore, Vermont, was opened October 19, and from October 22 fishing was continuously conducted until November 6; 344 males and 106 females were captured, which produced 162,000 eggs; 158,500 eggs were transferred to St. Johnsbury, where 125,400 fry were hatched from them.

At Lake Mitchell operations extended from August 2 to December 20, during which period 1,789 trout were caught. Of these 909 were

females and yielded 503,000 eggs, of which 473,200 were eyed. All except 120,000, which were shipped to other points, were transferred to St. Johnsbury, where they yielded 255,000 fry.

A lot of 30,000 eggs was also derived from the Wells River Fish and Game Club, and these, together with 10,000 eggs obtained from the brood fish at the station, yielded 9,500 fry. In addition to these, 25,000 domesticated trout eggs were received from Mr. H. F. Hurlbut, East Freetown, Mass., in exchange for eggs of the wild trout, and 290,000 eggs were purchased from him. The following shipments were received from other stations: 20,000 landlocked-salmon eggs from Craig Brook, Maine; from Rogue River, Oregon, 46,000 eggs of the steelhead trout.

The domesticated eggs above referred to, aggregating 315,000, were very disappointing, and as compared with the results secured from eggs taken from wild fish, it would seem that wild-trout eggs are much better in quality than the domesticated.

The trout on hand at the beginning of the year and those hatched during the spring were distributed as indicated in the details of distribution.

In March arrangements were made to collect steelhead-trout eggs at Willoughby Lake. A small trap net was set at the mouth of the principal stream, and a larger trap on a bar just off the mouth of the brook. Much difficulty was experienced in keeping this trap free of sawdust and mill refuse, and no fish were caught until May 1, when several steelheads were taken by fishermen trolling on the lake. Several ripe males entered the trap net between May 9 and 29. On May 19 one ripe female was secured, which yielded 1,778 eggs. These were shipped green by express to St. Johnsbury, with a loss of only 23. The fry hatched from them were apparently strong and healthy.

Though only a few eggs were obtained this year, there is no doubt that in a few years large numbers of steelhead-trout eggs can be collected in Willoughby Lake if the difficulty of capturing the fish can be overcome. It appears from Mr. Cobb's observations that steelheads probably spawn on the shoals of the lake, not entering the smaller streams.

The fish on hand at the close of the year are shown in the following table:

Species.	Calendar year in which fish were hatched.				
	1901.	1900.	1899.	1898.	1897.
Steelhead trout	38,984	.....	236	39	6
Rainbow trout	1,000	402	77	.....	182
Brook trout	14,473	.....	467	.....	.....
Grayling	.....	.....	45	.....	.....
Brook and lake hybrids	.....	.....	.....	4	.....
Rainbow and steelhead hybrids	.....	261	.....	.....	.....
Lake trout	3,814	.....	.....	.....	.....
Landlocked salmon	18,047	.....	.....	.....	.....

NASHUA STATION, NEW HAMPSHIRE (W. F. HUBBARD, SUPERINTENDENT).

The superintendent visited Greenough and Diamond ponds and Connecticut lakes, in the northern part of New Hampshire, for the purpose of securing a site for the collection of brook-trout eggs, and selected Diamond Pond as the most favorable place, and during the latter part of September two of the employees of the station were detailed to that point. A rough shanty was erected and the necessary troughs provided. The fishing was done with hook and line and with gill nets, and continued until November 30. During this time 909 trout were captured, of which 357 females produced eggs. The first were collected on October 12 and the last on November 30, the number being estimated at 140,000. At the close of operations the men returned to the station, leaving the eggs in charge of a watchman until the last of January, when it was found that they numbered only 15,120. The loss was attributed to the carelessness and ignorance of the watchman.

From the brood fish at the station 100,000 eggs were collected between October 13 and December 20. In January 500,000 brook-trout eggs were purchased from dealers in Massachusetts, and an assignment of 50,000 was received from the New Hampshire commission, also some landlocked-salmon and golden-trout eggs, which will be hatched and planted under their direction.

A fair percentage of all the eggs received hatched, but the fry from those purchased and from those belonging to the New Hampshire commission suffered very heavy losses when about 4 or 5 weeks old. As fry from eggs taken at the station and from Diamond Pond were not similarly affected it is believed that the eggs were of poor quality.

During the spring 191,000 fry were planted in local waters, and there remained on hand at the end of the year the following stock:

Species.	Calendar year in which fish were hatched.				
	1901.	1900.	1899.	1898.	1897.
Brook trout	63,810	5,205			110
Steelhead trout			6		
Rainbow trout				55	
Landlocked salmon	46,100			63	
Dublin trout	75			50	
Grayling		48			
Golden trout	850				
Total	110,835	5,343	6	177	110

In the early summer the employees at the station were occupied in making a number of improvements in the superintendent's cottage, and, assisted by a crew of temporary men, a number of new nursery ponds, 14 feet long by 8 feet wide, were constructed, and a storm ditch 3 feet wide and 2 feet deep was built for the purpose of protecting the ponds from freshets caused by surface water during the wet season. Since its construction it has several times prevented the ponds and hatchery from being flooded, which would have caused the loss

of most of the stock at the station. Wells were driven in the 14 new ponds and in a number of the old ones. These varied in depth from 14 feet to 60 feet, and a flow of water was obtained in all except those placed in Ponds A and F and the supply ditch, which were all 60 feet deep.

GLOUCESTER STATION, MASS. (C. G. CORLISS, SUPERINTENDENT).

Besides the usual work of overhauling and repairing the cod-hatching apparatus, the station force was occupied during the summer and fall in constructing a pump-room 16 by 12 feet, adjoining the fire-room, and installing a new Blake pump of 600 gallons per minute capacity. New floors were laid throughout the building, and a number of other improvements were made, including the rearrangement of the suction and supply pipes.

In November the usual arrangements were made for collecting cod eggs at Kittery Point, and a force of spawn-takers, under Captain Hahn, reported there on November 19. The weather during the first two months was generally good, and there was little difficulty in securing boats for the spawn-takers, but the fishing was a failure, especially during the early part of the season, so that the daily receipts of eggs were rarely as large as expected, considering the number of spawn-takers employed and extent of territory covered. The spawn-takers were untiring in their efforts, and the field of operations covered the fishing-grounds between Gloucester and Marblehead, Mass., in addition to Ipswich Bay.

The first eggs were received from Kittery Point on November 24 and the last on March 25, the collections amounting to 98,546,000. Besides these, 49,036,000 were transferred from Plymouth and 7,842,000 from Woods Hole, a total of 155,424,000. From these eggs 100,466,000 fry were hatched and planted on the natural spawning-grounds from Ipswich Bay to Boston.

In view of the uncertainty of collecting a large number of cod eggs at Kittery Point and Plymouth, it is urged that steps be taken to provide a suitable inclosure near the station where live brood cod can be held. It is believed that a structure of this kind can be built for about $2,000.

Early in April preparatory steps were taken to collect egg-bearing lobsters from fishermen operating in the vicinity of Gloucester, Beverly, Boston, and Cohasset, Mass., and Kittery Point, Me., collectors being stationed at Kittery, Boston, and Beverly. The schooner *Grampus*, assisted by a steam lobster-smack, made collections along the Maine coast from Portland to Rockland. This work was delayed by the stormy weather prevailing during the entire month of April and the early part of May. Heavy easterly winds, accompanied by rainfall, were of almost daily occurrence, causing a strong current along the coast and practically putting a stop to lobster fishing during this period. The first eggs were not received until May 11, and from

this time the work was pushed vigorously. The collections from the fishermen at all points compared favorably with other years, several places showing an increase, but the receipts from the large dealers in Boston and Portland fell off, although more lobsters were handled by these parties than during any other season for the past decade. The probable reason for this was that a large percentage of the lobsters handled by the dealers at those points came from Canadian waters, where strict inspection laws prevent the shipment of egg lobsters.

During the season 4,169 egg lobsters were collected, from which 51,213,000 eggs were obtained. The following table shows the number of egg lobsters and eggs received from the collecting fields:

Field.	Lobsters.	Eggs.
Maine coast, schooner Grampus	1,600	19,467,000
Boston, Cohasset, and vicinity	896	11,552,000
Kittery Point, Me., and vicinity	930	10,543,000
Gloucester, Beverly, and vicinity	743	9,651,000
Total	4,169	51,213,000

Of the 47,270,000 fry hatched, 15,000,000 were planted in Maine waters, and 32,270,000 were distributed in Massachusetts from Lanesville to Cohasset. Of the fry sent to the Maine coast 4,500,000 were taken on the schooner *Grampus* and 10,500,000 were shipped by rail to Portland, where they were transferred to the schooner and planted at points along the coast, selected after consultation with Hon. A. R. Nickerson, commissioner of sea and shore fisheries of the State.

The adult lobsters were as usual released in the localities from which they were secured. The continued decrease in the collection of egg lobsters during the past two years makes it evident that if the work is to be put on a permanent basis arrangements must be made for impounding egg lobsters during the fall and holding them until the eggs are ripe.

Woods Hole Station, Mass. (E. F. Locke, Superintendent).

During the summer the wharf was completed, some necessary repairs were made to the residence and launches, and a new dynamo was substituted in place of the old machine, which had become too small for the station, owing to the development of the biological work. The laboratory was kept open all summer, under the direction of Dr. H. C. Bumpus.

In accordance with the usual custom, the schooner *Grampus* began the collection of brood cod on October 1, and obtained 2,933 fish, ranging from 6 to 20 pounds in weight, by the 9th of November, when the work was discontinued and the crew sent to Kittery Point. The stock was further increased by the purchase of 332 fish from commercial fishermen, making a total of 3,265. Of these, 1,170 died from natural causes and 692 were killed by anchor frost. The others were

tagged and released after the eggs had been taken, and at the close of the year 46 had been reported captured, many of them at long distances from the station.

The collecting station at Plymouth was opened in November, work at that point being under the direction of Mr. R. N. Veeder. The spawn-takers, four in number, commenced work December 1, and on December 3 collected 3,000,000 eggs, which were shipped to Woods Hole. On account of the scarcity of fish, very few vessels operated in the vicinity of Plymouth early in the season, and later, when they became plentiful, the weather was so unfavorable and the sea so rough that fishermen could not get to the fishing-grounds. In addition to this, for three weeks during February the harbor was closed by ice and the steam launch frozen in, but notwithstanding all these difficulties 71,713,000 eggs were collected, 52,068,000 being sent to Gloucester and the remaining 19,645,000 to Woods Hole.

The brood fish commenced spawning November 14 and yielded 140,754,000 eggs, bringing the total handled at the station to 160,399,000. From these 102,405,000 fry were hatched and planted on the spawning-grounds in the vicinity of the station.

Early in January three fyke nets were set in Woods Hole for the purpose of collecting flat-fish, and about January 22 a number were placed in Waquoit Bay. This work was seriously interfered with by an exceedingly cold wave, which swept over New England early in February, lasting nearly the entire month and closing the harbors and bays with ice, so that it was impossible to reach the nets. As a result of the work 63 ripe fish were taken at Woods Hole and 107 at Waquoit Bay, but 42 died before spawning. Between January 28 and the 13th of April 53,099,000 eggs were collected, from which 44,230,000 fry were hatched. The methods followed in handling the brood fish were similar to those employed the previous season, and the results were equally good.

Although every effort was made to increase the lobster work, the results, as indicated by the number of eggs collected, were for several reasons the poorest that have been secured at this station. Arrangements were made early in March to collect egg lobsters at Plymouth and Scituate, Mass., but the receipts from those points were small, only 10 being secured from the fishermen in the immediate vicinity of the station, though large numbers of fish had been furnished them during the winter for lobster bait. An effort was also made to collect egg lobsters in Connecticut waters, a schooner being chartered for this purpose, but the returns were so poor that the work was abandoned at the end of May. Owing to a change in the laws of Rhode Island it was late in the season before arrangements could be perfected for the collection of eggs in that State, and it was only done then through the courtesy of the commissioners of inland fisheries, Dr. A. D. Mead and Mr. Henry T. Root.

The following table shows the receipts from the different sections for 1900 and 1901, and sets forth clearly the marked decrease this year at all points, especially in the vicinity of the station and around Buzzards Bay:

Field of collection.	1900.	1901.
Noank and Stonington, Conn., and Block Island, R. I	2,710,000	1,468,000
Woods Hole and vicinity, including Buzzards Bay	7,199,000	2,523,000
Plymouth, Mass	1,348,000	1,181,000
Scituate, Mass	3,827,000	1,772,000
Newport, R. I	13,058,000	11,318,000
Total	28,142,000	18,262,000

The total number of eggs collected was 18,262,000, from which 13,945,000 fry were hatched and planted. Considerable improvement has been made this year in the method of hatching the eggs of the lobster, the McDonald jar with the open top being used in combination with the ordinary glass aquarium, instead of the old Chester jar covered with scrim. A scale similar to that used in white-fish work was devised for the measurement of the eggs, and it was found to be not only more convenient, but fully as accurate as the old method of measuring in a glass graduate.

CAPE VINCENT STATION, N. Y. (LIVINGSTON STONE, SUPERINTENDENT).

A new coal-house has been built during the past year and various minor improvements have been made.

In October 68,000 lake-trout eggs were collected from the local fishermen and 1,500,000 were transferred from the Michigan and Minnesota stations. In January 325,000 brook-trout eggs were purchased from commercial hatcheries in New England, and 21,592,000 white-fish eggs were received from Put-in Bay, Ohio, and 720,000 collected from local fishermen. The eggs were successfully hatched in the spring, producing 1,485,000 lake trout, 275,100 brook trout, and 13,552,000 white-fish, which were distributed as usual.

With a view to the collection of pike-perch and sturgeon eggs in Vermont, the superintendent had a conference with the Vermont fish commissioners, which resulted in an agreement whereby the U. S. Fish Commission was authorized to collect eggs of these fishes in that State, the same to be hatched at Swanton, where a new State hatchery had been erected. The fry resulting from a third of the eggs were to be turned over to the Swanton fish commissioner for distribution in Vermont waters, the other two-thirds to belong to the U. S. Fish Commission.

On March 20, M. A. Mason was detailed from Cape Vincent to fit up the hatchery at Swanton, utilizing the old equipment as far as possible. The hatchery as equipped contained 348 jars, 100 of which were furnished by the Vermont commission, the others by the U. S. Fish Commission. By April 10 the ice had disappeared from the river

and fishing commenced. On the 17th ripe females were caught, and on the 18th the first eggs were collected. The conditions existing at this time were very unusual, as the river water, instead of warming up and increasing in volume, remained stationary in temperature for ten days or more, during which time there was scarcely any perceptible rise or current. Spawning fish were therefore not attracted upstream, and the catch, although large, consisted mostly of males, in some hauls the ratio being 100 males to 1 female. It consequently became necessary to fish seines in Lake Champlain a few miles below the mouth of the river. The seining along the lake shore was quite successful, and as a result of the season's work about 3,500 female pike perch were secured, of which 2,910 produced 160,375,000 eggs, the last being collected on April 30. The methods followed were practically the same as in previous years, though a number of experiments were tried with reference to the fertilization and transportation of eggs. The loss from fungus after the eggs were received at the hatchery was very large. Of those that were eyed, 22,500,000 were transferred to Cape Vincent and 4,000,000 to the Massachusetts Fish Commission. Those sent to Cape Vincent arrived in very bad condition and produced only 13,800,000 fry. At Swanton 23,750,000 fry were hatched and distributed from that point, 16,750,000 being turned over to the Vermont Fish Commission.

At the close of the pike-perch season preparations were commenced for the capture of sturgeon and the collection of their eggs. On the Missisquoi it was planned to place a rack across the river, consisting of wire netting and common seine twine, with a trap in the center, for the purpose of stopping the sturgeon ascending the river, after the manner of stopping salmon on the Pacific coast, but this idea was abandoned, owing to the fact that steamers ply up and down the river during high water in the spring. Pound and trap nets were also tried, but gill nets were finally resorted to, about 30 sturgeon being taken in this manner from various places in the river. These were placed in pens provided for pike perch, but later in a pen built in the river with boards laid horizontally on edge, a space being left between to let water in and out. The fish in the pens were examined daily, and on May 13 a large ripe female was found, which struggled so violently on being taken from the water that the combined efforts of three men could not prevent it from casting its spawn, some of which was thrown 30 feet or more. When finally subdued, the few remaining eggs left in the fish, somewhat less than a quart, were taken in a dry spawning pan. These were mixed with milt and treated in the same general way that pike-perch eggs are. When the eggs were finally separated they were placed in a McDonald hatching jar, such as is used for pike perch. No further trouble from the eggs sticking together was experienced, but they were so heavy that the pressure through the ordinary tubing was not sufficient to keep them in proper motion, and it became necessary to increase the pressure. The eggs

hatched successfully, the first fry appearing in the jar on May 20, having taken just a week to hatch, with an average temperature of 65°. After holding the fish in pens until the 1st of June they were all released, as the indications were that they were not becoming any riper. Two or three were killed and opened, and the eggs appeared to be caked together and worthless.

On the Lamoille River sturgeon made their first appearance on May 15. Trap and gill nets were used, but the majority were caught by hooking them at a place on the river called "sturgeon hole," where spawning sturgeon apparently collect. The water here is too deep to spear the fish, and nets can not be used; but they are taken by twitching them up with hooks, men watching the hole night and day. Many breeders were obtained in this way, 27 being caught on May 22, when the temperature of the water was 68°. Nearly all of these were ripe males, but on the afternoon of the next day two ripe females were captured. As the fish did not struggle violently at first, the men were able to stop the flow of eggs by stuffing handkerchiefs into the vent. They were then towed across the river, where the males had been secured, and were instantly killed by a blow on the head. In this way 1,300,000 eggs, were taken, but soon after the weather became extremely cold, the temperature of the water dropping several degrees, and as no more sturgeon were captured the work was abandoned and those in confinement were turned loose. Efforts were then made to catch sturgeon on McNall Bay, in Lake Champlain, a short distance south of the mouth of the Lamoille. On the 4th or 5th of June three apparently ripe females were captured, but when opened the eggs were found to be insufficiently advanced for fertilization. A number of others were caught in this bay during the next few days, but no more impregnated eggs were secured, and on June 12 efforts were discontinued. The sturgeon eggs were found, by actual count, to average 850 to the fluid ounce. They are apparently amorphous, and of a dull, dirty color, but this appearance is caused by a cobwebby film which surrounds each egg. By squeezing between the fingers the film can be easily separated from the egg, and the eggs then seem spherical, clear, and crystalline, not very different in size from white-fish eggs, though probably somewhat larger. When ripe the eggs come from the parent fish more easily and are somewhat glutinous, but if taken from a freshly caught fish they are not more glutinous than the pike-perch eggs, and will not give any more trouble if treated similarly.

Of the total number of eggs collected (1,320,000) 20,000 were hatched at Swanton, 380,000 were sent to Cape Vincent, where they were lost, and the balance were lost at the fishing-grounds. In the opinion of the superintendent, the following points with reference to the collection of sturgeon eggs seem to be pretty well established:

Lake sturgeon go up the tributary rivers of Lake Champlain to spawn. They ascend different rivers at different times, the time for each river apparently being determined by the temperature of the

water. The river that the spawning sturgeon of Lake Champlain first ascend is the Missisquoi, in the extreme northwestern corner of Vermont. They ascend this stream very soon after the pike perch have finished spawning in the river, which is usually the latter part of April. The largest number of ripe fish appeared this season about May 13, and were all gone by May 20.

The sturgeon ascend the Lamoille, a Vermont river, which flows into the lake about 30 miles south of the Missisquoi, somewhat later. This year their first appearance at the mouth of this river was about the middle of May, and they collected in the sturgeon hole in the greatest numbers for spawning on May 23. By the end of the month they had all left the river.

The lake sturgeon spawn in the shallow waters of the lake in June. At least, there is a spawning-bed in the shallow water of the bay just south of the mouth of the Lamoille, where the sturgeon come at that time to deposit their eggs. Parent fish collect in this bay to spawn about two weeks later than when they are found in the greatest numbers in the sturgeon hole of the Lamoille. The largest number of ripe ones was observed on June 4, and by June 15 they had all left the spawning-grounds of the bay.

As far as could be observed, lake sturgeon will not spawn until the water reaches a temperature of 60° F. It is concluded, therefore, that they require water at or above 60°, though of course this must be accepted only as an inference.

The lake sturgeon spawn at other places later than they do in the bay just mentioned, as is evidenced by the fact that parent fish were captured in June with eggs that would not have been ripe for a fortnight, and others with eggs that would not have ripened for a month or longer. Sturgeon do not seem to ripen their eggs well in confinement, unless very nearly ripe when captured. If the fish in the pens were confined too long their eggs caked together and were otherwise very poor, and probably would not have been susceptible to impregnation even if they had ripened sufficiently to be extruded from the fish; but this should not be accepted as conclusive, as means will probably be eventually found for keeping sturgeon in captivity without injury to their eggs till ready to spawn.

The spawning season at the various grounds of the lake sturgeon is very short. They are doubtless spawning somewhere all summer, but at any specified ground it is not believed they are in the act of spawning over three or four days. In order to be on the safe side, wide limits have been set to the period during which the spawning sturgeon remain on the spawning-beds, but after a more thorough investigation these limits may be much narrowed.

Unless some device has been adopted for forcibly retaining the eggs in the sturgeon, it seems almost useless to attempt to strip a ripe fish after it has once been lifted from the water alive, as a few seconds of time and a few powerful strokes of the tail hopelessly

scatter all the eggs. It must be ascertained whether the fish is ripe before it is taken from the water, or the instant it is lifted from the water. The vent can then be plugged, the fish put in a strait-jacket, and the eggs taken without difficulty. Various methods of plugging the parent sturgeon were tried, the most effective of which was to stuff a handkerchief instantly into the vent and keep it there, but if the fish is given any time to struggle the eggs will be lost.

Once the eggs of the lake sturgeon are taken it is an easy matter to impregnate them. It nearly always happens when a straggling ripe female is found, or when the females ripen in confinement, that ripe males for fertilizing the eggs can not be obtained, but if ripe females are captured during the three or four days they are on the spawning-beds, ripe males will be found in abundance. When the ripe females in the Lamoille sturgeon hole were caught a quart of milt might have been taken from the males had it been necessary.

The eggs of the lake sturgeon are easily hatched in any jars used in hatching pike perch and white-fish if a stream of water is run through the jars with sufficient pressure to keep the eggs in constant motion. Probably 80 to 90 per cent of lake-sturgeon eggs taken in future will be hatched.

In the latter part of April about 1,400 eggs were secured from the steelhead trout hatched at the station in 1897 from eggs sent from California and kept in tanks in the hatchery. A large percentage of the eggs were impregnated and hatched, producing healthy fry.

STEAMER FISH HAWK (JAMES A. SMITH IN CHARGE).

As soon as practicable after the vessel arrived on the Delaware River on April 30 the hatching apparatus was erected on the main decks and arrangements made for sending spawn-takers to the fishing shores at Howells Cove, Bennett's, and Cramer Hill, and to the gill nets off Billingsport, N. J. No ripe fish were found until May 6, probably because of the extremely cool weather which prevailed. Daily collections of eggs continued from that date to June 13, during which period 115,033,000 were secured and 52,813,000 fry hatched and distributed; 24,706,000 fertilized eggs were transferred to Havre de Grace, Md., 2,051,000 to Central Station, Washington, D. C., 4,235,000 to the Maryland Fish Commission at Druid Hill Park, Baltimore, and 1,419,000 to the Pan-American Exposition, Buffalo, N. Y. Owing to lack of hatching facilities 6,720,000 were deposited on the spawning-grounds. The fry were planted in streams along the coast from the mouth of the Delaware Bay to Massachusetts. Of the total number of eggs taken 76,955,000 were secured from the three seines referred to above, 49,000,000 from the Howell Cove seine, and 38,078,000 from the gill-net fishermen off Billingsport.

Though not quite as many shad were caught by the fishermen as the previous year, the fish-cultural work was the most successful and satisfactory ever done by the *Fish Hawk*, for which credit is due not

only to the officers and men belonging to the vessel, but to the fishermen, who assisted the spawn-takers to the extent of their ability in securing all the eggs possible.

There was a decided increase this season in the capture of Atlantic salmon in the Delaware River near Gloucester. Nine specimens, weighing 8 to 15 pounds each, were taken at Howells Cove; two were captured at Bennett's fishery, weighing 11 and 15 pounds, respectively; and one, weighing 14½ pounds, in a gill net off Camden. The prices received for them varied from 40 to 45 cents per pound.

BATTERY STATION, MARYLAND (J. N. WISNER, SUPERINTENDENT).

The work of getting the station ready for shad propagation commenced in March. The machinery was placed in order and a number of minor changes made which tended to increase its efficiency. As for several years the hatching facilities had not been adequate, 280 new jars were purchased and the necessary tables provided, which of course necessitated the extension of the circulating system. The old boat railway, which had been in a dilapidated condition for several years, was torn out and rebuilt, and a scow was constructed for transferring fry from Battery Station to Havre de Grace. A supply of herring roe was also canned and shipped to Wytheville, Va., and Erwin, Tenn., to be used as trout food.

As the egg-taking season approached arrangements were made for attending all the seining-grounds in the vicinity, a number of sailboats being chartered and a force of spawn-takers employed. The large catch of shad reported below the island indicated a successful season, but for inexplicable causes no eggs were obtained until April 26, and even then the collections were small. On May 1st 8,993,000 were secured, and from then until May 8 large numbers came in, but from that date to the close of the season the daily take amounted to only a little over a million, the total collections aggregating only 61,075,000. In addition to these, 24,706,000 were transferred from the *Fish Hawk* on the Delaware River. At first the small collections were attributed to the cold weather and high water prevailing, but this theory was abandoned later when weather conditions became more favorable. The fish apparently abandoned their usual spawning-grounds. In a single night over 5,000 shad were taken by gillers in the vicinity of Port Deposit, and on one day 1,900 were secured at one of the floats where a large seine is fished.

From the eggs collected at the station 38,845,000 fry were hatched and planted, a little over 63 per cent of the number collected. The eggs from the *Fish Hawk* produced 6,548,000, or less than 27 per cent of the number transferred.

The buildings at the station are in good repair, but the condition of the wharves is deplorable. It is urged that an appropriation be secured for the purchase of larger and better launches, as those at the station are very old.

BRYAN POINT STATION, MARYLAND (L. G. HARRON IN CHARGE).

The work of preparing the station for the season's operations was commenced in March, and everything was in readiness by April 13; but as the weather was very cold and unseasonable the force of spawn-takers was not taken on until April 19. The first eggs came in the next day, but the catch of shad was exceedingly small, and at the end of April only 9,795,000 eggs had been secured, whereas the collections at the same time the previous year amounted to over 49,000,000. Unfavorable conditions prevailed throughout the entire season, frequent rains causing freshets and muddy water, which, with the low temperature and the scarcity of shad, proved so detrimental to the work that only 33,321,000 were obtained. Of these, 1,011,000 were shipped to Central Station. The others were hatched at Bryan Point, producing 27,154,000 fry, which were distributed in North Carolina, South Carolina, Georgia, and Florida, and on the natural spawning-grounds in the Potomac River between Broad and Occoquan creeks.

The spawn-takers were dismissed on May 23, and on the 30th the station was closed and placed in charge of a watchman. The temporary force during the season consisted of 44 spawn-takers, 5 firemen, 3 assistants in hatchery, 1 coxswain and engineer, and 2 cooks.

The following shows the daily collection of eggs and the mean temperature of air and water:

Date.	Received.	Mean temperature.		Date.	Received.	Mean temperature.	
		Air.	Water.			Air.	Water.
		° F.	° F.			° F.	° F.
April 20	136,000	56	50	May 9	836,000	68	64
April 21	279,000	57	51	May 10	1,110,000	64	64
April 22	84,000	54	49	May 11	555,000	69	65
April 23	419,000	54	49	May 12	965,000	70	65
April 24	520,000	51	48	May 13	1,300,000	65	64
April 25	207,000	54	49	May 14	662,000	66	63
April 26	451,000	61	51	May 15	835,000	69	64
April 27	883,000	57	52	May 16	586,000	71	65
April 28	1,886,000	58	53	May 17	184,000	72	66
April 29	2,474,000	64	54	May 18	224,000	71	66
April 30	2,456,000	72	55	May 19	135,000	63	65
May 1	2,062,000	66	59	May 20	527,000	63	65
May 2	3,187,000	71	61	May 21	828,000	67	65
May 3	1,082,000	68	66	May 22	379,000		
May 4	1,632,000	65	63	May 23	751,000	73	67
May 5	1,020,000	69	64	May 24	985,000	76	66
May 6	1,239,000	68	64	May 27		61	63
May 7	1,485,000	64	64	May 28		66	64
May 8	957,000	67	63	May 30		68	65

A number of improvements were made during the year, the most important being the construction of a wharf 70 feet long by 12 feet wide, running out from the front of the hatchery. This has proved a great convenience, and will materially reduce the expense of operating the station, as vessels plying up and down the river now land at the station daily, thus obviating the necessity for an extra launch, which has heretofore been employed mainly for running between the station and Alexandria for the purpose of carrying down provisions and bringing up eggs and fry.

FISH LAKES, WASHINGTON, D. C. (C. K. GREEN, SUPERINTENDENT).

Dr. Rudolph Hessel, who had been in charge of this station since its establishment in 1877, died suddenly on August 19, 1900, and Mr. Z. H. Goldsmith directed operations until November 12, when he was relieved by Mr. J. N. Wisner, field superintendent. Mr. Wisner was relieved on March 1, upon the appointment of C. K. Green.

Work was conducted along the same general lines followed in past years; the ponds were drawn from time to time during the fall and the young fish were assorted and transferred to the breeding-ponds. The season's operations proved very satisfactory, 64,605 yearling and 50 adult large-mouthed black bass, besides 1,531 crappie, being furnished for distribution in the fall.

In November the shad which had been placed in the west pond during the month of May of the previous year were liberated in the Potomac River. It is impossible to give the exact number liberated, but it is believed that there were at least 2,000,000. In May, 1901, 2,000,000 were again placed in the west pond, and at the close of the year large numbers of apparently healthy and vigorous shad could be seen along the partition in deep water.

One of the most important improvements has been the construction of a new outlet for the north pond, which was done under direction of Mr. H. von Bayer, the architect and engineer of the Commission.

Early in April the breeding fish of all kinds were transferred from the retaining ponds to the ponds and partitions previously prepared for breeding purposes. The large-mouthed bass commenced spawning in the north and south ponds on April 28, and it was observed that they spawned not only on the gravel beds which had been placed in the ponds, but also on the weeds close to the water's edge. The first brood of fry appeared on May 6. The last nests were seen on June 10, and at the close of the year there were large numbers of young fish in the ponds.

The adult crappie, numbering 73, were transferred from the retaining ponds to the Seventeenth street ponds in April, and commenced to spawn on May 1, continuing until about the 20th. A number of nests were seen and some fry have been noticed in the pond near the edges.

The crappie in the canal pond spawned on the 29th of April, but as this pond was used for black bass, the fry, estimated at about 8,000, were transferred to the Seventeenth street pond as soon as they raised from the beds. A recent examination shows that they have made excellent growth, being from 1 to 1½ inches in length at the close of the year.

Although the distribution of ornamental fishes has been discontinued, some golden ide, tench, and gold-fish are raised annually for the aquarium at Central Station and for exhibition purposes. Large numbers of young carp are also hatched as food for bass.

CENTRAL STATION, WASHINGTON, D. C. (J. E. BROWN IN CHARGE).

Work at this station has been conducted on the same lines as heretofore, it being used as a distributing depot for the fish reared at the fish ponds in Washington, and also for hatching the various species of *Salmonidæ* during the winter, for illustrating the fish-cultural work of the Commission. The following table shows the number of eggs received and the fish hatched and planted:

Species.	Received.	Hatched.
Shad	4,571,000	3,640,000
Pike perch	2,000,000	1,750,000
Rainbow trout	9,769	9,030
Brook trout	500	477
Lake trout	14,888	14,319
Loch Leven trout	9,987	9,684
Atlantic salmon	4,993	4,832
Landlocked salmon	4,990	4,832
Scotch sea trout	1,971	1,544
White-fish	317,000	314,000
Total	6,935,098	5,748,718

The superintendent is charged with receiving and shipping freights and express matter passing through the central office. During the past year this involved the handling of 783 shipments and 1,004 receipts. The general distribution apparatus is also stored at this station under his direction. After the distribution season is ended the cars are laid up at Central Station for the winter, during which time their machinery is thoroughly overhauled by the station machinists, thereby saving the Commission thousands of dollars annually.

CENTRAL STATION AQUARIUM (L. G. HARRON IN CHARGE).

From July 1 to September 15 the grotto was closed, it being impracticable, on account of the high temperature of the water, to maintain an exhibit of salt-water specimens.

The salt-water circulating plant was improved by the introduction of a new heater and the installation of an engine for use in operating the salt-water pumps whenever the water pressure might be too low to run the motor.

A supply of salt water was obtained from the Chesapeake Bay early in September, and arrangements were made for restocking the aquarium with marine fishes and other animals collected from points on the Chesapeake and Buzzards Bay. About 1,000 specimens, representing 54 species, were secured from these two sources, and these, with supplies of sea-anemone and star-fish from Gloucester, Mass., stocked the salt-water aquaria to their full capacity. This exhibit remained exceptionally good until about February, when a disease appeared and caused the loss of a great many of the specimens. It attacked their fins and gillrakers, and seemed to eat the flesh from the spines and rays, causing the fish to refuse all of the food. Various remedies, including strong salt baths, were tried, but without effect,

and the ravages continued until April, when most of those surviving succumbed to the rising temperature.

The exhibit of fresh-water fishes indigenous to this region was good throughout the summer, and in October, when the water temperature fell to 60°, consignments of rainbow trout, brook trout, Scotch sea trout, Atlantic salmon, and landlocked salmon were sent from Wytheville, Va., and East Orland, Me.; all of these were about nine months old when received. They continued to thrive until early in May, when a rise in temperature necessitated their removal, and in order to avoid losing them they were planted in suitable waters in Pennsylvania. Attention is again called to the large lot of large-mouthed black bass, which have been carried since July, 1896, in a tank 6 feet long by 4 feet wide, on the main floor of Central Station. During this time they have suffered no losses.

Following is a list of salt-water and fresh-water species exhibited during the year:

Salt-water species.—Sheepshead, tautog, spot or goody, croaker, sea trout, pompano, bur-fish, toad-fish, sea bass, gray snapper, black drum, sea robin, jumping mullet, swell-fish, spade-fish, sea-horse, yellow-tail, blenny, striped bass, hog-choker, pig-fish, mummichog, king-fish, moon-fish, star-gazer, pin-fish, flounder, tongue sole, remora, stickleback, pipe-fish, file-fish, chætodon, cunner, scup, sea raven, sculpin, tomcod, lobster, spider crab, hermit crab, blue crab, star-fish, shrimp, sea-urchin, sea-anemone.

Fresh-water species.—Rainbow trout, brook trout, steelhead trout, Scotch sea trout, Atlantic salmon, landlocked salmon, large-mouthed black bass, small-mouthed black bass, rock bass, crappie, yellow perch, white perch, common tench, golden tench, golden ide, gold-fish, paradise-fish, common sun-fish, banded sun-fish, common sucker, chub sucker, channel cat-fish, yellow cat-fish, mill roach, German carp, pickerel, gar pike, sturgeon, common eel, lamprey eel, top minnow, alligator, terrapin, snapping turtle.

The following shows the maximum and minimum temperatures of salt and fresh water in the tanks during the year:

Month.	Fresh water.		Month.	Salt water.	
	Max.	Min.		Max.	Min.
	°F.	°F.		°F.	°F.
July	84	77	September	74	62
August	84	78	October	74	56
September	83	70	November	64	52
October	72	60	December	58	52
November	63	47	January	59	54
December	47	36	February	58	53
January	38	33	March	62	49
February	35	33	April	68	52
March	48	34	May	72	61
April	55	45	June	78	60
May	65	56			
June	76	62			

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

Immediately after the 1st of July, when the special appropriation of $2,500 for the construction of additional ponds became available, the material for this work was assembled and operations commenced. It was decided to construct the pond on that part of the station property lying west of the road leading to the railroad. It is irregularly

shaped, covers about 2 acres of land, and is from 3 to 8 feet deep. The embankment on the north and west sides is 600 feet long, from 20 to 30 feet wide at its base, and from 8 to 12 feet high. In order to protect it from high water, a piling wall 7 feet high was built along Tates Run and along the west end of the pond. On the east end the old road bed was raised from 4 to 6 feet and widened, so that it now serves not only as a wagon road but as a strong embankment for the pond as well. The water supply was obtained from Tates Run, 1,100 feet above the pond, a 12-inch terra-cotta pipe laid in cement being run alongside the old pipe, through land belonging to R. G. Corvin. Between the two main pipe lines a 5-inch tile pipe was laid to carry off leakage and surface drainage, thus preventing injury to the lands for agricultural purposes.

In addition to the usual cribs, screens, etc., for the outlet of water, which are situated in the northeast corner of the pond, a tight crib-like arrangement was constructed about midway on the east end of the pond, at the foot of the road embankment. Connected with this crib is an offshoot from the supply pipe for the old series of ponds, through which the main line is flushed. This is accomplished by withdrawing a plug from the end of the pipe by means of a lever. The water in flushing passes through the crib and enters a 12-inch pipe line connected at the other end, and is then conveyed to Tates Run. After flushing, the pipe is closed by reversing the lever. The overflow from the large pond passes into the series of ponds below, thereby increasing the water supply.

After the completion of this pond, in October, a carpenter shop 15 by 28 feet, 1½ stories high, was built 50 feet west of the hatchery. The upper floor is used for the storage of cans, tools, and other material, and the lower one as a carpenter shop, meat room, etc. A number of other improvements were also made, such as the building of a porch 6 by 30 feet on the south side of the hatchery, grading and sodding embankments, filling in old blind ditches, regrading and seeding to grass the small bottom east of the spring, building fences, painting buildings, etc.

The fish-cultural operations for the year consisted in the propagation and distribution of rainbow trout, brook trout, black bass, and rock bass. The distribution of fish hatched in the previous year commenced October 6 and continued to December 23, during which period 165,480 rainbow trout, 8,192 brook trout, 8,730 rock bass, and 1,812 black bass were distributed; also 15,816 black bass and 800 crappie were transferred from other points.

The food used during the summer for the young and adult fish consisted of beef liver and mush, mixed in varying proportions, according to the size of the fish.

In September a loss of 156 large breeding trout from suffocation occurred in one of the ponds. The water at the time was very low,

barely sufficient in the ponds north of the hatchery to sustain life, consequently this loss was unavoidable.

The breeding stock of rainbow trout on hand at the beginning of the year numbered about 4,000, their age ranging from one to ten years. Of these, about 2,500 were classed as spawners. The season extended from November 4 to February 10, and resulted in the collection of 1,255,800 eggs from 1,224 fish, an average of 1,025. The size of the eggs was more uniform than last season, the variation being from 355 to 438 to the ounce, though the majority ran about 381. About 25 per cent of the eggs collected were unfertilized or lost during incubation, 417,000 were shipped to other stations and foreign applicants, and 524,000 were hatched.

The loss of brood-fish was more than double that of any previous season, amounting to nearly 700, or about 33 per cent of the fish handled. This was unquestionably due to the inexperience of the spawn-takers, the foreman and fish-culturist both being absent during the spawning period. Most of the fish lost were the larger females.

In January two consignments of brook-trout eggs were purchased from New England dealers, and reached the station in apparently good condition, though there was a subsequent loss of several thousand.

For the first three weeks after hatching the rainbow and brook-trout fry were fed six times a day on canned herring roe. From that time they were fed four times a day until they were ten weeks old, when the roe was gradually discontinued and liver substituted. At the age of three months the usual mixture of liver and mush was given to them.

The water was unusually muddy during the summer months, which was of course very injurious to the young fish of all kinds and especially to brook trout. The death rate increased from 40 to 50 per day to several hundred, and on two or three occasions, when the water was very muddy, over a thousand were lost.

The rainbow trout were not so seriously affected from this cause, but late in June they were attacked by parasites in large numbers. This parasite (*Gyrodactylus elegans*) is described by Livingston Stone in his book on the Domesticated Trout, also by J. J. Armistead, in Angler's Paradise. After trying a number of remedies it was finally destroyed by the use of common apple vinegar. The vinegar was diluted with water to a 25 per cent solution, and in this the fish were dipped, a net full at a time, and allowed to remain from 2 to 4 seconds, according to the size and age. This treatment does not injure the fish and is an absolute remedy for the parasite. Care should be taken, however, not to have the solution too strong nor allow the fish to remain in it too long.

Early in April the brood rock bass were placed in suitable ponds and a number of gravel nests provided for them. On April 19, just as

the fish had commenced to nest, the ponds were overflowed and the nests washed away, many of them being buried in mud and drift. The ponds were at once repaired and the remaining fish were distributed in them again. They soon resumed their nesting, and a good many young have been seen, though the number hatched could not be determined at the end of the year.

On April 26 the breeding-ponds of the black bass were stocked, and on May 7, when one of the ponds was partially drawn for the purpose of repairing a leak, numbers of fry were noticed. Owing to the muddy condition of the water it has been impossible to make any estimate of the number on hand.

Following is a list of the stock on hand at the close of the year:

Species.	Calendar year in which fishes were hatched.				
	1901.	1900.	1899.	1898.	1897 or before.
Rainbow trout	318,000	5,080	598	339	1,872
Brook trout	19,400				
Large mouth black bass			36		57
Small mouth black bass					6
Rock bass			39	80	180
Carp					20
Gold-fish					15

EDENTON STATION, N. C., (S. G. WORTH, SUPERINTENDENT).

Early in March arrangements were made for collecting shad eggs from the seines and the trap and gill nets fished in the Chowan River, Roanoke River, and Albemarle Sound, an additional steamer being chartered and a large force of spawn-takers and assistants employed. The results were far in excess of any previous work on the Albemarle Sound, 75,400,000 eggs being collected and transferred to the station from March 29 to May 15. The run of shad was large and the herring catch under the average, thereby rendering conditions most favorable. The temperature throughout the spring was also below normal, another favorable circumstance.

Arrangements were made with Dr. Capehart for securing eggs from the seine fished at Avoca, and from this source 61,195,000 were derived, as measured at the station. From the trap nets, gill nets, and other seines 14,205,000 were collected, nearly 4,000,000 more than the previous season. At Skinner Point there was a decided falling off as compared with the past year, owing probably to adverse winds. The trap nets on the Chowan River afforded but few eggs, but under different conditions it is believed that the yield at this point may be materially increased. Conditions on the Roanoke were unusually favorable, only one freshet occurring during the season; this lasted ten days. The Willow Branch seine, on the Chowan, from which large numbers were collected the year before, was not fished this season, but the gillers on the Roanoke furnished twice the number they

did the previous year, and this field will doubtless prove even more productive in future.

On April 24 the superintendent was relieved from duty, and Mr. J. B. Rogers, fish-culturist, was placed in charge until the close of the season. The egg productions by areas were as follows: From the Chowan River, 1,905,000; Roanoke River, 10,872,000; Albemarle Sound, 62,623,000, a total of 75,400,000. By apparatus the production may be recapitulated as follows: Trap nets, 2,783,000; gill nets, 3,766,000; seines, 68,851,000.

The number of fry produced was 51,280,000, or 68 per cent of the number of eggs received. A study of completed tables of production shows an abnormal loss on 13 lots of eggs between April 8 and May 1. Two of these lots suffered from an electric storm, namely, those on April 30 and May 1. The other 11 lots referred to were selected from the records as representing the largest individual shrinkage, and are as follows:

Date.	Eggs received.	Fry produced.	Per cent of loss.
Apr. 8	2,666,000	1,085,000	52
Apr. 9	380,000	204,000	47
Apr. 10	1,862,000	702,000	63
Apr. 12	3,701,000	1,457,000	61
Apr. 13	1,393,000	579,000	59
Apr. 15	928,000	434,000	54
Apr. 16	1,257,000	526,000	58
Apr. 17	3,458,000	1,762,000	49
Apr. 18	3,465,000	1,265,000	64
Apr. 19	3,360,000	1,107,000	77
Apr. 22	3,405,000	1,400,000	59
Total	25,875,000	10,521,000	

While on the 8,285,000 eggs of April 30 and May 1, killed by an electrical storm, there was a loss of 50 per cent, on the above 11 lots there was a loss of 60 per cent. On all other eggs of the season there was a loss of only 11 per cent, as shown below:

Designation.	Eggs received.	Fry produced.	Egg loss.	Per cent of loss.
Two lots of April 30 and May 1	8,285,000	4,160,000	4,125,000	50
Eleven lots, April 8 to 22	25,875,000	10,521,000	15,354,000	60
All other lots	41,240,000	36,599,000	4,641,000	11
Total	75,400,000	51,280,000	24,120,000	32

Of the eggs collected in 1900, 63 per cent were hatched.

Air bubbles again formed in the water supply to the hatchery on sudden rises of temperature, due probably to rapid expansion of air in the water-pipes between the suction well and hatching-jars; this suggests the desirability of covering the exposed parts of the pipe system with asbestus or some other nonconductor.

The fry were distributed by messengers in North Carolina waters, principally in Albemarle Sound and its tributaries.

The following table shows the daily collection of eggs received and fry hatched and planted at Edenton during the season:

Date.	Eggs received.	Fry hatched and planted.	Date.	Eggs received	Fry hatched and planted.
Mar. 29	165,000	65,000	Apr. 23	1,771,000	1,310,000
Mar. 30	93,000	80,000	Apr. 24	1,375,000	1,090,000
Apr. 1	824,000	558,000	Apr. 25	2,060,000	1,575,000
Apr. 2	827,000	582,000	Apr. 26	2,410,000	1,690,000
Apr. 4	184,000	135,000	Apr. 27	3,725,000	2,765,000
Apr. 5	288,000	190,000	Apr. 29	1,990,000	1,450,000
Apr. 6	1,364,000	983,000	Apr. 30	3,915,000	1,225,000
Apr. 8	2,266,000	1,208,000	May 1	4,370,000	2,900,000
Apr. 9	1,165,000	835,000	May 2	5,140,000	4,190,000
Apr. 10	380,000	176,000	May 3	4,675,000	3,645,000
Apr. 11	1,862,000	1,160,000	May 4	2,835,000	2,360,000
Apr. 12	3,701,000	2,244,000	May 6	2,240,000	2,030,000
Apr. 13	1,393,000	814,000	May 7	2,395,000	2,175,000
Apr. 15	928,000	300,000	May 8	1,040,000	910,000
Apr. 16	1,257,000	700,000	May 9	905,000	825,000
Apr. 17	3,458,000	1,686,000	May 10	190,000	175,000
Apr. 18	3,465,000	2,200,000	May 11	350,000	335,000
Apr. 19	3,360,000	2,253,000	May 15	99,000	79,000
Apr. 20	3,530,000	2,387,000			
Apr. 22	3,405,000	2,005,000	Total	75,400,000	51,280,000

ERWIN STATION, TENNESSEE (ALEX. JONES, SUPERINTENDENT).

The fingerlings on hand at the beginning of the year (130,560 rainbow trout and 2,500 black bass) were carried until fall and fed as usual on a mush made of shorts, corn meal, and beef liver. They were distributed between October and December, the output being 1,258 black bass and 89,125 rainbow trout, not including 5,000 trout held for brood stock.

For the purpose of testing the merits of a manufactured preparation called animal meal, two 1,000 lots of rainbow trout were counted and weighed on October 22 and placed in ponds 9 and 10, where they remained until December 11, when they were again counted and weighed. The food given the fish in pond 9 consisted of a mush composed of 6 parts corn meal, 14 parts shorts, 3 parts animal meal, and 1 of salt. During the period mentioned the fish in pond 9 consumed 96 pounds of this material, the cost of same being $1.31, and on December 11 they were found to have made a gain of 3 pounds, their weight on October 22 being 6¾ pounds. Each pound of fish gained therefore cost 43.6 cents. The fish in pond 10 weighed 7 pounds at the commencement of the experiment, and when taken out on December 11 showed a gain of 8½ pounds. In this pond 96 pounds of food were used, costing $1.58, making the cost of each pound of fish gained 19 cents. The preparation given this lot consisted of 3 parts shorts and corn meal to 2 parts of liver.

Similar tests were made later in the same ponds with two 500 lots, the fish being held until May 20. Those fed on the preparation containing the animal meal were found to have gained 37 pounds, at a cost of 15 cents per pound, and the other lot had gained 77 pounds, at a cost of 8½ cents per pound. As the food used in these experiments was carefully weighed and the conditions were identical, it seems apparent that liver and mush are preferable.

The spawning season of the rainbow trout extended from November 25 to January 13, the collection of eggs amounting to 262,600. Of these, 146,900 were eyed, producing 135,800 fry; 100,000 eggs were also transferred from Wytheville and yielded 84,300 fry, giving a total of 220,000 young trout, 130,000 of which were distributed during the spring. At the close of the year there were 141,233 on hand.

The eggs were of much better quality than those of the previous year, which was attributed to the fact that the adult fish had been kept in a pond provided with a raceway, thus obviating the necessity for seining them, as had been customary in previous years. The fry were fed in the usual way, first on herring roe, then on beef liver, and on liver and mush as they increased in size. They were transferred from troughs to the rearing-ponds as soon as they commenced taking food, as experience shows that they are more liable to diseases of various kinds when retained in troughs. The loss was heavy in June, though lighter than in previous years.

During the winter 100,000 eyed brook-trout eggs were purchased from dealers in Massachusetts, and 92,295 strong, vigorous fry were hatched from them. These did well until they commenced to feed, when heavy losses were experienced. In May 10,000 of the fry were planted in local waters and the remainder, 25,000, were retained for the fall distribution.

The stock of black bass was increased during the fall by the receipt of 54 adults, giving a total of 60 brood fish. These nested in the new ponds, and while it is impossible to correctly estimate the number of fry resulting, it is believed there were over 5,000 on June 30. Large numbers of predatory birds, animals, and reptiles were killed on the grounds during the year.

In addition to the land already owned by the Government, a tract of 40 acres was acquired during the year, and a half acre was leased for a period of fifty years for the purpose of controlling the water supply from its source to the end of the system. A great deal of work was done during the summer with the appropriation of $5,000 made by Congress for the construction of bass ponds and other improvements. The new tract was inclosed by means of a wire fence 5 feet high. The posts to which the wire was fastened were of oak, set 2½ feet in the ground and tarred, the exposed part being painted with oxide of iron and capped with blocks an inch thick, making them as nearly waterproof as practicable. On this tract seven ponds of different dimensions and depths were constructed (Nos. 33 to 39). A watchman's tower was also erected on the ground between ponds 35 and 36, to be used for storing equipment and for the shelter of the watchman during inclement weather. An office was erected for the superintendent between the hatchery and residence, 14 by 22 feet, the hatchery was ceiled and varnished, a number of changes were made in the method of supplying water to the various ponds, and a large number of maple trees were set out on the reservation.

COLD SPRINGS STATION, GEORGIA (J. J. STRANAHAN, SUPERINTENDENT).

Very little fish-cultural work was accomplished during the year, owing to the incomplete condition of the station. The fingerlings on hand in July were distributed during the fall as follows: 275 black bass, 306 warmouth bass, 3,367 bream, and 258 sun-fish.

Efforts were made during the winter to increase the stock of brood fish, and in January the superintendent, assisted by the fish-culturist, made a number of trips to Dead Lake, Florida, and succeeded in transferring 137 black bass and 28 strawberry bass, though fully half of them died from the effects of fungus within a few days after reaching the station. Those that survived spawned freely, but all of their eggs were lost, turning white on the nest within a few hours. Brood fish were secured from streams near the station, among them 34 speckled cat-fish, 24 of which died within three months from fungus.

About 50,000 roaches and pond chubs were obtained from a pond near Greenville, about 14 miles distant from the station, and the fry from these were utilized as food for the young bass.

The adult bass, bream, and cat-fish were placed in the various breeding-ponds, and although it is impossible to estimate accurately the number of fry on hand at the close of the year, it is thought there were at least 10,000 bream and a fair supply of cat-fish. Over 4,000 young black bass had also been counted, assorted, and transferred to the rearing-ponds.

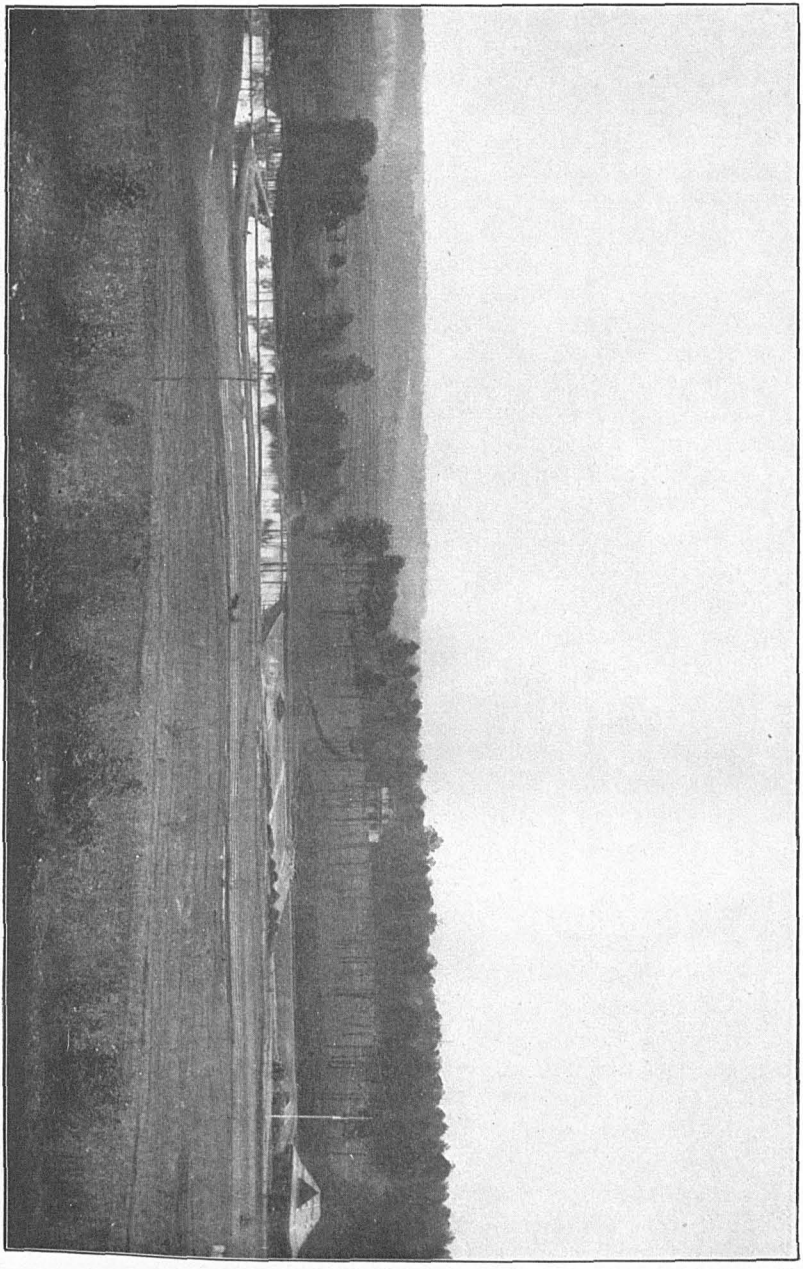
The bottoms of all the ponds at the station have been enriched and planted with suitable vegetation, in order to furnish a certain amount of natural food and also to protect the young fish from the sun and from birds of prey.

After removing the young fish from the breeding to the rearing ponds they were fed about six times a day on finely chopped fish. They were also given as much minute animal life as practicable and a certain amount of live minnows. The loss from cannibalism was not large, as the fish were assorted according to size at regular intervals, but a certain percentage died from starvation, notwithstanding the care exercised in feeding them. For handling the young fish a seine of bobbinet is used.

After removing the fry from the ponds the water was drawn down and the inclosures thoroughly washed with a saturated solution of salt.

Following is a list of brood stock on hand at the close of the year:

Species.	Adults.	Yearlings.
Black bass	108	220
Bream	114	96
Strawberry bass	9	.....
Warmouth bass	20	.....
Speckled cat-fish	44	.....
Carp	16	860
Total	311	1,236



GENERAL VIEW OF BULLOCHVILLE STATION, SHOWING POND SYSTEM.

PUT-IN BAY STATION, OHIO (S. W. DOWNING, SUPERINTENDENT).

The capacity of the hatchery has been materially increased by the construction of an extension 24 feet by 28 feet. This was equipped with three single batteries capable of holding 180 jars each, giving the station a capacity of 1,500 jars. The new jars, which were of the type designed by Mr. Stranahan, and to which reference has been made in previous reports, were found to do fully as good work as the McDonald jar, and are much more convenient to operate, as they are of the open-top pattern. A sleeping room was fitted up in the space over the fry tanks for the use of the fireman, the building was painted, and a number of other minor improvements made.

Early in the fall arrangements were made for the collection of white-fish eggs at various points on Lake Erie, and for penning the fish at Monroe Piers, Michigan, and Put-in Bay, Ohio. Although the spawning season was later than ever before, commencing November 17, indications at first pointed to a very large take. A series of heavy storms occurred shortly after, however, driving the white-fish from the spawning-grounds to deep water, and damaging the nets so badly that the fishermen were compelled to remove many of them for repair, and as the season was far advanced by this time, they were not reset.

Taken as a whole, the season will probably be recorded as the poorest ever known on Lake Erie, so far as fishing operations are concerned. The greatest damage done to nets was in the vicinity of Kelley Island, Put-in Bay, Port Clinton, and Toledo. The Monroe fields, being on the north shore, were protected. The first fish were penned at this point on November 10 and the last on December 3. At Put-in Bay penning commenced on November 8th and lasted until December 5th, 14,739 being penned at the two points, 5,388 of which were females. These yielded 148,334,000 eggs, an average of about 25,000 per fish. The spawning of the fish held in pens continued from November 20 to December 31.

In addition to the eggs derived from the fish referred to above, spawn-takers stationed at Port Clinton, Kelley Island, North Bass, Monroe, and Put-in Bay collected 45,900,000 eggs, bringing the total to 194,234,000. The average cost of these per million was $13.95, the cost at different points varying from 40 cents to $1.99 per quart.

The experience of the past two years clearly demonstrates that it is much cheaper to collect eggs from fish that have been penned than to rely upon collections made by men in the open field, and that the outcome is more certain.

During the fall 21,592,000 white-fish eggs were transferred to the Cape Vincent Station, and 6,000,000 were sent to the State Fish Commission at Erie, Pa. The others were hatched at the station, yielding 125,100,000 fry, which were planted at suitable points in Lake Erie. They were all hatched within a period of 21 days, the first coming out on April 7 and the last on April 27.

In view of the deep interest manifested in the lake-herring work by the fishermen on Lake Erie, preparations were made to operate on an extended scale, but owing to the severity of the season, the prospects seemed very poor. It was learned in December, however, that spawning herring were being taken in large numbers at Vermilion, Ohio, and the spawn-takers, sent immediately to that point, secured 61,760,000 eggs from December 3 to 11. At this time the weather became so cold that the fishermen were obliged to use hot water on their nets to keep them from freezing while being taken on board, and as the hot water spoiled all the eggs with which it came in contact the work was discontinued. Of the eggs collected, 30,820,000 were shipped to the Pennsylvania Fish Commission at Erie, Pa., and the remaining 30,940,000 were hatched at Put-in Bay. The first fry came out on April 6 and the last on April 15, the total number hatched being 20,200,000. These were liberated between April 7 and 17 at points in the vicinity of Put-in Bay.

Early in April spawn-takers were stationed at different points on Lake Erie for the purpose of collecting pike-perch eggs.. The season opened propitiously on the 10th of April, fish being taken in large numbers and in good condition; but a storm of four days' duration commenced on April 19, which not only wrecked nearly all the nets, but roiled the water to such an extent that the fish left the grounds and it was feared that the season was ended. They came back in considerable numbers, however, and the collection of eggs continued to April 30, the season being the longest ever recorded at this station. It was also one of the most successful, as it resulted in the collection of 341,025,000 eggs; 219,525,000 were received from Toledo, 75,300,000 from Monroe, and 46,200,000 from Port Clinton. The cost of these varied from $3.70 to $8.50 per million, Toledo proving the cheapest field of operations and Port Clinton the most expensive. Shipments of pike-perch eggs were made as follows: 10,000,000 to the Missouri Fish Commission at St. Joseph, Mo.; 32,000,000 to the Michigan Commission at Detroit, Mich.; 6,000,000 to the Pan-American Exposition, Buffalo, N. Y., and 2,000,000 to Central Station, Washington, D. C. The balance were hatched at the station, producing 160,087,000 fry, 46,000,000 of which were utilized in stocking inland waters. The remainder were planted in Lake Erie. The hatching period extended from May 6 to May 17, the earliest eggs being in incubation 26 days and the latest 17 days.

Exhaustive experiments, which were again conducted for the purpose of determining the value of starch and swamp muck for preventing adhesion of the eggs, seemed to demonstrate that no special advantage is to be derived from the use of either of these materials, except that it reduces the work of the spawn-taker somewhat, as it prevents the eggs from sticking together, and he does not have to separate them after fertilization has taken place. In conducting these experiments each lot of eggs was kept separate and the conditions carefully noted. It was observed that the same variation in the

quality of the eggs taken by the same person, but on different days, occurred in the use of both muck and starch, some days the quality seeming to favor the use of starch, and others the muck, but on the whole the eggs treated with starch were of superior quality.

The old method of continuously stirring the eggs during the process of fertilization was abandoned, and the following instructions were issued to the spawn-takers:

Take the eggs from one fish (if large), use plenty of milt, do not stir but add a little water, let stand about half a minute and then lower and empty carefully into the keg, which should contain about 2 inches of water. This process should be continued until the keg contains as many eggs as can be carried in it. After the eggs have all been taken, add a little water to each keg, pouring a little on and a little off constantly until the eggs are washed clean of milt and hardened thoroughly, after which the water should be changed as often as once an hour. In adding water it must never be poured directly on the eggs, but against the side of the keg, and care must be exercised not to empty off enough of the water to expose the eggs to the air, as during the entire time they should be covered to a depth of 2 inches. No stirring of the eggs is to be done during the entire process, as this has been found to cause the rupture of large numbers.

NORTHVILLE STATION AND SUBSTATIONS IN MICHIGAN (FRANK N. CLARK IN CHARGE).

The work for the first three months of the fiscal year consisted chiefly in caring for the fish at Northville, maintenance of buildings and ponds at the various stations in Michigan, the construction of additional transportation apparatus, and repairs to the hatching equipment. The lake-trout fingerlings that had been carried through the spring were liberated in July.

In August the superintendent visited Mackinaw, Sault Ste. Marie, Petoskey, Charlevoix, and other points on Lakes Superior and Michigan to arrange for lake-trout collections during the coming season. Spawn-takers were sent to the northern shore of Lake Superior in September to collect eggs, but the work there was discontinued on October 24, as only 704,000 had been obtained. At Marquette 2,375,000 eggs were secured, and at Mackinaw City 200,000, all taken in October, during the open season.

It having been decided, after conference with the State fish and game warden, not to attempt fishing during the closed season at any point except Beaver Island, Mr. H. H. Mancha was sent to that point on October 28, with instructions to collect under the same conditions as heretofore. Arrangements were made with two of the commercial fishermen to fish at such points and such times as might be found advisable, and as a result 10,500,000 eggs were obtained between November 12 and 28, on which date operations ceased. The height of the spawning season extended from November 18 to November 26,

514 quarts being obtained on the latter day from the two tugs. All the eggs, except 1,500,000 delivered to the Michigan Fish Commission from the field, were forwarded to Northville.

During operations at this point the two tugs captured 9,297 lake trout, weighing 69,271 pounds, and by field measurements 1,659.5 quarts of eggs were obtained from them. The trout caught by McCann's tug averaged 8 pounds in weight and those by Martin's a little less than 7, making the average for the whole about 7.5 pounds.

The fishing was under the supervision of the State fish and game warden and his deputies, who threatened to arrest the agents of the Commission, although operations were conducted in accordance with the laws of the State and with an agreement made with the State fish and game warden the previous year. Through the courtesy of the Attorney-General arrangements were made to have the United States district attorney for Michigan defend any employees that might be interfered with by the State authorities.

Of the 13,779,000 lake-trout eggs collected, 7,267,000 were shipped to other points, 5,766,000 of them being eyed before shipment, and 1,501,000 sent out in the green stage. The balance were hatched at Northville, producing 3,910,000 fry, which were distributed in suitable waters during the early spring and summer. The majority were planted just before the absorption of the sac, but 125,000 were held until June, measuring about 2 inches in length when distributed. The total cost of collecting these eggs was $1,200, or about 9 cents per thousand delivered at the hatchery.

The 9,600 brook-trout fry on hand at the beginning of the fiscal year were transferred from the hatchery to the ponds early in July, and when counted again on October 12 they numbered 7,569, showing a loss of 21 per cent. They did well through the winter, but in April they were apparently attacked in the same way as the brook trout of previous years, and the mortality increased to such an extent that the experiment of thinning them by transferring to other ponds was tried; but this seemed to increase rather than diminish the mortality, and Mr. Marsh was sent to the station to make a thorough investigation of the matter. It is believed that the disease is caused by bacteria, and water-tight ponds of stone will probably be constructed for experimental purposes.

As there were no brood fish on hand in the fall, 1,000,000 brook-trout eggs were purchased from dealers in New England and 32,000 were received from Kalamazoo, Mich., in exchange for eggs of the rainbow trout. The eggs developed well, the hatching being done in spring water. The fry began coming out in February and were ready for distribution by the middle of March, at which time 991,250 were planted in the waters of Michigan, Indiana, and Ohio; 10,000 were retained for rearing at the station.

During January and March three consignments of rainbow-trout

eggs, aggregating 88,074, arrived from Neosho and Manchester in good condition and produced 69,000 fry, of which 61,000 were planted as fry early in the spring and 8,000 as fingerlings in June.

There were on hand at the beginning of the year 8,000 yearling Loch Leven trout—500 of the hatch of 1897–98 and about 50 ranging from 6 to 10 years in age. The old fish were not used, as it was found that their eggs were worthless, but 103,800 eggs were obtained from the younger fish between November 1 and December 27. These were handled in the Clark box, spring water being used for the first month, when creek water was substituted. This being much colder than the spring water, retarded the hatching so that they did not commence to come out until about the middle of February. In distributing the eggs, 1,000 were shipped in the green state and 20,000 after the eye-spots appeared; from the remainder, 50,000 fry were hatched and planted in Michigan waters during the spring.

An unsuccessful attempt was made to collect sturgeon eggs on the Grand, Muskegon, and Kalamazoo rivers in western Michigan, and also on the Detroit River near Wyandotte. Mr. Thayer, who had been detailed for this work, conducted fishing operations persistently for several weeks, but succeeded in capturing only three sturgeon.

The following table shows the number of fish on hand at Northville at the close of the fiscal year:

Species.	Calendar year in which fish were hatched.					
	1901.	1900.	1899.	1898.	1897.	1894 or earlier.
Steelheads				1,243	169	
Loch Leven trout		5,583		110	231	15
Grayling			51			
Brook trout	9,500	1,532				
Total	9,500	7,115	51	1,353	400	15

The Detroit hatchery, under the immediate charge of Mr. Thayer, was prepared for white-fish work early in the fall, and on November 17 the first eggs were received from the three fisheries on the Detroit River. These were operated in connection with the Wolverine Fish Company of Detroit, on the same conditions as in the previous year.

At Belle Isle fishing operations extending from November 5 to December 9 secured 6,308 male and 5,865 female white-fish, besides 574 undersized ones, which were returned to the river. Those captured at the upper seine were transferred to the lower grounds, where they were held in pens and crates. At Grassy Island 7,254 mature fish were taken, 4,272 males and 2,982 females, 2,609 of which yielded eggs.

From the Belle Isle fish 139,280,000 eggs were obtained, and from those at Grassy Island 64,280,000, giving a total of 203,560,000. The average yield of eggs per female was 25,679. Two shipments, aggregating 31,000,000, were transferred to the Alpena hatchery, 20,000,000 were sent to Sault Ste. Marie, and 52,000,000 were shipped to other

fish commissions and private individuals. The balance were hatched at Detroit and produced 77,000,000 fry, which were liberated during the month of April.

On March 10 the Alpena hatchery was opened for the reception of 31,000,000 white-fish eggs and 1,000,000 lake-trout eggs, which had been sent to that point to be hatched and planted in Lake Huron. This work was superintended by Mr. Howard Mancha and was completed by May 5, when the station was closed.

In order to reduce the expense of distribution, and for the purpose of stocking Lake Superior, 20,000,000 white-fish eggs and 750,000 lake-trout eggs were transferred to the State fish-hatchery at Sault Ste. Marie, arrangements having been made with the State fish commission for its use from February 1. The white-fish hatched in May with a loss of 10 per cent, and were all planted in Lake Superior with the exception of 3,000,000, which were deposited in Lake Huron, near Detour. The lake-trout eggs yielded 700,000 fry, the loss amounting to only 50,000.

The water at this point during April ranged from 32° to 37° the average for the month being about 33½°. The average for the month of March was 32°. The water was shut off from the hatchery several times during the season, but, as it was only for short intervals, no apparent damage was done.

All the lake-trout eggs hatched by this commission at Alpena and Sault Ste. Marie were transferred from Northville, and the white-fish eggs were shipped from the Detroit River fisheries.

The following table shows the number of eggs collected at Northville and substations, and the number of eggs and fish shipped during the fiscal year, including accessions by transfer from other stations:

Species.	Eggs collected.	Eggs and fish shipped.
Lake trout	13,779,000	11,280,000
Brook trout	1,019,442	1,001,380
Loch Leven trout	103,800	71,026
Steelhead trout		132
Rainbow trout	83,850	72,026
Grayling		63
White-fish	203,560,000	177,495,000
Total	218,546,092	189,919,627

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

The hatching apparatus was overhauled and repaired during the summer, and a number of improvements to the station grounds were made, including the planting of a large number of willows and poplars and the completion of roads. Arrangements were also made with the water and light commissioners of Duluth to furnish the station with water from Lake Superior, this being very essential in hot weather for reducing the temperature of the river water.

The lake-trout work was commenced early in September, as usual, in the vicinity of Port Arthur and Rossport, Ontario; Grand Portage, Minn.; Isle Royale, Ontonagon, Copper Harbor, Montreal River, and Keystone, Mich. The spawning season opened in the vicinity of Port Arthur about September 20, and at the Michigan fields on October 5, eggs coming in from the various points up to and including November 30. The work resulted in the collection of 9,525,000 eggs, all but 3,000,000 of which were taken in Michigan waters. These were transferred to Duluth, and after being eyed 2,100,000 were shipped to the State fish commissioners of Utah, New York, Wyoming, and to stations of the U. S. Fish Commission, the total loss in transit on the entire number amounting to only 2,550. The eggs retained at the station hatched in April, and the distribution of the fry was made between May 2 and June 14.

In view of criticisms which have been made in the past year as to the methods employed in planting fry from this station, the following experiment was conducted: On the 4th of April 10,000 lake-trout fry, 2 days old, were transferred from one pail to another in dippers, each dipperful being allowed to fall 7 feet into a pail containing 6 inches of water. On the 15th this was repeated, the fall being increased to 9 feet, and again on May 5, with a fall of 12 feet. They were distributed the last of May in excellent condition, the total loss during the time they were held being 65. In view of these facts, it scarcely seems possible that the fry could be materially injured by planting from the deck of a vessel running at a moderate rate of speed with a fall of only 2 or 3 feet.

On the 20th of February 15,000,000 white-fish eggs were received from the Detroit hatchery. These hatched between April 20 and 25, yielding 14,600,000 fry, which were planted in Lake Superior at points in Wisconsin and Michigan. Consignments of brook trout and rainbow trout were also received in February, and were hatched with very small losses, the fry being distributed as usual during the month of June.

With the view to the collection of steelhead-trout eggs in the near future an investigation was made in streams tributary to Lake Superior, in which plants of that fish have been made in the past few years. From information gained from anglers in the vicinity it appears that during the past two seasons about 10,000 steelheads have been caught, their weight ranging from one-sixth of a pound to 8 pounds and their length from 6 to 25 inches. It was also learned that their spawning season in these streams commences about May 20. On account of lack of funds no effort was made to collect eggs this year, but 45,000 eyed eggs were received from the Oregon station in June; but as these had been six days en route, during very warm weather, they were of poor quality. The fry were hatched by June 21, and at the close of the year there were 34,290 on hand.

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

The prospects at the opening of the season seemed favorable for a large collection of bass and other fishes. They were particularly abundant in June, and as the river was falling rapidly it was believed and hoped that large numbers would be available for distribution; but on July 19, after several loads of fish had been sent to Mississippi and Indiana, a very heavy rain caused the overflow of the river and all of the ponds and lakes in the vicinity, scattering the fish all through the surrounding country and making it impossible to collect them in large numbers without incurring great expense. As soon as the river had subsided the steamer *Reindeer* was secured from the Illinois commission and vigorous efforts were made to accomplish the work laid out. The operations were very expensive, however, and the season closed before a great deal of the usual territory could be covered. Late in the fall several carloads of adult bass were collected and distributed. The output for the season amounted to 50,108 black bass (fry and adults), 13,345 crappie, and 72 warmouth bass, besides large numbers of the commoner species.

Work was resumed the following May. The services of a gasoline launch were procured, and by the end of June large numbers of fish had been collected and placed in the retaining pools at Meredosia.

MANCHESTER STATION, IOWA (R. S. JOHNSON, SUPERINTENDENT).

Various repairs were made to the buildings, ponds, grounds, and waterway during the spring and summer, the most important being the reconstruction in cement of the old dry wall along the spring branch, which had been seriously damaged by freshets. The new wall was made 1 foot higher than the old one, and the land behind it filled in correspondingly. A new roadway was constructed, which adds greatly to the appearance of the station. Heretofore the retaining tanks at Bellevue have been covered with a temporary shelter, which was taken down at the close of each season and stored with the other equipment, but this year it was decided to construct a permanent building over the tanks, the city council of Bellevue having granted free use of the land for that purpose. The building is a one-story frame structure, 50 by 16 feet, with an extreme height of 15 feet. It stands on a hillside and is supported by white-oak posts, which raise it 6 feet above the ground on the lower side, thus giving ample space under the building for the storage of boats and other large equipment. In one end there is an office and storeroom 8 by 16 feet. In the main portion, which is 42 feet long, are 6 wooden retaining-tanks, 12 feet by 4 feet by 3 feet, intended for holding young bass and crappie until ready for distribution. These tanks are supplied with water from the city works, conveyed through 1-inch pipes under a pressure of 100 pounds. The total cost of the structure was $439.39.

Fish-cultural work was conducted on the same general lines as in previous years, except that the propagation of black bass has been

discontinued entirely, the station depending on collections at Bellevue for its supply of this important fish. The large ponds formerly used for the bass work were devoted to the culture of brook and rainbow trout, with very gratifying results, the adult trout having a much wider range and being able to secure a large amount of natural food.

The brook-trout fry on hand at the beginning of the year numbered 30,800, of which 19,600 were distributed during the fall. The stock of breeders consisted of 1,810 two-year-olds and 500 adults. These fish have been kept in the old bass ponds for several months, and were in excellent condition. From the 487 ripe females available 173,920 eggs were secured, or an average of 359 per fish. They were of excellent quality, and hatched 98 per cent of strong, vigorous fry. On January 18th, 189,420 eyed eggs were received in good condition from Mr. H. F. Hurlbut, of East Freetown, Mass., and in February another lot of 50,000 came in from Leadville, with a loss of only 210. From these eggs, amounting to 413,340, 370,495 fry were hatched, 257,500 being distributed to applicants and planted in public waters during the spring, and 60,000 held for shipment in the fall.

The rainbow trout on hand in July were carried until fall, when 13,635 were distributed, the loss during this time being very slight. The breeders, consisting of 3,600 three-year-old and 1,340 four-year-old fish, yielded the first eggs on December 31, and collections continued until the end of March, 415,330 eggs being secured. The results were very disappointing, as only 588 ripe females were available. The fish are in excellent condition, though, and it is hoped that the yield next year will be considerably over a million. Of the eggs obtained, 126,000 were shipped to other stations and 206,155 were hatched, 124,000 fry being distributed during the spring and 75,000 held for fall distribution.

Between October 27 and November 24 the Loch Leven trout on hand yielded 4,680 eggs, an average of 520 per fish. From this lot 3,830 fry were hatched. The fry on hand at the beginning of the year were planted during the fall in the Maquoketa River, near Manchester, as there were no applicants for this fish.

Several of the 3-year-old grayling reared at the station produced eggs during April and May, but as no ripe males were found an effort was made to fertilize them with milt from the rainbow trout, but without success. Of the 5,000 fry on hand at the beginning of the year, 3,000 were planted in a stream near the station, the loss during the time they were held amounting to 2,000.

All of the brood trout and yearlings were kept as usual during the spring and summer in troughs and nursery ponds, their principal food throughout the year consisting of a mush made of beef liver and shorts boiled in varying proportions, according to the age of the fish, though a considerable amount of minnows and other live food, collected from streams in the vicinity, was utilized in this way.

Very heavy losses of trout occurred again during the spring from

the same disease that attacked them the previous year. On July 16 Mr. M. C. Marsh, who has been detailed to make a systematic study of fish diseases, visited the station for the purpose of investigating the cause of the diseased condition of the adult brook trout, and remained until August 1.

The rock-bass ponds were drawn on August 1, and 6,000 young were transferred to the hatching-troughs for distribution. The fish were not shipped until October 22 and during this time about 50 per cent of them were lost.

Several hundred adult fish were collected near the station during the fall, and early in April 118 of them were placed in Pond V and 117 in Pond Z. The fish were noticed spawning in May, and the first fry were discovered on June 15. As the ponds were not drawn down, no estimate could be made as to the result of the spawning.

On account of the excessive drought during the early spring and summer, and the consequent failure of the Mississippi River to overflow its banks, very little work was done at the Bellevue collecting station. Lakes and bayous from which thousands of young black bass and crappie had been taken the previous year were practically dry, and although a large extent of territory was covered only a small number of young fish could be secured. Work commenced on July 5 under the direction of Mr. Charles Hruby. Fishing continued from July 11 to September 1, during which time 16,089 black bass, 4,570 crappie, 829 yellow perch, 65 sun-fish, 300 pickerel, and 2,274 cat-fish were collected and delivered to the cars for distribution. Work was discontinued on September 1 and the station closed for the season.

During the spring of 1901 the station was opened and arrangements made to commence actual work on July 1.

Fish on hand at Manchester station at beginning of the year 1900–1901.

Species.	Calendar year in which fish were hatched.				
	1901.	1900.	1899.	1898.	1897.
Brook trout	60,000	560	.....	.....	649
Rainbow trout	75,000	.....	2,840	.....	1,140
Loch Leven trout	3,000	.....	10	.....	.....
Grayling	.....	.....	431	.....	.....
Rock bass	.....	.....	.....	.....	235

Air temperatures at Manchester station during the year 1900–1901.

	Min.	Max.	Mean average.		Min.	Max.	Mean average.
1900.				1901.			
July	59	92	78	January	−10	48	24
August	68	95	83	February	−20	38	18
September	40	93	70	March	2	62	36
October	46	86	64	April	32	90	57
November	1	65	30	May	44	90	66
December	0	50	27	June	48	100	79

Water temperature constant at 50.

NEOSHO STATION, MISSOURI (H. D. DEAN, SUPERINTENDENT).

The fish on hand at the beginning of the year were carried until fall with comparatively light losses, and in October the distribution was commenced, the output amounting to 92,600 rainbow trout, 8,037 black bass, 9,345 rock bass, 300 crappie, 2,700 strawberry bass, and 5,730 bream.

At the approach of the spawning season the trout were transferred to breeding ponds, but although in excellent condition, the results were not satisfactory. Once a week the ponds were seined to prevent loss of eggs through the fish not entering the raceways, but despite this precaution the number secured was much smaller than usual. The first eggs were taken on December 10 and the last on March 12, the 655 fish available yielding 473,503, an average of 723 eggs per fish. Of these only 60 per cent were eyed. 184,032 were sent to other stations and to private applicants, and at the close of the year the stock of fingerlings on hand for fall distribution numbered 51,500.

Early in July the black-bass ponds were drawn and 10,968 young fish transferred to troughs placed in the branch stream; 74 per cent of this number were successfully distributed in October and November. With abundance of suitable food there seems to be little difficulty in holding black bass through the summer at this station. Provision was made during winter for separating the breeders from the young fish by partitioning off a small portion of the ponds with wire screens, through which the young might pass and thus escape the old ones. At the close of the year large numbers of young fish were in evidence, but none had been transferred from the ponds.

The ponds containing strawberry bass were not drawn until September, as it is difficult to handle these fish during warm weather without loss, and it was thought best to allow them to remain undisturbed until fall, but only 3,874 were found, and better results might possibly have been secured had the ponds been drawn earlier.

The breeding crappie, 38 in number, were transferred to the ponds in the spring, and for the first time it was possible to observe their spawning habits. Their nests were placed close together and not far from the banks of the pond, 18 nests occupying a space of not more than 10 by 15 feet. In the act of spawning the fish remain nearly stationary, their bellies close together, but their bodies at an angle so that their backs are separated 2 or 3 inches. They will lie this way, bodies quivering, for a few seconds, then separate and take a turn around the nest. Sometimes one fish will visit several nests in succession, but it could not be determined whether one fish spawned on more than one nest. The eggs are smaller than gold-fish eggs, and practically invisible unless drawn up in an examining tube. They hatch in about 50 hours, the fry being so small at first that they can hardly be seen in a pan of water. They are very active, but no screen is small enough to hold them, which explains why so many of them

have been found in ponds below the breeding ponds. It could not be determined just how long the young remain on the nests after hatching, but parent fish watch the nest very closely for two weeks or more. It is not certain which parent watches the nest, but they show more vigilance than either the rock bass or the black bass, sometimes biting at the glass tube when it is put down to take up fish or eggs for examination. The water temperature in this pond ranged from 60° to 65° during the spawning season. Nests were observed on April 27, and the first eggs were taken up for examination on May 13.

The rock-bass work of the past season was very disappointing, as for some unknown cause only 9,345 were secured from the ponds. The breeders were placed in three ponds during the spring of 1901, and as large numbers of nests were occupied and many fry have been observed, it is thought that the results will be much better this season.

Sun-fish appeared in large numbers in the ponds during the spring, and thousands of them were used for bass food; 5,730 were also distributed to applicants.

After the ponds were drawn down in the fall ponds Nos. 1, 2, 3, and 4 were entirely rebuilt, and a number of others were materially improved. A cement walk, over 1,000 feet long, from the residence to the small gate on the north side of the grounds, was constructed, and two fine cement bridges over the branch were built. This work has improved the appearance of the station very much.

Congress having made a special appropriation of $7,500 for reconstructing the hatchery and acquiring land for bass ponds and an additional water supply, steps were taken to purchase the necessary land and to assemble the material for the work of construction.

Number of fish on hand at Neosho at the end of the year.

Species.	Calendar year in which fish were hatched.				
	1901.	1900.	1899.	1898.	1897.
Rainbow trout	51,500	1,500	2,275	940	.....
Black bass	.....	.....	133	.....	155
Rock bass	.....	.....	177	.....	40
Strawberry bass	.....	.....	105	.....	55
Golden ide	.....	.....	.....	.....	11
Total	51,500	1,500	2,690	940	261

Temperature and precipitation at Neosho for the year ending June 30, 1901.

Month.	Max.	Min.	Mean.	Precipitation.	Snow.	Month.	Max.	Min.	Mean.	Precipitation.	Snow.
1900.	°F.	°F.	°F.	*Inches.*	*Inches.*	1901.	°F.	°F.	°F.	*Inches.*	*Inches.*
July	92	50	75.4	4.65	.....	January	70	9	38.9	0.45	.....
August	98	57	77.7	3.50	.....	February	64	12	34.4	1.20	2
September	94	47	73	10.57	.....	March	82	6	46.6	4.54	2
October	88	33	52.6	4.02	.....	April	80	28	54.4	3.12	1
November	78	18	48	3.13	.....	May	85	36	63.9	2.62	.....
December	64	9	38.4	.68	.....	June	98	45	77	1.31	.....

Mean temperature for year, 57.5° F. Total precipitation, 39.79 inches.

SAN MARCOS STATION, TEXAS (J. L. LEARY, SUPERINTENDENT).

To prevent a repetition of the loss of fish and damage to property caused by the overflow of the San Marcos River in 1900 a special appropriation was obtained for the construction of a protection wall along its banks. During the month of August a stone wall 246 feet long and 6½ feet high was built of white limestone, laid loose, 2½ feet at base and 14 inches on top. This work was commenced August 20 and was completed by October 5, at a cost of about $640. A concrete walk 1,200 feet long, 4 feet wide, and gravel walks 400 feet long, 4 feet wide, were laid from the residence to the office, and a number of minor improvements were made to the ponds and buildings.

It became necessary during the year to obtain additional brood fish, as many had been lost during the freshet above referred to. By seining the Blanco and San Marcos rivers 150 black bass were secured and transferred to the station in excellent condition. With the approach of the spawning season they were placed in the spawning-ponds, 24 fish being allowed for each half acre. This number is considered ample for that area, as in stocking bass ponds care should be taken not to allot too many breeders to a pond, it being better to have too few rather than too many. Nesting commenced on January 31, and by February 8 young fish were seen. This unusually early spawning was undoubtedly due to the very mild winter and to the direct flow of water from the artesian well, the temperature of which was 68°. Owing to a sudden cold change late in February, however, nearly all the eggs and fry in the pond at that time were lost. The last nest was noticed on June 17. The majority of the bass still deposit their eggs on the clay banks of the ponds, though the number taking the piles of gravel provided for this purpose is increasing annually.

The transfer of fry from ponds to distributing tanks commenced in April and continued to the end of June, 89,600 young being handled during this period. In making transfers a seine of bobbinet is used, and no fry under 1½ inches in length are removed from the ponds.

No change has been made in the method of feeding, the flesh of crawfish and fish ground very fine and then screened through a fine sieve being the principal material. When they could be obtained water fleas were given for a change in diet, and as the fry became older large numbers of small minnows were fed them. The brood-fish are always fed regularly throughout the spawning season, as it not only keeps them in good condition, but tends to tame them and allows opportunity for close observation.

Of the rock bass brought from Neosho six remain. These, with the 17 yearlings saved from the flood, were placed in a breeding pond in the spring, and at the close of the year many thousand young were visible. They commenced spawning about the middle of March, and nests were noticed as late as June 22.

The strawberry bass transferred from the same station also suffered heavy losses, though the six remaining of this lot are in fine

condition. They commenced spawning late in March, and it is expected that there will be a considerable number of young available for distribution. This fish is much more hardy than the crappie and, unlike it, will thrive in clear water.

The breeding crappie were placed in a pond about an acre in area, together with 26 adult carp for keeping the water in a slightly muddy condition, which is apparently essential in the propagation of this species. About the middle of June a haul of the seine in this pond resulted in the capture of nearly 1,000 fry 2 to 3 inches long. Crappie were also placed in several other ponds and tanks in the vicinity, but owing to the drought the water in them dried up and the fish had to be removed. The spawning season of crappie at this station extends from the latter part of March to midsummer, and under favorable conditions fish from 12 to 16 months old will spawn during the fall.

The bream, of which there are 45 adults, have proven very productive, grow rapidly, and are especially well adapted for small ponds. They were placed in Pond P in March and commenced spawning in April. A peculiarity of these fish is that their spawning extends throughout the entire summer and early fall.

As usual, a great deal of attention has been paid to providing the various forms of fish food. Carp and mud shad were cultivated for the black bass and crappie, and shrimp (*Crangon vulgaris*) have been introduced in the ponds containing bass and bream, and this year furnished a large amount of excellent food for the adults and young. During the summer shrimp in large numbers and an occasional salamander came up from the artesian well.

Many aquatic birds, snakes, and turtles have been killed, the ponds proving an especially great attraction to wild ducks of different varieties during the winter. Crawfish and bullfrogs were also very numerous and furnished a valuable supply of food for the fry.

The station has been very free from diseases of all kinds until this year, when fungus attacked a lot of 1,000 crappie transferred from a pond in the vicinity. The water in this pond was quite muddy and the temperature high, and fungus made its appearance very shortly after their transfer to the station in water at 75°. During the spring fungus also developed in the five ponds supplied by the artesian well, killing a number of the adult black bass and about 30,000 young before it could be checked. This was believed to have been caused by the cold weather killing the upper portion of the very dense growth of water plants, and partly also to the poor circulation of the water, the flow from the artesian well being very light during that period. The plants were all cut out of the ponds, and while the water was very low salt was applied, about half a pint for each square foot of surface at the bottom and sides being allowed. The fish were also taken out and immersed in a bath of strong brine. Though very seriously affected, they commenced to improve at once under this treatment. and the fungus disappeared in a very short time.

The station furnished for distribution during the year 89,985 black bass, 12,770 crappie, 8,090 rock bass, and 7,595 bream. The distribution was made by the station employees, and extended from July 2 to October 3, 1900. It was again resumed the following May and continued to the close of the fiscal year, the total cost of this branch of the work amounting to $778.06. In making this distribution 36,162 miles were traveled, 31,555 of which were free and 4,607 paid.

With few exceptions the railroads of the State not only furnished free transportation, but rendered every assistance possible to the employees engaged in the work. To the officers of the International and Great Northern Railroad special thanks are due for courtesies.

LEADVILLE STATION, COLORADO (E. A. TULIAN, SUPERINTENDENT).

From December 20 to June 1 the superintendent was absent from the station, his duties being performed by the foreman.

At the commencement of the fiscal year there were on hand 500,000 fingerling brook trout, 270,000 of which were planted in July, 10,000 in August, and 28,000 in October, the losses during this time being about 38 per cent.

The usual arrangements were made for the collection of brook-trout eggs in the fall from lakes belonging to private individuals, and the results of the work are embodied in the following statement:

Source of supply.	Spawning season.	Eggs collected.	Loss.	Fry hatched.	Eggs shipped.
			Per cent.		
Station brood fish	Oct. 10-Dec. 7	272,700	47.5		142,100
Uneva Lake	Nov. 1-Nov. 25	275,900	48.5	143,800	
Smith's Pond	Oct. 24-Nov. 17	155,900	30	109,000	
Ridgway's Pond	Nov. 16-Nov. 20	569,800	9.8	514,800	
Wellington Lake	Oct. 31-Nov. 24	1,818,400	48	675,000	267,900
Young's Pond	Oct. 25-Nov. 11	610,000	21.1	481,500	
Decker's Pond	Dec. 11	116,600	70.6	32,000	
Musgrove's Pond	Oct. 23-Nov. 30	454,500	44.6	251,500	
Derry's Pond	Oct. 28-Nov. 28	439,000	40	274,000	
Black Lake	Nov. 17	46,000	81.5	8,500	
Total		4,759,800		2,489,600	410,000

On May 20, when all the eggs had been hatched, there were on hand 1,995,000 brook-trout fry, 887,300 of which belonged to the Commission and 1,107,700 to the parties who had furnished the eggs. Between this time and the end of the fiscal year 41,000 of those belonging to the Commission, or 4.5 per cent, were lost and 585,000 were planted, leaving on hand 260,800.

Last year it was believed that the heavy loss of brook-trout eggs was largely due to their having been derived from 2-year-old fish, and the results this year seemed to confirm this theory, as the loss on each lot, except those taken from the brood-fish at the station and the Uneva Lake fish, was from 10 to 60 per cent less than last year. On the station eggs the loss was 2 per cent greater than the previous year, but this was attributed to the fact that the stock is getting very old. The loss on the Uneva Lake eggs, however, was 38 per cent

greater than last year, and this is inexplicable, unless it was due to close inbreeding of the trout for the past eight years, or to the fact that nearly all of the trout were caught out of the small lakes early in the season and held in ponds in a somewhat crowded condition, and were injured by frequent handlings. There is no doubt that much handling of the fish injures the quality of the eggs, hence the greatest care is exercised in collecting and in fertilizing them.

Shipments of eyed brook-trout eggs, aggregating 410,000, were made to other stations of the Commission, State fish commissions, and private hatcheries, and with one exception they reached destination in excellent condition, the loss en route ranging from 33 to 600 eggs on shipments of 25,000. The exception referred to was a consignment to Tokyo, Japan, which hatched en route because the ice chamber in the top of the case was not kept filled with ice.

On July 1 there were 120 three-year-old Loch Leven trout in stock, but 52 died during the year, and the bulk of the 2,000 fry on hand at that time were also lost. The only eggs of this species collected were 20,700, taken at Uneva Lake on November 25; of these 6,700 died and the remainder were hatched, half the resulting fry going to the owner of the lake. At the close of the year there were 5,790 fingerlings on hand.

The rainbow-trout work in Colorado is very discouraging, notwithstanding the fact that the few planted in the streams of the State by the Commission and the State commission have done exceptionally well. Nearly all of the eggs collected this year from the fish at the station were lost, and out of a collection of 25,000 obtained at Lake Loveland on March 27, only 6,000 were saved. These were shipped to Buffalo, reaching destination in excellent condition, and were hatched in the Fish Commission exhibit. In February 50,000 eggs were received from Manchester station and hatched with a loss of 10,000. During May and June 17,000 fingerlings were planted, and at the close of the year there were 6,795 on hand.

The 21,400 lake trout on hand, resulting from eggs shipped from Northville and Duluth, were planted in suitable lakes in Colorado during the months of July, August, September, and October.

The steelhead fry from eggs shipped from Rogue River, Oregon, in May, were planted in August and September, with a loss of only 800.

The collection of black-spotted trout eggs continued into July, but at the beginning of the year there were 1,881,300 on hand. They finished hatching early in August, with a loss of 131,800, or about 7 per cent, and the loss of fry up to the middle of August was 11.5 per cent. The owner of the Grand Mesa lakes received 310,000 fry as his share, and the remaining 1,231,000 were the property of the Commission; 820,000 of these were planted in September and 360,000 in October, with a loss of about 4 per cent of fry, making a total loss of only about 25 per cent on the entire collection of eggs obtained at the Grand Mesa lakes.

These eggs are obtained under very adverse conditions, as they must be hauled 35 miles over the roughest kind of mountain road and then transferred by rail a distance of 230 miles, with the thermometer ranging from 100° to 110° in the shade. During June, 1,317,000 eggs were collected at these lakes and taken to Leadville. The loss on them to the close of the year was 1,800, or about 0.12 per cent.

The fish and fry on hand at the close of the year is shown by the following table:

Species.	Calendar year in which fish were hatched.				
	1901.	1900.	1899.	1898.	1897.
Brook trout	260,800	.....	.....	.....	65
Loch Leven trout	5,790	410	.....	.....	68
Black-spotted trout	.....	.....	.....	.....	21
Rainbow trout	6,795	1,525	.....	.....	.....
Grayling	.....	.....	.....	76	.....

SPEARFISH STATION, SOUTH DAKOTA (D. C. BOOTH, SUPERINTENDENT).

During the summer the special appropriation of $3,500 was expended in improving the grounds, building ponds, constructing a storm channel for protecting the lower grounds from flood, and laying a 4-inch iron pipe from the upper spring to the hatchery, a distance of 700 feet.

The fish reared at the station were distributed in the fall to applicants in South Dakota, Wyoming, and Montana, the output being 210,000 brook trout and 10,000 Loch Leven trout.

With the approach of fall arrangements were made, as in previous years, for collecting eggs of the brook and Loch Leven trout from public and private waters in South Dakota and Wyoming, and a temporary station for eying eggs was established at Sand Creek, Wyoming. Several thousand trout about 10 inches in length were handled here, yielding 302,200 eggs, which after being eyed were transferred to Spearfish. The water temperature at this creek stands uniformly at 54° F. throughout the year, so that the eggs were ready for shipment in 28 days. Collections were also obtained from ponds controlled by private individuals, and these, with the eggs produced by the brood fish at the station, gave a total collection of 1,062,650 brook-trout eggs and 50,470 Loch Leven eggs.

Of the brook-trout eggs, 201,000 were shipped as follows: 100,000 to Bozeman, Mont.; 50,000 to Duluth, Minn.; 51,000 to the Wyoming Fish Commission. The rest were hatched at the station and produced 654,000 fry, of which 250,000 were returned to the owners of the brood stock. On the remaining 408,000 there was a loss during the spring of 133,000, and 195,000 were planted in waters of South Dakota, leaving 80,000 on hand at the close of the year.

The Fish Commission's share of Loch Leven trout eggs amounted to 36,100. These were hatched and 30,000 young fish were distributed during the spring, leaving 5,000 on hand at the close of the year.

During the winter arrangements were made with Mr. S. H. Campbell, the superintendent of the Wyoming commission, for the collection of rainbow-trout eggs on Laramie River. Several hundred large rainbow trout were secured about 24 miles southwest of Laramie and placed in retaining-ponds, but a sudden rise of the river washed away the pond and the fish escaped, but in the meantime 25,000 eggs had been secured. These were transferred to the station and produced 18,500 fry.

At the request of the acting superintendent of the Yellowstone National Park, arrangements were made in April for an investigation of the trout streams, with the view to the establishment of a substation for the hatching of trout. Accordingly, the superintendent examined the Gardiner River and Lupine, Lava, and Glen creeks, but owing to the large number of bowlders and the swift, strong current, which prevented the use of a seine, it was found impracticable to operate at any of these points. Accompanied by an escort of six men, a trip was made through the park in the attempt to secure rainbow trout in the Gibbon River from Norris Basin to a point a mile above the Virginia Cascades, but none was captured, though a fisherman was seen with two small ones taken from the cascades.

The trip was continued to Grand Canyon and a camp was made on May 18 at the mouth of the Otter Creek along the Yellowstone River, where the first fish of the season had been captured on May 15 by Lieutenant Amos. Seining operations were conducted for several days in the Yellowstone and hundreds of *Salmo mykiss* taken. These, however, were found to be affected by parasites and not very gamy. As soon as the road crew could shovel out the road, which was full of snow, the trip was continued to Yellowstone Lake, where the small streams entering the lake from the west were found to abound in trout. Four troughs were constructed, and after building a reservoir 300,000 eggs were taken and placed upon the trays. An investigation was then made of all the streams entering the lake from the lake outlet to West Thumb Bay, with the view of obtaining a more central point for establishing an egg-eying station, and it resulted in the selection of a site 2 miles north of West Thumb Station, on a stream not over 5 feet wide, but containing a sufficient supply of water of good quality. This stream was alive with *Salmo mykiss*, averaging 15 inches in length and weighing about 1¼ pounds. Sufficient trough capacity for eying 2,000,000 eggs was provided, and after building a substantial dam and flumes, the fish were caught and eggs taken. Fish were so plentiful that they were frequently taken with the hands in the shallow water. By the 30th of June 1,200,000 eggs had been taken and placed on trays at this station.

Nearly all of the small streams entering the lake are full of *Salmo mykiss*, and it is recommended that the Commission cooperate with the commanding officer in erecting a building at or near West Thumb for the collection and hatching of black-spotted trout eggs, as it is believed that 5,000,000 could be taken each season.

BOZEMAN STATION, MONTANA (JAMES A. HENSHALL, SUPERINTENDENT).

In August and September the fish that had been carried through the summer were shipped to applicants in Montana, Idaho, Oregon, and Washington, the distribution being made principally by one of the cars.

In November 108,000 brook-trout eggs were collected from the brood fish at the station. In addition to these, 100,000 were received from Spearfish, S. Dak., and 88,000 from Leadville, Colo., making a total of 296,000. During the spring it became necessary to remove the fry hatched from these eggs to the nursery ponds, in order to make room for the grayling and native-trout eggs, and the consequent loss was considerable, but the fingerlings on hand at the close of the year were healthy and growing rapidly.

The eastern brook trout at this station are subject to a peculiar disease when they reach the age of two years, and at spawning time it is very pronounced. It commences with the formation of encysted tumors on the lower jaw, usually at the end of the mandible; this is succeeded by a slimy condition of the entire body in some cases, with engorgement of the gills, though in others the fish seem to be quite normal with the exception of the tumors. All the specimens affected have died, about 30 per cent of the 2 and 3 year old fish having been lost. As no other species has been similarly affected it is thought that the disease is inherent and not due to local conditions.

During the winter the usual arrangements were made for collecting eggs of the native trout at Henry Lake, Idaho, and grayling eggs at Redrock, Mont. The season at the former place did not result as successfully as heretofore, only 730,000 eggs being secured, as against 1,440,000 in the season of 1900. This was attributed to scarcity of fish, 50 tons of trout having been taken from the lake and shipped the previous winter. The station was opened on April 4, and the first eggs were taken on April 22. The 592 fish handled yielded an average of 1,235 eggs. About 370,000 of the eggs were transferred to Bozeman, 150,000 were shipped to other points, and 115,000 fry were hatched and planted at the lake. The last eggs were taken at this place on June 3.

At Redrock Lake, where Mr. G. H. Tolbert was in charge, a new and larger trap was put in lower down the creek and a new dam was built. On account of the cold backward season, the run of grayling commenced later than usual, but the fish were very numerous, and it is probable that twice as many eggs as were taken might have been secured had it been desired. Operations at this point began April 4th and closed June 21st, 2,400,000 eggs being secured. From these, 1,362,300 fry were hatched and planted in the lake and its tributaries, 526,000 eggs were transferred to Bozeman, and 390,000 were shipped to other points. The spawning season lasted from May 11 to May 23.

The eggs transferred to Bozeman hatched between June 7 and 29, producing 293,000 fry, an unusually good percentage.

If the washings from an emulsion of fresh liver are fed to the fry

while they are yet in the hatching-troughs and before the absorption of the yolk sac, it has been found that they can be removed to the nursery ponds as soon as they begin to swim and that their physical condition is improved. This food is placed in the aerating tray at the head of the trough, and soon finds its way to the fry at the bottom.

A collection of 33,000 steelhead eggs was made from the four-year-old fish confined at the station and from a few captured in Bridger Creek. Of these, 12,000 were sent to the Pan-American Exposition at Buffalo; the rest were hatched at the station, and at the end of the year there were 6,600 fingerlings on hand.

The following table shows the number of fish and eggs of all kinds on hand on June 30, 1901:

Species.	Calendar year in which fish were hatched.				
	1901.	1900.	1899.	1898.	1897.
Brook trout	202,000	.....	.....	637	489
Black-spotted trout	*293,000	.....	.....	3,691	119
Steelhead trout	6,600	.....	.....	149	2,030
Rainbow trout	.....	.....	1,600	.....	.....
Grayling	293,835	.....	50	.....	.....
Total	795,481	.....	1,650	4,477	2,638

*Eggs and fry.

There was but very little rainfall during the summer of 1900 and a lack of snow the previous winter, consequently the mountain streams were much diminished and the supply of water in the reservoirs was considerably lessened; but, by utilizing the creek water as far as possible, no great inconvenience was experienced. In order that the work of the station be not jeopardized by an insufficient water supply, a connection was made between the creek water pond and the main supply pipe from the spring reservoirs, by a 12-inch wooden pipe. With this arrangement either spring or creek water can be used for the hatchery and ponds. The creek water is perfectly clear for nine months in the year, and never exceeds 60° F.; hence it is really preferable to the spring water after the eggs are hatched, as it contains plenty of food and air, in which the spring water is entirely deficient. In using the creek water in winter, it can be tempered by the water from the warm spring, which has a uniform temperature of 77°; accordingly the spring has been partly inclosed by a wall, which it is proposed to carry to a height of 4½ feet, whereby the warm water can be flumed into the creek water ditch and thus prevent its freezing in winter.

BAIRD STATION, CALIFORNIA (G. H. LAMBSON, SUPERINTENDENT).

At the beginning of the fiscal year the racks were in place and the river closed to the ascent of salmon above the station. Numerous repairs were made to the buildings, a new spawning-house was constructed, and provision was made for canning salmon as fish food.

Experimental hauls of the seine early in August showed that the run of salmon was very light. On the 18th, in four hauls, nine ripe females were secured, and on the next day 36,000 eggs were taken. Fishing continued until the 22d of September, during which time 215 hauls of the seine were made, 4,588 females and 3,633 males being captured. Of the females 520 proved ripe and yielded 2,021,000 eggs, 517 males being used in fertilizing them. The fish averaged 3,887 eggs each, much less than those of the previous year, which averaged about 5,000. The fall run of salmon was very light and no ripe fish were taken in the seine, though several hauls were made at intervals during the season. From traps in the upper rack 26 ripe fish were collected, which yielded 118,500 eggs, an average of 4,557.

The practice of killing the salmon before spawning was not followed, as it causes the loss of large lots of eggs. Fully 10 per cent of the females impounded early in the season, and 5 per cent during the latter part, were not sufficiently ripened, though eggs were pressed from them when taken from the seine. If the fish killed prove to be unripe, the entire lot of eggs is lost; but it requires as much time and trouble to try them as to accomplish the work of spawning. When there are only a few salmon on hand and an abundance of time, they are killed before stripping, if there is no doubt as to their being ripe; but where large numbers are to be handled this method should not be employed.

The eggs were fertilized in the same way as last season—that is, the pan in which they were to be caught was dipped in water and moistened; the eggs and milt were then taken simultaneously and mixed thoroughly with a feather or the hand. About half a pint of water was then added and the eggs again stirred, after which they were washed and poured into a large bucket, where they were left until the eggs separated. After becoming free they were placed in baskets in the hatchery, 25,000 to the basket, it having been found that they do better allotted in this way than by putting 40,000 to the basket, as formerly. All of the eggs except 8 baskets were picked or washed throughout the time of incubation including the tender stage, and with very successful results compared with the 8 baskets which were kept covered during that time, the experiment seeming to demonstrate that constant picking and washing improves them to some extent.

All of the eggs from the first run were transferred to the California Fish Commission hatchery at Sisson, and arrived in good condition.

Besides the eggs collected in the fall, 1,000,000 were received from Battle Creek, making a total of 1,118,500 left in the hatchery. Of these, 25,000 were shipped to Mr. L. Z. Leiter, Lake Geneva, Wis., and 1,000 to Professor Dudley, of Stanford University. Those retained commenced hatching November 28, and by February 16 they were all out. Of the 1,056,250 fry hatched, 166,680 were lost. The others were planted in the McCloud River between March 15 and May 18.

During the fall several attempts were made to can salmon as fish

food before a successful solution of the problem was reached. A number of fish received from Battle Creek on December 7 were canned on the 8th, the whole fish being used, including head, tail, fins, and backbone, the contents filling 41 five-pound cans. These were found in good condition when opened two months later, and they probably would have kept indefinitely. This material was given to the fry during December, January, and February, but it did not prove a very satisfactory food, as it was very difficult to divide it properly for the young fish. If ground very fine, it would wash away in the water, and if given in coarse pieces many of the fish would choke and a heavy death rate followed. It is thought that the difficulty may be overcome in future by rejecting the bones, heads, and fins. As the fry became older they took this food readily and seemed to thrive on it, but, as the quantity canned was too small, it was soon consumed, and it became necessary to procure a supply of liver, which, mixed with shorts, was fed to the close of the season, except for a period of two weeks when it was impossible to secure liver, and goat meat was used. This proved very unsatisfactory.

At the request of Hon. W. T. Glascow, the secretary of the marine department, Wellington, New Zealand, the superintendent of Baird station was detailed to take an assignment of 500,000 quinnat-salmon eggs to the New Zealand government. He sailed from San Francisco on December 13 with 14 boxes, each 2⅝ feet long, 1⅜ feet wide, and 2 feet high, the weight of each package being about 230 pounds. The passage was very rough, but considering the difficulties under which the eggs were taken, the length of time en route (31 days), and the 7,059 miles traveled, the shipment was regarded as successful. The total number of eggs lost was 57,500. It was impossible to remove dead eggs, as in the poor light they could hardly be distinguished from the good ones. When such an attempt was made, the fungus was found to have taken such a firm hold on the wire bottoms of the screens that it broke into smaller particles, which, coming into contact with the good eggs, caused it to spread. All attempts at removal were therefore abandoned and an effort was made to prevent its spread by keeping the temperature as low as possible. It is thought the fungus started at Honolulu, where the eggs were exposed to a temperature of 48° for about nine hours, while the freight in the cold room was being unloaded. A quantity of vegetables stored in the cold room with the eggs may have helped in developing the fungus. In loading the cases on the steamer they were raised from the dock and lowered into the ship by slings, five cases at a time, and frequently they were almost on end. This was also done at Honolulu, when removing the eggs, in order to unload freight. In many of the cases the eggs had all jolted to one end, and as the dead and unimpregnated eggs were rather soft, many were broken, thus giving the fungus every possible chance for growth.

While the eggs were in the cold room no ice was used in the cases,

as the temperature was so low that there would have been but little meltage and eggs could not be kept moist by this means. Instead of this the eggs were watered every day after leaving Honolulu, care being taken to have the water of the same temperature as the room. This water was taken aboard ship at San Franciso and Honolulu and no condensed water was used. The isolated car used for transporting the eggs from Littleton to Kurow was a freight car with double walls for keeping out the heat. Ice was packed in the car with the eggs and on arrival at Kurow the interior of the car was cold and a large proportion of the ice remained. As the eggs arrived in New Zealand during the extremely warm weather of summer, it is not thought that they could have been safely transported without this car, as it is a 12-hour journey from Littleton to Kurow. Only three times during the trip did the temperature of the eggs get above 37° or below 35°—once on December 22, when it was 48°, and once on December 26, when it was 42°; on the 29th it fell to 32°. At such times the temperature was either lowered or raised until it was at 36°, the temperature maintained during the trip. In making the trip the eggs were loaded and unloaded 15 times, and though great care was exercised, they received at times some very hard jolts.

BATTLE CREEK STATION, CALIFORNIA (G. H. LAMBSON, SUPERINTENDENT).

A rack was constructed in August under the direction of Mr. Ledgerwood, and the two retaining racks were placed in position by the middle of the month, so that no salmon could ascend the stream. The station was then left in charge of a watchman until September 23, when the force reported and work was commenced on the ditch and flume. It was found necessary to place new flumes and to make a number of improvements to the mess-house.

As very few fish were noticed in the stream in October, an examination of the mouth of the creek was made, and it was found that a sandbar had formed across it near the site of the old racks, which caused the water to pass through Cottonwood Slough and lessened the flow in the regular channel. The bar was partially removed and the water restored to the old channel. On October 12 a number of hauls of the seine were made and 11 ripe fish were secured. Fishing continued throughout the month whenever the number of fish in the pool warranted, and as a result 865,500 eggs were obtained, though many were of poor quality, owing to long confinement of the fish.

In November fishing was irregular, as the run continued very light, though reports from the Lower Sacramento indicated that the run below Red Bluff was larger than it had been for years. To ascertain the whereabouts of the fish and to learn the cause of their not ascending as far as Battle Creek, two men were sent to make investigations. They found that the river from Battle Creek to Red Bluff was almost barren of salmon, but that the stream from Red Bluff to Tehama was full, the number increasing the lower they went. They also found

that large numbers were spawning on the gravel bars and riffles in that part of the river. This was thought to have been due to the low water for the past several seasons forming good spawning-grounds in the main bed of the river.

In November 2,216,000 eggs were collected and 438,600 in December, a total of 3,520,100 for the season.

A heavy storm occurred during the fall and caused considerable damage, washing out auxiliary racks, spawning weirs, etc., and carrying away about 12 feet of the bank at the east end of the rack.

Of the eggs collected, 461,640 were lost in incubation, several minor shipments were made to the Stockton High School, and 3,079,660 were transferred to the Sisson hatchery of the California commission and to Baird station, including 500,000 sent to New Zealand.

Clackamas Station, Oregon (E. N. Carter, Superintendent).

It having been decided to move the Clackamas station on account of the insufficient supply and poor quality of the water at the old site, a point down the Clackamas River, with a good supply of spring water, was selected during the month of July and the work of constructing a new station was commenced. A hatchery 42 feet by 80 feet, a bunk-house 30 feet by 42 feet, a stable, and other necessary buildings were erected, and by the end of September the station was in readiness for operating. The necessary roadways, bridges, etc., were provided, and all equipment that was of value was moved from the old station, which was then abandoned and left in charge of a watchman at a nominal salary.

At the beginning of the year an effort was made to tag about 1,600 quinnat-salmon fingerlings, but the experiment was a failure, and the fry were marked by clipping the adipose and the upper portion of the caudal fins. This method of marking seemed necessary in order that the fish might be distinguished from a lot of 5,000 marked in 1896.

Preparations were made early in October to receive salmon eggs taken on the Clackamas River by G. H. Oldenburg, which were delivered at the hatchery at 40 cents per 1,000 eyed. From this source 1,725,000 were derived. There were also transferred from the Little White Salmon 3,327,000, making a total of 5,049,000 salmon eggs handled at the station. They arrived in excellent condition and were eyed and hatched with a loss of 429,628. The fry were strong and healthy and commenced feeding about the latter part of December, when they were placed in troughs, 8,000 to each trough. By the end of January all of these fry were swimming and taking food, which consisted of canned salmon of a cheap variety, such as dog salmon, chippings from the gang knives used in canneries, etc. The salmon was put up in gallon cans for the Fish Commission, and was donated by the following-named firms, the cans having been furnished free of charge through the courtesy of Mr. F. P. Kendall, superintendent of the Pacific Sheet Metal Works, of Astoria, Oreg.; J. G. Megler & Co.,

of Brookfield, Wash.; A. Booth & Co., G. W. Sanborne, Columbia River Packers' Association, and Union Fishermen's Cooperative Company, Astoria, Oreg.; F. M. Warren and Mr. Farrell, of Portland, Oreg. This food was fresh and in good condition and the fry throve on it, but owing to the lateness of the season only about 1,000 pounds could be had, and it became necessary to purchase 2,880 one-pound cans of dog salmon. Shortly after commencing the feeding of this food a disease broke out among the fry, causing heavy losses. The fattest and oldest fry died, though they were apparently sound. This disease was undoubtedly due to the food. When first affected the fry would dart back and forth in the troughs as if seeking escape, but after 24 hours they became too weak for further effort and were drawn down against the screen, where they soon died.

Various experiments were tried with canned salmon, in the hope of continuing its use as fish food, but without success. Shortly afterwards the use of liver was begun, and the disease above referred to disappeared. Liver mixed with mush in varying proportions, according to the age of the fry, and seasoned with a small quantity of salt, proved satisfactory and about as cheap in the long run as canned salmon. The mush is a mill product known as "germea," commonly used as breakfast food; it costs nearly twice as much as middlings, but is a stronger and better food. Mixed with ground liver, it separates readily in water and can easily be taken by the smaller fry.

The fry were held as long as possible and were then planted at selected places, where the progress of their growth might be noted as far as possible. It is, of course, to be regretted that it is necessary to plant fry under 2 inches in length, but this is unavoidable owing to the immense amount of space that would be required for the rearing of millions.

With the exception of the affection due to the feeding of canned salmon, there was very little disease among the fry. In the winter, though, there appeared on the yolk sacs of about 1,500 fry what was supposed to be small air-bubbles, about the size of a pea, which held the fry to the surface of the water. They seemed to have no connection with the vital portion of the sac, however, as when pricked with a needle the bubbles would collapse and the fish would return to the water apparently none the worse from the operation. Upon applying a lighted match to the bubbles they would burst with a sharp report, indicating that they were filled with hydrogen gas only. Frequent and strong salt-water baths during the rearing period go far toward keeping the fry in a healthy condition.

In rearing the fry a tank 2 feet deep, 3 feet wide, and 12 feet long, which had been built for the purpose of hatching white-fish, was utilized for carrying about 10,000. The result was very satisfactory, as the fry had a greater depth of water in this receptacle and more room in which to move about, and it can be easily and quickly cleaned. The floor space occupied is also much less than would be required for

four 16-foot troughs, which would safely accommodate only 8,400. It is therefore recommended that tanks be substituted.

During the winter 1,000,000 white-fish eggs were received from Northville and 200,000 lake-trout eggs from Duluth, all of which were hatched and planted in lakes near Tacoma, Wash. From Leadville 100,000 brook-trout eggs were received, which produced 80,000 fry. Of these, 10,000 were planted in Cox Creek, Oregon, and the balance held at the station for rearing. The same number of grayling eggs, transferred from Bozeman, were hatched with a loss of only 8,839, and the fry were planted in the vicinity of Pendleton and Union, Oreg., at the request of the Oregon Fish and Game Association. During the spring the California commission furnished the station with 25,000 rainbow-trout eggs, which produced 23,291 fry. Of these, 5,000 were planted as fry and the remainder are on hand at the close of the year.

ROGUE RIVER STATION, OREGON (E. N. CARTER, SUPERINTENDENT).

During the first part of the year $1,000 was expended in constructions and improvements, the money being furnished by Mr. R. D. Hume, of San Francisco. A residence for the fish-culturist in charge of the station, Mr. J. W. Berrian, and an additional hatching-house, 24 feet by 70 feet, were erected; the grounds around the station were inclosed by a substantial fence. Provision was also made for procuring an increased supply of water from Rogue River, a pump-house being provided, in which a boiler and two small engines were placed, with two centrifugal pumps capable of throwing 600 gallons of water per minute each. In order to reduce the cost of pumping water a tank 20 feet wide, 48 feet long, 10 feet deep, capable of holding 72,000 gallons of water, was also constructed. This can be filled in a very short time by the pumps, and in addition to saving a large amount of fuel, it now requires the services of only one engineer where three were formerly employed. An investigation was made with the view to taking water from the Rogue River through a ditch, but owing to the expense the project was abandoned.

A rack was thrown across the river to stop the ascent of salmon, and by the end of October, when work had to be discontinued on account of high water, 3,303,000 eggs had been secured. Of these, over 500,000 were taken 15 miles below the station with drift gill nets.

An attempt was made to transfer the eggs while green, but those so treated proved almost a total loss, and it became necessary, therefore, to erect troughs for eyeing them near the spawning-grounds.

During November one-third of the eggs obtained were shipped to Mr. R. D. Hume, in San Francisco, from which point they were transferred to his hatchery at Wedderburn, at the mouth of the Rogue River, where they were hatched and liberated in adjacent waters.

The balance of the eggs were hatched at the station, producing 1,850,000 fry, which were held until May 15 and fed on canned fish;

silver salmon and steelhead trout were used for this purpose, being canned in 2½ gallon tin cans, with caps of thin tin. The cans were stacked in a retort and were allowed to remain for 3 hours at a temperature of 254° F., when they were taken out and the vents closed, no salt being used in the process. Canned salmon has proved fairly satisfactory as fish food at this station, and it must be used here, owing to the impossibility of securing other material. Its cost, also, is very light, as it can be put up by men employed for other purposes. It was hoped that the cans might be used over and over for a number of years, but it was found impossible to prevent their collapse while cooling, which renders them valueless for subsequent use.

During the season 14,500 eggs were taken from two female salmon through slits cut in the abdomen, instead of spawning them in the usual manner. Milt was applied before washing the blood from the eggs, and they were then placed in baskets and separate records kept to note the result of the experiment. Only 16 per cent of them were lost during incubation, and the loss in fry prior to their liberation in Rogue River amounted to 221.

The smallest matured female salmon taken during the season, from which 1,800 eggs were secured, weighed before spawning 5¾ pounds, and after spawning 4½ pounds. The length of this fish was 24½ inches.

Efforts were made to collect silver salmon at Elk Creek, but the results were very disappointing, only 133,000 eggs being secured. These were hatched and the fry were liberated in Elk Creek.

The steelhead work commenced on March 1 and was continued until May 18, the total take of eggs aggregating 370,000, which were disposed of as follows: 25,000 were shipped to the Tuxedo Club, New York; 50,000 to Wisconsin; 80,000 to Wyoming; 46,000 to St. Johnsbury Station, Vt.; 45,000 to Duluth Station, Minn. The balance were hatched, and the 65,850 fry resulting were planted in Elk Creek.

LITTLE WHITE SALMON STATION, WASHINGTON (J. N. WISNER, SUPERINTENDENT).

Early in July the station was opened and preparations commenced for the conduct of salmon work in the fall. The hatching apparatus was put in thorough repair, the upper rack was constructed, four traps built, and later on four other racks were placed in position. A small boat, 24 feet long, 6½ feet beam, was provided for use in planting fish, and at the Big White Salmon, which was operated as an auxiliary for collecting and eying eggs, two large racks and a good downstream trap were put in. Racks were also constructed in Tanner and Eagle creeks.

By September 10 everything was in readiness and men had been sent to the Big White Salmon to commence operations. It was not deemed advisable to detail a crew to Tanner and Eagle creeks, as the work at both points was experimental, and it was thought a visit there every few days would be sufficient. This conclusion proved wrong, however, as a visit on September 18 showed that the fish had entered

and were spawning. The superintendent at once purchased supplies for both points and sent down a force of men, but on their arrival it was found that a sudden rise in both streams had carried away the racks. It is now believed that from two to three million eggs can be collected from these streams in future.

On the Little White Salmon the first eggs were received September 12. For the first five days the collections were comparatively small, but they increased daily until September 21, when 1,069,000 were taken. The total collections for the season on the Little White Salmon and the Big White Salmon aggregated 12,840,700 eggs.

The fall run of salmon was reported to be very fair, but the great majority of the fish were caught before they could enter the streams to spawn. According to the Oregon law fishing can be lawfully conducted up to and including August 15, and this condition of affairs operates unfavorably on the work of the station. Another matter for regret is that the Little White Salmon, which is acknowledged as probably the best spawning-ground of the salmon in the Columbia River region, is being ruined by deposits of sawdust. Every possible effort has been made by the superintendent to have this nuisance abated, but so far the results have not been satisfactory.

A few of the fish this season were taken by gill nets and seines, but the great majority were captured by means of downstream traps. These traps were necessarily put in where there was considerable fall of water, and consisted of pickets 20 feet long, placed 2 inches apart, forming a bed in the river. From either end of the upstream end wing dams or racks were built leading upstream and within a few feet of the banks of the river. The ends of the traps pointing upstream were submerged and weighted into position, and the downstream ends were held on horses, about 18 inches above the water. The space between the end of the racks and the shore was left to allow fish to pass upward. Some distance above each rack were deep holes, in which the fish would lie for a few days after ascending. As they ripened they dropped out on the riffles to spawn, and when a sufficient number to warrant it were on the riffles, a seine was passed across the river above them. This was then rapidly hauled downstream for the purpose of frightening the salmon. It is in the nature of a salmon to turn and swim downstream rapidly when startled, and in doing so they encountered the rack, which led them to the trap, where their great momentum carried them out of the water onto the beds, where pickets took the salmon and assorted them, placing males and females in separate pens and returning the green fish to the water.

The spawning operations were conducted as follows: A female was stunned by a blow on the head, after which it was put into a spawning-box and securely tied. The spawn-taker then placed the bottom of the box on the floor and lifted the head of the fish until it was at an angle of about 80°, with the back down. The spawning-pan was held immediately below and close to the vent by an assistant, while the

spawn-taker expressed the eggs. In the meantime a male salmon, which had been gotten in readiness by tying a line securely around its caudal peduncle, was manipulated by a second assistant, who grasped the line near the tail of the fish with the left hand, drawing its head between the knees with the right, thus holding it securely suspended with the belly down. The pan containing the eggs was held immediately below, and the milt expressed by the assistant with the right hand. Eggs and milt were carefully stirred until thoroughly mixed, when sufficient water to barely cover the eggs was added, and the mass again stirred to insure the milt coming in contact with every egg. They were then allowed to remain for 1½ minutes, after which they were washed and transferred to the hatchery in buckets, 15,000 being placed in each bucket.

For the first five days the eggs were picked; they were then covered and allowed to remain undisturbed until about 30 days old, when they were again washed thoroughly and picked at regular intervals until shortly before hatching, when they were distributed in the troughs, 5,000 to each apartment, after which they were tended as before.

The superintendent having been ordered to Washington, Mr. G. H. Tolbert assumed charge of the station on October 22, and the eggs on hand were hatched under his direction.

Of the eggs taken, 4,953,000 were transferred to Clackamas and other stations; 5,620,000 fry were hatched from the balance, and the distribution was commenced on December 7. It is believed that this work could be much more satisfactorily performed with a small steam launch, and it is recommended that one be procured.

As it had been decided to rear as many fry as possible, arrangements were made for a supply of fish food consisting principally of beef liver, ground and mixed with mill feed. Canned salmon was used as an experiment, but as it was not of good quality the results were not satisfactory. The young fish commenced taking food on December 30, and the last of them were planted April 28.

BAKER LAKE, WASHINGTON (H. H. BUCK, SUPERINTENDENT).

Arrangements for the capture of blueback salmon were made, as usual, during the summer by the construction of racks near the mouth of the river. It has been the practice to put in the racks just above the lake to prevent the fish from ascending the stream. For about 2 miles the river runs through an alluvial deposit of gravel and driftwood in several ever-changing channels, and with swift, strong current, often carrying immense trees torn from the banks higher up. The first year of the Commission's work racks were built in five places and by constant attention and repair were kept in place through the season. This year a location nearer the lake was selected, where the river could be closed by two racks, but the principal one was carried away by a sharp rise of water on August 25, and no attempt was made to rebuild it, as it was thought that all of the fish had passed up that

were likely to ascend the river. Furthermore, it was believed that bluebacks would not go above the lake in large numbers, and that the time for testing the matter was opportune; but experience proved that probably over 25 per cent did ascend the river, and after they leave the lake their capture is difficult and expensive.

The first ripe female was taken on September 7, and fishing continued without interruption until October 25, resulting in the capture of 1,140 females, which produced 4,171,000 eggs. No account was taken of the male fish. The eggs hatched without unusual losses, and 3,834,553 fry were liberated in Baker Lake and its tributaries.

At the close of the blueback season fishing for silver salmon was commenced in three creeks tributary to the river, about a mile above the lake, and in a slough or old branch at the head or east end of the lake. By means of traps, seines, and gill nets 78 ripe females were captured before the cold rains and the high stage of the water came. From these 222,000 eggs were collected, which yielded 172,041 fry.

Early in March it was decided to again attempt the collection of eggs of the steelhead trout, and a location on Phinney Creek, about 5 miles from Birdsview and some 30 miles from Baker Lake, was selected and the work of reopening an old road to the site was commenced. A camp outfit was installed in some old ranch buildings near by, and by the middle of the month a rack was completed and net fishing commenced under the direction of Mr. Henry O'Malley. Only a few fish were caught, and it soon became evident that the run of steelheads was over. Explorations on Phinney Creek, Grandy Creek, and the Skagit River did not show any large numbers, all testimony seeming to prove that the principal run had gone up in January.

In accordance with instructions from the office efforts were made to reduce the number of Dolly Varden trout in the lake, as it was believed they were feeding principally on the young salmon fry liberated there. A limited number were killed, but great quantities came up from the Skagit River, and it was soon found to be impossible to materially reduce them without making a systematic effort on the main river.

During the year improved connections have been made with mail and railroad by the construction of a trail down the east side of Baker River and the extension of the Hamilton branch of the Great Northern Railroad to Baker.

Details of distribution.

Species and disposition.	Eggs.	Fry and fingerlings.	Adults and yearlings.
Shad:			
Connecticut Fish Commission, Stratford, Conn		3,210,000	
Hadlyme station, Conn		5,618,000	
Nanticoke River, Seaford, Del		1,860,000	
Brandywine Creek, Wilmington, Del		2,500,000	
Blackbird Creek, Middletown, Del		150,000	
Appoquirimink Creek, Middletown, Del		150,000	
Smyrna Creek, Smyrna, Del		150,000	
Leipsic Creek, Cheswold, Del		240,000	
St. John Creek, Dover, Del		980,000	
Murderkill Creek, Felton, Del		980,000	
Mispillion Creek, Milford, Del		860,000	
Indian River, Millsboro, Del		736,000	
Broadkiln Creek, Nassau, Del		480,000	
Potomac River, opposite Fish Lakes, D. C			2,000,000
St. Marys River, Glen St. Marys, Fla		450,000	
Suwannee River, Ellaville, Fla		451,000	
Aucilla River, Aucilla, Fla		250,000	
Ocklockonee River, Ocklockonee, Fla		450,000	
Little River, Quincy, Fla		450,000	
Chattahoochee River, River Junction, Fla		450,000	
Hillsboro River, near Tampa, Fla		325,000	
Ichetucknee River, near Branford, Fla		375,000	
Santa Fe River, near High Springs, Fla		375,000	
Blue Springs, near Julietta, Fla		175,000	
Peace River, near Bartow, Fla		175,000	
Miami River, Miami, Fla		375,000	
Anclote River, Tarpon Springs, Fla		125,000	
Suwanochee River, near Dupont, Ga		200,000	
Toms Creek, near Alexanderville, Ga		375,000	
Savannah River, near Augusta, Ga		1,125,000	
Tugeloo River, near Folsom, Ga		375,000	
Ocmulgee River, near Macon, Ga		500,000	
Potomac River, off Bryan Point, Md		1,448,000	
Pomonkey Creek, Md		1,810,000	
Accokeek Creek, Md		660,000	
Broad Creek, Md		881,000	
Hunting Creek, Md		481,000	
Piscataway Creek, Md		2,145,000	
Swan Creek, Md		585,000	
Point of Rocks, Md		450,000	
Chesapeake Bay, Battery Haul, Md		2,693,000	
Carpenter Point, Md		2,805,000	
Eastern Flats, Md		3,731,000	
Western Flats, Md		2,476,000	
Channel, Md		6,661,000	
Off Mill Creek, Md		1,208,000	
Western Channel, Md		1,383,000	
Eastern Channel, Md		1,000,000	
Locust Point, Md		563,000	
Susquehanna River, Garrett Island, Md		1,338,000	
Port Deposit, Md		1,275,000	
Frenchtown, Md		1,168,000	
Elk River, Elk River, Md		1,712,000	
Bush River, Bush River, Md		950,000	
Gunpowder River, Gunpowder River, Md		450,000	
Patuxent River, Laurel, Md		750,000	
Pocomoke River, Snowhill, Md		2,500,000	
Miles River, Easton, Md		2,753,000	
Patapsco River, Relay, Md		1,000,000	
Maryland Fish Commission, Salisbury, Md	1,000,000		
Druid Hill Park, Md	4,235,000		
Wankinco River, Wareham, Mass		397,050	
Shark River, Belmar, N. J		450,000	
Great Egg Harbor Bay, Mays Landing, N. J		450,000	
Salem Creek, Salem, N. J		080,000	
South River, Oldbridge, N. J		450,000	
Delaware River, Howells Cove, N. J	6,720,000	11,141,000	
Off Bennett's Fishery, N. J		1,000,000	
Lambertville, N. J		1,580,000	
Milford, N. J		9,054,000	
Hudson River, Catskill, N. Y		7,784,000	
Albany, N. Y		5,372,000	
Delaware River, Callicoon, N. Y		3,230,000	
F. G. Mitchell, New York, N. Y	42,000		
Edenton Bay, Edenton, N. C		6,826,000	
Chowan River, Edenton, N. C		4,394,000	
Avoca, N. C		11,169,000	
Colerain, N. C		2,005,000	
Perquimans River, Hertford, N. C		2,887,000	
Roanoke River, Plymouth, N. C		6,045,000	
Pasquotank River, Elizabeth City, N. C		2,900,000	
Tar River, Washington, N. C		3,000,000	

Details of distribution—Continued.

Species and disposition.	Eggs.	Fry and fingerlings.	Adults and yearlings.
Shad—Continued.			
Trent River, Newbern, N. C		910,000	
Cape Fear River, Fayetteville, N. C		589,000	
Scuppernong River, Columbia, N. C		2,360,000	
Salmon Creek, Avoca, N. C		3,285,000	
Albemarle Sound, Edenton, N. C		5,430,000	
Susquehanna River, Fites Eddy, Pa		450,000	
Peachbottom, Pa		888,000	
Delaware River, Delaware Water Gap, Pa		450,000	
Rhode Island Fish Commission, Providence, R. I		2,249,950	
Pedee River, Pedee, S. C		751,000	
Black River, Kingstree, S. C		750,000	
Waccamaw River, Conway, S. C		500,000	
Sampit River, Georgetown, S. C		500,000	
Cooper River, Monks Corner, S. C		625,750	
Combahee River, Yemassee, S. C		625,750	
Ashepoo River, Ashepoo, S. C		625,750	
Edisto River, Jacksonboro, S. C		625,750	
Savannah River, Woodlawn, S. C		500,000	
Potomac River, off Dove Creek, Va		528,000	
Pohick Creek, Va		1,216,000	
Occoquan Bay, Va		3,758,000	
Hunting Creek, Va		1,137,000	
Nansemond River, Suffolk, Va		450,000	
Total	11,997,000	179,290,000	2,000,000
Quinnat salmon:			
McCloud River, Baird, Cal		889,570	
California Fish Commission, Sisson, Cal	3,402,036		
Clackamas River, Clackamas, Oreg		2,607,759	1,668
Spring Branch, Clackamas, Oreg		1,370,013	
Pond connected with Clackamas River, Clackamas, Oreg		450,000	
Bennett Creek, Clackamas, Oreg		192,000	
Hood River, Hood River, Oreg		380,000	
Columbia River, Hood River, Oreg		42,000	
Shell Rock, Oreg		225,000	
Mitchell Point, Oreg		721,000	
Nicolia, Oreg		21,000	
Ostergards, Oreg		21,000	
Linsley Creek, Oreg		23,680	
Rogue River, Rogue River Station, Oreg		350,000	
Trail, Oreg		1,500,058	
Herman Creek, Herman Creek, Oreg		127,000	
R. D. Hume, Wedderburn, Oreg	1,100,000		
Oregon Fish Commission, Portland, Oreg	1,628,000		
Big White Salmon River, White Salmon, Wash		691,000	
Little White Salmon Lake, Little White Salmon, Wash		1,653,000	
Dog Creek, Dog Creek, Wash		74,000	
Columbia River, Underwoods Landing, Wash		150,000	
White Salmon Landing, Wash		96,000	
Drano, Wash		75,000	
Thirteen Mile Point, Wash		583,000	
Walters, Wash		61,000	
Olsen Creek, Wash		40,000	
Gnat, Wash		40,000	
Sprague, Wash		148,000	
Rock Creek, Rock Creek, Wash		254,000	
L. Z. Leiter, Lake Geneva, Wis	25,000		
Government of New Zealand, Auckland, New Zealand	500,000		
Total	6,655,036	12,785,080	1,668
Atlantic salmon:			
Phillips Lake, Hancock County, Me			10,000
Pleasant River, Brownville, Me			37,700
Penobscot River, Grindstone, Me			63,410
Mattawamkeag River, Oakfield, Me			70,510
Moosetocmaguntic Lake, Bemis, Me			1,000
Phillips Lake, Bangor, Me		10,000	
Fishing Creek, Frederick, Md		4,516	
New Hampshire Fish Commission, Laconia, N. H	200,000		
New York Aquarium, Battery Park, New York, N. Y			100
Fish Pond, Bryn Mawr, Pa			64
Total	200,000	14,516	182,784
Landlocked salmon:			
Connecticut Fish Commission, Windsor Locks, Conn			2,000
Rock Creek, Zoological Park, D. C		4,500	
Spring Brook, Ellsworth Falls, Me			1,000
Rift Pond, Great Pond, Me			1,000
Canaan Lake, Camden, Me			1,000

Details of distribution—Continued.

Species and disposition.	Eggs.	Fry and fingerlings.	Adults and yearlings.
Landlocked salmon—Continued.			
Phillips Lake, Lakehouse, Me			1,000
Lake St. George, Thorndike, Me			2,000
Norcross Pond, Farmington, Me			1,000
King and Bartlett lakes, Farmington, Me			1,000
Clearwater Pond, Farmington, Me			2,000
North Pond, Farmington, Me			1,000
Big Island Lake, Farmington, Me			2,000
Varnum Pond, Farmington, Me			1,000
Little Jim Pond, Farmington, Me			1,000
Sweets Pond, Farmington, Me			1,000
Duck and Junior lakes, Winn, Me			1,000
Decker Ponds, Bingham, Me			1,000
Pierce Pond, Bingham, Me			3,500
Clear Pond, Bingham, Me			1,000
Rowe Pond, Bingham, Me			500
Rowe and Bean ponds, Bingham, Me			1,000
Jewett Pond, Bingham, Me			1,000
Otter Ponds, Bingham, Me			1,500
Jackson Pond, Oakland, Me			1,000
Ellis and McGrath ponds, Oakland, Me			1,000
Roach Pond, Greenfield, Me			1,000
Sysladobsis Lake, Grand Lake Stream, Me			8,000
First Debsconeag Lake, Great Works, Me			2,000
Moose Pond, Hartland, Me			1,000
Lake George, Skowhegan, Me			1,000
Parmacheene Lake, Oxford County, Me			1,500
Water Company's Reservoir, Belfast, Me			1,000
Swan Lake, Belfast, Me			1,000
Moosehead Lake, Greenville, Me			4,500
Holbrook Pond, Holden, Me			1,000
Long Pond, Great Pond, Me			2,500
Long Pond, Bar Harbor, Me			2,000
Tunk Pond, Tunk Pond, Me			1,500
Brewer Pond, Brewer Junction, Me			2,000
Donnell Pond, Franklin, Me			1,500
Lake Thompson, Oxford, Me			1,000
Pleasant River Lake, Cherryfield, Me			1,000
Embden Lake, Monmouth, Me			1,000
Crystal Lake, Waldoboro, Me			2,000
Lake Anasagunticook, Canton, Me			2,000
Wilson Lake, Wilton, Me			1,000
Green Lake, Otis, Me		175,231	41,000
Branch Pond, Dedham, Me		60,000	30,133
Patten Pond, Ellsworth, Me		30,000	8,800
Big and Little Bear ponds, Canton, Me			1,000
Boyden Lake, Perry, Me			3,000
Indian Pond, Shirley, Me			6,000
Twin Lakes, Brunswick, Me			200
Grand Lake, Washington County, Me		20,332	9,303
Grand Lake Stream, Washington County, Me		47,360	16,559
Moosetocmaguntic Lake, Bemis, Me			3,014
Williams Pond, Bucksport, Me		3,000	
Maine Fish Commission, Enfield, Me	15,855		
Billings Pond, Ellsworth, Me		15,000	
John F. Stanley, East Auburn, Me	5,000		
Hampden Pond, Holyoke, Mass			1,000
Watuppa Lakes, Fall River, Mass			2,000
Lake Quinsigamond, Worcester, Mass			1,000
Furnace Pond, Hanover, Mass			1,000
Podunk Pond, Brookfield, Mass			1,000
Chauncey Lake, Westboro, Mass			1,000
Neck Pond, West Barnstable, Mass			1,000
Massachusetts Fish Commission, Northampton, Mass	10,000		
Wilkinsonville, Mass	5,000		
C. C. Wood, Plymouth, Mass	10,000		
William H. Drew, Plymouth, Mass	5,000		
Tehanto Club, Wenaumet, Mass	5,000		
Michigan Fish Commission, Paris, Mich	10,000		
Penacook Lake, Concord, N. H			2,000
Webster Lake, Franklin, N. H			2,000
Lake Tarleton, Pike Station, N. H			1,000
Dan Hole Pond, Center Ossipee, N. H			1,600
Lake Massabesic, Manchester, N. H			1,000
New Hampshire Fish Commission, Bristol, N. H	10,000		
Tuxedo Club, Tuxedo Park, N. Y	10,000		1,000
Lake George, Caldwell, N. Y			10,000
New York Aquarium, Battery Park, New York, N. Y			100
Adirondack League Club, Fulton Chain, N. Y	10,000		
Utah Fish Commission, Murray, Utah	5,000		
Caspian Lake, Greensboro, Vt			11,098
Willoughby Lake, Westmore, Vt			7,047
Big and Little Averill ponds, Averill, Vt			2,099

Details of distribution—Continued.

Species and disposition.	Eggs.	Fry and fingerlings.	Adults and yearlings.
Landlocked salmon—Continued.			
Lake Dunmore, Salisbury, Vt			1,738
Vermont Fish Commission, St. Johnsbury, Vt	10,000		
L. Doyen-Vitry, Brussels, Belgium	10,000		
G. Annville Serebelloui, Milan, Italy	10,000		
Total	130,855	364,423	236,691
Silver salmon:			
Elk Creek, Trail, Oregon		128,000	
Skagit River, Baker Lake, Wash		172,041	
Total		300,041	
Blueback salmon:			
Skagit River, Baker Lake, Wash		3,834,453	
Steelhead trout:			
Eagle River, Berry Station, Colo			20,000
Fryingpan River, Thomasville, Colo			14,000
South Platte River, Buffalo, Colo			13,800
Maize Lake, Hailey, Idaho			3,000
Lake Tesemini, Rathdrum, Idaho			10,000
Portneuf River, Pebble, Idaho			3,000
Morrison Lake, Ellsworth Falls, Me			2,000
Phillips Lake, Lakehouse, Me		5,000	5,000
Alamoosook Lake, East Orland, Me			5,172
Green Lake, Otis, Me			1,370
Catlin Reservoir, Dorsey, Mont			5,000
Picnic Springs, Monida, Mont			5,000
Bridger Creek, Gallatin County, Mont			10,000
Lake Champlain, Rouses Point, N. Y			3,498
New York Aquarium, Battery Park, N. Y			100
Tuxedo Lake, Tuxedo Park, N. Y			2,000
Tuxedo Club, Tuxedo Park, N. Y	25,000		
Clear Creek, Clackamas, Oreg			25,000
Elk Creek, Trail, Oreg		65,850	
Trout Pond, Bryn Mawr, Pa			68
Otter Creek, Vergennes, Vt			900
Newark Pond, Newark, Vt			2,100
Crystal Lake, Barton, Vt			2,100
Mississquoi River, Swanton, Vt			6,600
Lamoille River, Johnson, Vt			1,200
Sheldon, Vt			2,000
Cambridge Junction, Vt			2,000
A. J. McNab, Lake Nebagemain, Wis	50,000		
Wyoming Fish Commission, Laramie, Wyo	80,000		
Total	155,000	70,850	144,908
Loch Leven trout:			
Maquoketa River, Forestville, Iowa			3,000
Fishing Creek, Frederick, Md		9,342	
Long Lake, near Alpena, Mich		9,600	
Torch Lake, Antrim County, Mich		40,000	
Hopkins Lake, Spearfish, S. Dak		5,000	
Fish Pond, Spearfish, S. Dak		5,000	
Fish Pond, Piedmont, S. Dak		5,000	
Spring Ponds, Rapid City, S. Dak		10,000	
Fish Pond, Merritt, S. Dak		5,000	
A. J. McNab, Lake Nebagemain, Wis	10,000		
Wyoming Fish Commission, Sheridan, Wyo			10,000
Total	10,000	88,942	13,000
Rainbow trout:			
Chewacla Quarry Pond, Opelika, Ala			300
Applicants in Alabama			1,500
Sabina, Bear, and Wilderness creeks, Tucson, Ariz			1,000
Applicant at Prescott, Ariz			250
Fern Lake, Russellville, Ark			800
Chicot Lake, Lake Village, Ark			1,000
Lake Chatawa, Lawrence, Ark			300
Hurricane Creek, Bryant, Ark			500
Applicants in Arkansas			800
West Dallas Creek, Ridgway, Colo		2,000	
Willow Run, Jefferson, Colo		1,000	
Prospect Park Lakes, Cimarron, Colo		3,000	
Barnard Creek, Cripple Creek, Colo		3,000	
Sweetwater Lake, Gypsum, Colo		3,000	
Hourglass Lake, Loveland, Colo		5,000	
Soldiers' Home Pond, District of Columbia			12
Panther Creek, Turnerville, Ga			500

Details of distribution—Continued.

Species and disposition.	Eggs.	Fry and fingerlings.	Adults and yearlings.
Rainbow trout—Continued.			
Little Cedar Creek, Cavespring, Ga			400
Bear Creek, Lookout Mountain, Ga			500
Spring Lake, Tunnel Hill, Ga			500
Atherton Creek, Jasper, Ga			500
Applicant at Lovejoy, Ga			500
Notre Dame Lake, South Bend, Ind		5,000	
Spring Lake, Oakland City, Ind		5,000	
Spring Brook, Bristol, Ind		5,000	
Trout Pond, Bristol, Ind		5,000	
Applicant at Lebanon, Ind		2,000	
Spring Creek, Orchard, Iowa			2,000
Sny Magill Creek, North McGregor, Iowa			1,000
Spring Creek and Pond, Riceville, Iowa			1,000
Mill Creek, Bellevue, Iowa			1,175
Maquoketa River, Forestville, Iowa		50,000	
Turkey River, Cresco, Iowa		18,000	
Upper Iowa River, Limesprings, Iowa		18,000	
Willow Creek, Mason City, Iowa		18,000	
Spring Branch, Manchester, Iowa		5,000	
Volga River, Fayette, Iowa		15,000	
Applicant at Manchester, Iowa			60
Spring Pond, Ossawatomie, Kans			500
Lake Walking, Milldale, Ky			500
Crystal Lake, Ryland, Ky			750
Applicants in Kentucky			1,500
Spring Run, Hagerstown, Md			1,000
Whiteoak Run, Oakland, Md			1,000
Deer Branch, Butler, Md			350
Ridgely Branch, Butler, Md			400
Gray Rock Creek, Butler, Md			350
Barren Rock Creek, Rocky Ridge, Md			500
Tributary of Gunpowder River, Texas, Md			350
Spring Brook, Conowingo, Md			400
Branch of Western Run, Glyndon, Md			500
Pretty Boy Creek, Shamburg, Md			250
Price Creek, Philipolis, Md			150
Crabtree Creek, Swanton, Md			500
Pocomoke River, Snowhill, Md			500
Little Gunpowder River, Parkton, Md			200
Browning Dam, Oakland, Md			1,000
Paint Branch, Hyattsville, Md			1,000
Fishing Creek, Frederick, Md		7,816	
Applicants in Maryland			1,100
Maryland Fish Commission, Baltimore, Md	20,000		
Massachusetts Fish Commission, Wilkinsonville, Mass	25,000		
Hadley, Mass	25,000		
W. G. Davis, Boston, Mass	15,000		
L. B. Handy, South Wareham, Mass	20,000		
W. S. Nickerson, Kingston, Mass	5,000		
Bacon Pond, Hyannis, Mass			431
Branches of Rifle River, Westbranch, Mich		5,000	
Pine River, Lincoln, Mich		8,000	
Washington River, Washington Harbor, Mich		10,000	
Red Run, Dorr, Mich		6,000	
Little Long Lake, Harrison, Mich		5,000	
East Branch Ontonagon River, Watersmeet, Mich		5,000	
Coldwater Brook, Freeport, Mich		3,000	
Huron River, Milford, Mich		19,000	
Spring Brook trout hatchery, Kalamazoo, Mich	20,900		
Gill Lake, Duluth, Minn		10,000	
Poplar River, Lutsen, Minn		5,000	
Lester River, Duluth, Minn		4,900	
Sac Creek, Bois d'Arc, Mo			1,500
Spring Brook, Aurora, Mo			300
Spring Lake, Carthage, Mo			1,500
Blue Spring, Bourbon, Mo			12,700
Wittenberg Spring, Steelville, Mo			8,400
Cedar Gap Pond, Cedargap, Mo			8,788
Mountain Grove Pond, Mountain Grove, Mo			8,333
Railroad Reservoir, Willow Springs, Mo			8,734
Bennett Spring Branch, Lebanon, Mo			16,250
Sweetwater Creek, Christopher, Mo			1,500
Indian Creek, Christopher, Mo			1,500
Applicants in Missouri			2,900
Applicant at Leigh, Nebr			2,000
New Hampshire Fish Commission, Plymouth, N. H	25,000		
Lilear Lake, Blairstown, N. J			500
A. M. Bigelow, Branchville, N. J	25,000		
Pecos River, Glorietta, N. Mex			1,000
Mescalero Lake, Tularosa, N. Mex			1,000
Rio Penasco and Julian lakes, Tularosa, N. Mex			750
Mariano Lake, Gallup, N. Mex			1,000

Details of distribution—Continued.

Species and disposition.	Eggs.	Fry and fingerlings.	Adults and yearlings.
Rainbow trout—Continued.			
Rio Ruidosa, Capitan, N. Mex			3,750
Rita Leandra Creek, Maxwell City, N. Mex			1,000
Rock Creek, Maxwell City, N. Mex			1,000
Rita del Ore Creek, Maxwell City, N. Mex			1,000
Rita Bernal Creek, Maxwell City, N. Mex			500
Vermejo Creek, Maxwell City, N. Mex			1,000
Castle Rock Creek, Maxwell City, N. Mex			500
Gonzales Creek, Maxwell City, N. Mex			500
Pena Flor Creek, Maxwell City, N. Mex			500
Bonita and Eagle creeks, Alamogordo, N. Mex			1,375
Irrigation Canal, Espanola, N. Mex			300
Applicants in New Mexico			700
Montague Stevens, Magdalena, N. Mex	44,960		
Trout Lake, Fayetteville, N. C			600
West Fork Pigeon River, Canton, N. C			600
Deep Creek, Bryson City, N. C			500
Swannanoa River, Swannanoa, N. C			500
Linville River, Linville, N. C			1,000
Mill Pond, Flatrock, N. C			500
Nantahala River, Jarretts, N. C			500
Cranberry Creek, Cranberry, N. C			500
Elk River, Elkpark, N. C			3,000
Punching Fork Creek, Madison County, N. C		5,000	
Applicants in North Carolina			950
R. E. Carson, Sapphire, N. C.	40,000		
W. C. Fisher, Brevard, N. C.	10,000		
C. A. Schenck, Biltmore, N. C	25,000		
Applicants in Oklahoma			2,000
Bear and McKay creeks, Pendleton, Oreg		5,000	
McElhattan Creek, McElhattan, Pa			500
Mountain Stream, McElhattan, Pa			500
Falling Spring Creek, Chambersburg, Pa			500
Bear Run, Bear Run, Pa			2,000
Rattling Run, Tremont, Pa			500
Laurel Run, Center Hall, Pa			500
Spring Branch, Elverson, Pa			500
Millbach Creek, Sheridan, Pa			500
South Mountain Creek, Sheridan, Pa			500
Spring Brook, Sheridan, Pa			500
Beaverdam Run, Hooversville, Pa			500
Tumbling Run, Hunters Run, Pa			300
Tag Run, Hunters Run, Pa			300
Pine Grove Lake, Hunters Run, Pa			300
Mountain Creek, Hunters Run, Pa			300
Laurel Dam, Hunters Run, Pa			500
Beamer Creek, Hunters Run, Pa			300
Fellows Creek, Columbia Crossroads, Pa			500
Speck Lake, Elizabethville, Pa			500
Letort Spring, Carlisle, Pa			900
Spotts Dam, Carlisle, Pa			300
Bonny Brook, Carlisle, Pa			300
Radley Run, Pocopson, Pa			500
Lower Briar Creek, Berwick, Pa			500
Wolfinger Run, Berwick, Pa			500
Loyal Sock Creek, Laporte, Pa			1,000
Spring Lake, Glenside, Pa			500
Haynes Branch, Shinglehouse, Pa			800
East Branch Fishing Creek, Bloomsburg, Pa			300
Trout and Big runs, Bloomsburg, Pa			600
Spring Brook, Newton Square, Pa			500
Trout Run, York, Pa			500
Louck Run, York, Pa			500
Schall Run, York, Pa			500
Spring Garden Run, York, Pa			500
Cooper Creek, New Freedom, Pa			500
Webber Branch, New Freedom, Pa			500
Piney Creek, Altoona, Pa			300
Little Kettle Creek, Carters Camp, Pa			900
Lick Run, Millhall, Pa			500
Old Log Cabin Creek, Honesdale, Pa			500
Big Brook, Honesdale, Pa			500
Middle Fork Creek, Glenhazel, Pa			500
Boyer Brook, Smethport, Pa			300
Daly Brook, Smethport, Pa			300
Barney Brook, Smethport, Pa			300
Blacksmith Brook, Smethport, Pa			300
Walcott Creek, Smethport, Pa			300
Brewer Run, Clermont, Pa			300
West Branch Potato Creek, Clermont, Pa			300
Red Mill Brook, Clermont, Pa			300
Robins Brook, Clermont, Pa			300
Wernway Brook, Clermont, Pa			300

Details of distribution—Continued.

Species and disposition.	Eggs.	Fry and fingerlings.	Adults and yearlings.
Rainbow trout—Continued.			
Palmerville Creek, Clermont, Pa			300
Card Machine Run, Johnstown, Pa			500
Alevins Run, Johnstown, Pa			350
Mill Run, Johnstown, Pa			1,300
Bens Creek, Johnstown, Pa			1,350
Mountain Brook, West Hickory, Pa			500
Miller Creek, Hamburg, Pa			500
Peg Hunters Run, Nanticoke, Pa			300
South Pond Creek, Nanticoke, Pa			600
Badlock Creek, Nanticoke, Pa			600
Roaring Brook, Nanticoke, Pa			600
Harvey Creek, Nanticoke, Pa			900
Fade Creek, Nanticoke, Pa			300
Cease Creek, Nanticoke, Pa			300
David Spring Creek, Nanticoke, Pa			500
Pike Creek, Nanticoke, Pa			300
Roberts Run, Central, Pa			500
Tatman Run, Huntingdon, Pa			300
Stony Creek, Huntingdon, Pa			300
Rattlesnake Run, Wetham, Pa			500
Goose Pond Creek, Cresco, Pa			500
Bear and Sand Runs, Landrus, Pa			2,100
Bear and Bob Creek, Landrus, Pa			900
Bear Run and Rock Creek, Landrus, Pa			300
Sand Run and Rock Creek, Landrus, Pa			300
Rock Creek, Landrus, Pa			300
Beech Creek, Snowshoe, Pa			2,000
Rock Run, Snowshoe, Pa			250
South Fork of Beech Creek, Snowshoe, Pa			250
Egypt Creek, Susquehanna, Pa			300
Brushville Creek, Susquehanna, Pa			300
Mill Creek and branches, Ligonier, Pa			600
Spring Creek, Bellefonte, Pa			1,000
East Lake Creek, Susquehanna, Pa			300
Dunker Creek, Susquehanna, Pa			300
Fishing Creek, Millhall, Pa			1,000
Little Creek, Obold, Pa			500
Oak Creek, Reading, Pa			1,000
Pike Creek, Plymouth, Pa			900
North Branch of Buffalo Creek, Mifflinburg, Pa			600
Limestone Run, Mifflinburg, Pa			300
Molls Hollow Run, Mifflinburg, Pa			300
Weirick Gap Run, Mifflinburg, Pa			300
Raritan Run, Mifflinburg, Pa			300
Panther Run, Mifflinburg, Pa			300
Ridgeview Pond, Derry, Pa			300
South Mountain Trout Run, Richland, Pa			300
Cedar Run, Lockhaven, Pa			300
Hawk Run, Cherrytree, Pa			500
Spring Meadow Dam, Bedford, Pa			500
Wapwallopen Creek, Wapwallopen, Pa			500
Trout Pond, Bryn Mawr, Pa			77
Applicant in Pennsylvania			2,700
Julius E. Brooks, Allegheny, Pa	25,000		
Pine and Smith Fork Creeks, McMinnville, Tenn			500
Flint River, Fayetteville, Tenn			1,000
McFarland Lake, Chattanooga, Tenn			500
East Lake, Chattanooga, Tenn			500
Clark Spring, Chattanooga, Tenn			500
Crosby Creek, Delrio, Tenn			500
Lake Burem, Rogersville, Tenn			500
Fall Creek, Russellville, Tenn			500
Duck River, Lewisburg, Tenn			500
Spring Lake, Meadowbrook, Tenn			500
Camp Creek, Greenville, Tenn			1,000
Little River, Rockford, Tenn			500
Big Stony Creek, Elizabethton, Tenn			500
Fish Pond, Cleveland, Tenn			5,000
Little Doe Creek, Doe, Tenn			500
Clinch River and Sycamore Creek, Lone Mountain, Tenn			500
Whitecak Creek, McEwen, Tenn			250
Fish Pond, Johnson City, Tenn		1,000	
Rock Creek, Rockcreek, Tenn			6,000
Unaka Branch, Rockcreek, Tenn			4,000
Martin Creek, Erwin, Tenn			4,000
Love Branch, Erwin, Tenn		3,000	6,000
Nolachucky River, Unaka, Tenn			6,000
Dry Creek, Unicoi, Tenn			4,000
Dick Creek, Unicoi, Tenn		4,000	
North Indian Creek, Unicoi, Tenn			6,000
Doe River, Roan Mountain, Tenn			6,000
South Indian Creek, Chestoa, Tenn			5,000
Applicants in Tennessee			2,725

Details of distribution—Continued.

Species and disposition.	Eggs.	Fry and fingerlings.	Adults and yearlings.
Rainbow trout—Continued.			
Gageby Creek, Mobeetie, Tex			200
Lake Hayes, Marshall, Tex			125
City Reservoir and Tyler Lake, Fort Worth, Tex			900
Utah Fish Commission, Murray, Utah	44,000		
Beaver Pond, Proctor, Vt			2,998
Colvin Run, Vienna, Va			500
Mill Creek, Blacksburg, Va			1,000
Elk Creek, Crockett, Va			1,000
Private Pond, Crockett, Va			500
Stuffles Run and Pond, Crockett, Va			600
Fish Pond, Ellerson, Va			500
Fish Pond, Granite, Va			500
Middle River, Staunton, Va			1,000
South Fork Holston River, Marion, Va			7,100
Fish Pond, Marion, Va			500
Staley Creek, Marion, Va			1,000
North Fork Holston River, Saltville, Va			2,600
Robinson Pond, Saltville, Va			400
Fish Pond, Howardsville, Va			500
Spring Brook, Delaplane, Va			500
Elk Creek and Pond, Natural Bridge, Va			500
Abraham Creek, Winchester, Va			500
Redbud Creek, Winchester, Va			500
Spring Brook, Winchester, Va			500
Big Crab Orchard Creek, Crab Orchard, Va			500
Laurel Creek, Bland, Va			1,500
Little River, Plains, Va			975
Fish Pond, Amelia, Va			500
Private pond, Fred, Va			500
Mountain stream, Craigsville, Va			500
Spring Brook, Boyce, Va			500
Spring Pond, Dublin, Va			1,000
Big Walker Creek, Dublin, Va			5,000
Page Spring, Boyce, Va			1,000
Reed Creek, near Wytheville, Va			3,000
Tate Run, Wytheville, Va			1,930
Peak Creek, Pulaski, Va			2,400
Little Walker Creek, Pulaski, Va			5,000
Little River and Laurel Creek, Pulaski, Va			3,000
Max Creek, Pulaski, Va			2,000
Cripple Creek, Beverly Furnace, Va			2,500
Tinker Creek, Roanoke, Va			2,600
Glade Creek, Roanoke, Va			2,400
Mason Creek, Roanoke, Va			2,400
Upper Lick Run, Roanoke, Va			1,600
Roanoke River, Roanoke, Va			5,000
Wolfe Creek, Abingdon, Va			2,400
Fish Pond, Etter, Va			800
North and South Forks, Clinch River, Burkes Garden, Va			7,000
Clear Fork Creek, Burkes Garden, Va			2,000
Meadow Creek, Emory, Va		3,000	
Applicants in Virginia			2,850
Rattlesnake Run, Shepherdstown, W. Va			500
Keyer Run, Rowlesburg, W. Va			500
Meadow Brook, Romney, W. Va			500
Rockwell Run, Orleans Roads, W. Va			500
Spring Brook, Martinsburg, W. Va			500
Fish Pond, Charles Town, W. Va			500
Buckhannon River, Hall, W. Va			3,500
J. B. Johnson, Morgantown, W. Va	1,000		
Bear Lake, Minocqua, Wis			2,000
Beef River, Augusta, Wis			1,000
Bridge Creek, Augusta, Wis			1,000
Horse Creek, Augusta, Wis			400
Middle Inlet to Lake Nogueboy, Athelstane, Wis			1,994
Reefer Creek, Orienta, Wis		5,000	
Walter Bailey, Malvern Wells, England	25,000		
Moreton Frewen, Innishannon, Ireland	20,000		
Total	415,860	277,716	343,727
Black-spotted trout:			
Lone Pine Lakes, Fort Collins, Colo			20,000
Trout Lake, Fort Collins, Colo			10,000
Surface Creek, Cedar Edge, Colo			20,000
Lakes and streams, Cascade, Colo			20,000
Eagle River, Berrys Ranch, Colo			55,000
Sweetwater Lake, Gypsum, Colo			25,000
Gypsum Creek, Gypsum, Colo			15,000
Willow Creek, Leadville, Colo			17,000
Rock Creek, Leadville, Colo			15,000
Arkansas River, Leadville, Colo			15,000

Details of distribution—Continued.

Species and disposition.	Eggs.	Fry and fingerlings.	Adults and yearlings.
Black-spotted trout—Continued.			
Halfmoon Creek, near Leadville, Colo.			18,000
Fryingpan Creek, between Norrie and Basalt, Colo.			120,000
Ivanhoe Lake, Ivanhoe, Colo.			10,000
Trout Lake, Soda Springs, Colo.			5,000
Crystal River, Carbondale, Colo.			20,000
South Platte River, Hartsell and Idlewild, Colo.			30,000
North Fork of South Platte River, between Buffalo and Grant, Colo.			150,000
Public Lake, Idaho Springs, Colo.			15,000
St. Vrain River and tributaries, Lyons, Colo.			150,000
West Fork of North St. Vrain River, Lyons, Colo.			10,000
Middle Fork of St. Vrain River, Lyons, Colo.			30,000
Cabin Creek, Lyons, Colo.			10,000
Fox Creek, Lyons, Colo.			10,000
Rock Creek, Lyons, Colo.			10,000
Goose Creek, Wagonwheel Gap, Colo.			25,000
Los Pinos Creek, Osier, Colo.			25,000
Snow Mass Lake, Aspen, Colo.			25,000
Gunnison River, Elk Creek, Colo.			50,000
Cimarron River, Cimarron, Colo.			20,000
South Boulder Creek, Central City, Colo.			50,000
Poncho and Marshall creeks, between Salida and Montrose, Colo.			5,000
Dallas Creek, Dolores and Mancos rivers, between Ridgway and Durango, Colo.			75,000
Lime Creek, Thomasville, Colo.			35,000
Brush Creek, Eagle, Colo.			15,000
Grizzly Creek, Glenwood Springs, Colo.			10,000
Spring Lake, Aspen, Colo.			10,000
Mesa Creek Lakes, Cotopaxi, Colo.			25,000
Maize Lake, Hailey, Idaho.			13,000
Cottonwood Spring, Blackfoot, Idaho.			5,000
Trout Lake, Granite, Idaho			2,000
Portneuf River, Pebble, Idaho.			10,000
Henrys Lake, Henrys Lake, Idaho.		105,000	
Applicant at Henrys Lake, Idaho.		5,000	
George W. Rea, Rea, Idaho.	20,000		
R. A. Osborne, Rea, Idaho.	25,000		
Charles J. Trude, Rea, Idaho.	25,000		
Thomas Turton, Kilgore, Idaho.	50,000		
Sorren Nelson, Kilgore, Idaho.	10,000		
Yellowstone River, Livingston, Mont.			25,000
Bear Creek, Whitlash, Mont.			15,000
Big Spring Creek, Lewiston, Mont.			10,000
Waterdog Lake, Sweetgrass, Mont.			5,000
Trout Pond, Poplar, Mont.			5,000
Sixteen-Mile Creek, Lombard, Mont.			20,000
Little Blackfoot River, Elliston, Mont.			10,000
Spring Pond, Harlow, Mont.			5,000
Trout Lake, Fridley, Mont.			10,000
Cottonwood lake and stream, Martinsdale, Mont.			25,000
Little Casino Creek, Lewiston, Mont.			5,000
Walter Creek, Pony, Mont.			5,000
Smith River, Great Falls, Mont.			5,000
Sun River, Great Falls, Mont.			5,000
Hound Creek, Great Falls, Mont.			5,000
Sheep Creek, Great Falls, Mont.			5,000
Nez Perces Creek, Woodville, Mont.			5,000
Dearborn Creek, Craig, Mont.			12,500
Prickly Pear Creek, Helena, Mont.			12,500
Lake Five, Belton, Mont.			10,000
Vincent Lake, Anaconda, Mont.			10,000
Cottonwood Creek, Bozeman, Mont.			10,000
Fish Pond, Bozeman, Mont.			5,000
Middle Creek, Bozeman, Mont.			10,000
Lyman Creek, Bozeman, Mont.			30,000
East Gallatin River, Bozeman, Mont.			15,000
Trout Lake, Bozeman, Mont.			10,000
Bridger Creek, Gallatin County, Mont.			60,000
Stone Creek, Gallatin County, Mont.			15,000
Bear Creek, Gallatin County, Mont.			15,000
Fish Pond, Whitehall, Mont.			10,000
Johnson Lake, Twin Bridges, Mont.			10,000
Blacktail Creek, Dillon, Mont.			10,000
Roberts Creek, Oka, Mont.			5,000
Lake Palmer, Butte, Mont.			5,000
Lake Wilder, Bernice, Mont.			5,000
Roosevelt Lake, Silverbow, Mont.			5,000
Spring Creek, Drummond, Mont.			5,000
Crater Lake, Dillon, Mont.			5,000
Private Lake, Salesville, Mont.			20,000
Tributaries of Missoula River, Bonner, Mont.			4,800

Details of distribution—Continued.

Species and disposition.	Eggs.	Fry and fingerlings.	Adults and yearlings.
Black-spotted trout—Continued.			
Duck Creek, Lakeview, Mont		5,000	
Spearfish Creek, Elmore, S. Dak			2,000
Fish pond, Spearfish, S. Dak			71
Utah Fish Commission, Murray, Utah	20,000		
Bigelow Creek, Spokane, Wash			5,000
Little Spokane River, Spokane, Wash			5,000
Spring Creek, Spokane, Wash			10,000
Knester Lake, Milan, Wash			10,000
Pend de Oreille River, Newport, Wash			38,500
Fish pond, Wilbur, Wash			1,000
Wyoming Fish Commission, Laramie, Wyo	75,000		
Total	225,000	115,000	1,736,371
Brook trout:			
North Fork Cache la Poudre River, Tie Siding, Colo			5,000
Squaw Lake, Canyon City, Colo			1,000
Pond and stream, Cotopaxi, Colo			10,000
Trout Lake, Twinlakes, Colo			5,000
Beaver Lakes, Dillon, Colo			5,000
North Fork of St. Vrain River, Lyons, Colo			20,000
South Fork of St. Vrain River, Lyons, Colo		20,000	
St. Vrain River, Lyons, Colo		45,000,	12,000
Freeman Creek, Estabrook, Colo			1,000
Van Place Lake, Cimarron, Colo		5,000	
Big Cimarron River, Cimarron, Colo		10,000	
Little Cimarron River, Cimarron, Colo		25,000	
Crystal River, Carbondale, Colo			5,000
Jarvis Creek and ponds, Montrose, Colo		10,000	
Pelton Lake, Montrose, Colo		10,000	
Spring Creek, Montrose, Colo		10,000	
North Fork of South Platte River, Cassells, Colo		15,000	8,000
Bailey, Colo		15,000	11,000
Grant, Colo			3,000
Cliff, Colo		10,000	3,000
Chaseville, Colo		10,000	3,000
Slaghts, Colo			17,000
Shawnee, Colo		15,000	
Buffalo, Colo		15,000	17,000
Pinegrove, Colo		5,000	6,000
Brookside, Colo			6,000
Domerock, Colo		5,000	8,000
Between Grant and Cliff, Colo		40,000	
Tributaries of North Fork of South Platte River, Meadows, Colo			8,000
North Fork of South Platte River and Geneva Creek, Grant, Colo		15,000	
South Platte River, Muldoon, Colo		5,000	
Deer Creek, Bailey, Colo			8,000
Elk Creek, Pinegrove, Colo		40,000	5,000
Kenosha Creek, Webster, Colo		5,000	3,000
Beaver Creek, Webster, Colo			3,000
Jefferson Creek, Jefferson, Colo			5,000
Spring Lake, Jefferson, Colo		10,000	
North Fork of Geneva Creek, Cassells, Colo			3,000
Beeler Creek, Chaseville, Colo			5,000
Brandy Creek, Chaseville, Colo			3,000
Lake Hassell, Idaho Springs, Colo		5,000	5,000
Clear Creek, Idaho Springs, Colo			10,000
Chicago Creek, Idaho Springs, Colo		5,000	
St. Mary Lake, Idaho Springs, Colo		5,000	
Loch Lomond, Idaho Springs, Colo		5,000	
Rock Creek, Cycle Park, Colo			10,000
Chinn Lake and Mill Creek, Dumont, Colo			5,000
Naylor Lake, Georgetown, Colo		10,000	10,000
Grand Lake, Georgetown, Colo			10,000
Clear Creek, Georgetown, Colo			5,000
Buffalo Creek, Buffalo, Colo		5,000	3,000
Wigwam Creek, Buffalo, Colo		10,000	
Bear Creek, Morrison, Colo			8,000
Blue Creek and tributaries, Basalt, Colo		10,000	
Cold Springs Pond, Basalt, Colo		5,000	
Beaver Creek Pond, Gunnison, Colo			5,000
Tributaries of Beaver Creek, Gunnison, Colo		5,000	
Elk Creek, Cliff, Colo		10,000	
Fish Lake, Durango, Colo			5,000
Boulder, Mammoth, and Jenny Lind creeks and Mammoth Lake, Blackhawk, Colo			30,000
Lake Lenore, Ouray, Colo		5,000	
Middle Evergreen Lake, Leadville, Colo			18,000
Reservoir, Victor, Colo		10,000	

Details of distribution—Continued.

Species and disposition.	Eggs.	Fry and fingerlings.	Adults and yearlings.
Brook trout—Continued.			
Woods Lake, Thomasville, Colo		10,000	
Gardner Lake, Fort Collins, Colo		20,000	
South Arkansas River, Salida, Colo		10,000	
Spring Pond, Denver, Colo		15,000	
Trout Pond, Loveland, Colo		10,000	
Buckhorn Creek, Loveland, Colo		10,000	
Fremont Lake, Climax, Colo		5,000	
Blue River, Breckenridge, Colo		10,000	
Price Creek, Shawnee, Colo		10,000	
Tributaries of East River, Crested Butte, Colo		10,000	
Goose Creek, Wagonwheel Gap, Colo		15,000	
Fryingpan River, Sellar, Colo		30,000	
Aspetuck River, Reading, Conn		4,995	
Saugatuck River, Reading, Conn		5,000	
Norwalk River, South Wilton, Conn		9,990	
Brambletye Brook, Chester, Conn		4,995	
Trout Brook and Pond, Manchester, Conn		9,995	
Applicants in Connecticut		6,000	
E. G. Shortlidge, Wilmington, Del			500
Cottonwood Spring, Genesee, Idaho			500
Fish Pond, Genesee, Idaho			500
Halverson Pond, Moscow, Idaho			500
Maize Lake, Hailey, Idaho			1,000
Sweetwater Creek, Lewiston, Idaho			2,500
Bull Run and Patrick Creek, Kendrick, Idaho			1,500
Potlatch Creek, Kendrick, Idaho			1,500
Portneuf River, Pebble, Idaho			2,500
Fish Pond, Mindoka, Idaho			500
Swank Creek, North Manchester, Ind		10,000	
Pinhook Pond, South Bend, Ind		5,000	
Spring Pond, Crawfordsville, Ind		5,000	
Baldwin and Bigalk brooks, Cresco, Iowa			2,000
Steel Branch, Edgewood, Iowa			1,000
Spring Creek, Osage, Iowa			1,000
Bloody Run, North McGregor, Iowa			1,000
Mill Creek, Bellevue, Iowa		20,000	
Spring Branch, Manchester, Iowa		17,500	
Maquoketa River, Manchester, Iowa			5,000
McIntyre Springs, McIntyre, Iowa		10,000	
Kane Creek, Decorah, Iowa		49,900	
Spring Brook, Decorah, Iowa		20,000	
Village Creek, Lansing, Iowa		30,000	
Bacon Creek, Lansing, Iowa		12,000	
Clear Creek, Lansing, Iowa		8,000	
Pennamaquan Lake, Eastport, Me		5,000	
Brewer Pond, Brewer, Me		5,000	
Harrington River, Cherryfield, Me		10,000	
Sandy Brook, Unity, Me		15,000	
Herd Pond, Norcross, Me		10,000	
Second Herd Pond, Norcross, Me		5,000	
First Debsconeag Lake, Norcross, Me		5,000	
Blunt Pond, Ellsworth, Me		5,000	
Patton Pond, Ellsworth, Me		30,000	
Moosehead Lake, Greenville, Me		25,000	
Upper Wilson Pond, Greenville, Me		5,000	
Spring Lake, Phillips, Me		5,000	
Little Jim Pond, Phillips, Me		5,000	
Sandy River, Phillips, Me		10,000	
Long Pond, Phillips, Me		5,000	
Pushaw Lake, Bradley, Me		5,000	
Clearwater Pond, Farmington, Me		5,000	
Clearwater and Varnum Ponds, Farmington, Me		5,000	
Lake Anasagunticook, Canton, Me		5,000	
Big and Little Bear Ponds, Canton, Me		5,000	
St. George Lake, Thorndike, Me		5,000	
Sabbath Day Lake, Danville, Me		5,000	
Otter Ponds, Bingham, Me		15,000	
Bean Pond, Bingham, Me		5,000	
Brandy Pond, Bingham, Me		5,000	
Clear Pond, Bingham, Me		5,000	
Jewett Pond, Bingham, Me		5,000	
Rowe Pond, Bingham, Me		5,000	
Great Pond, Oakland, Me		5,000	
Messalouskee Pond, Oakland, Me		5,000	
Ellis and McGrath Ponds, Oakland, Me		5,000	
Hebron Pond, Monson, Me		10,000	
Held Pond, Jackman, Me		10,000	
Canaan Lake, Rockland, Me		5,000	
Turkey Pond, Rockland, Me		5,000	
Phillips Lake, Dedham, Me		5,000	
Branch Pond, Dedham, Me		30,000	
Sprague Meadow Brook, Calais, Me		5,000	

Details of distribution—Continued.

Species and disposition.	Eggs.	Fry and fingerlings.	Adults and yearlings.
Brook trout—Continued.			
Russell Pond, Houlton, Me		5,000	
Sebago Lake, Sebago, Me		20,000	
Great Pond, Belgrade, Me		5,000	
Little Sebago Lake, Gray, Me		5,000	
Jordan Pond, Eden, Me		5,000	
Williams Pond, Orrington, Me		8,000	
Swan Lake, Belfast, Me		5,000	
Private Pond, Franklin, Me		5,000	
Donnell Pond, Franklin, Me		5,000	
Alton Pond, Alton, Me		5,000	
Green Lake, Otis, Me		64,529	59
Grand Lake Stream, Washington County, Me			176
Browning Dam, Oakland, Md			10,300
Fishing Creek, Frederick, Md		308	
Applicants in Maryland			1,383
Lebine Brook, Dunstable, Mass			3,000
Fletcher Brook, Dunstable, Mass		10,000	
Bash Bish Brook, Mount Washington, Mass			994
Silver Spring, Newburyport, Mass			500
Spring Pond, Newburyport, Mass			1,000
Lake Chaubunagungamaug, Webster, Mass		15,000	
Headwaters of Westfield River, Williamsburg, Mass		10,000	
North Branch, Springfield, Mass		9,995	
Trout Brook, Everett, Mass		10,000	
Trout Brook, Fall River, Mass		9,990	
Tatunck Brook, Worcester, Mass		9,995	
Massachusetts Fish Commission, Worcester, Mass	25,000		
Hadley, Mass	25,000		
Centennial Mill Creek, Dailey, Mich		10,000	
Shaw Creek, Dailey, Mich		10,000	
Harriman Creek, Schoolcraft, Mich		10,000	
Wells Creek, Schoolcraft, Mich		10,000	
Trout Pond, Farmington, Mich		5,000	
Buckhorn Creek, Holly, Mich		10,000	
Head Thread River, Holly, Mich		10,000	
Hill Creek, Sidnaw, Mich		10,000	
Paint Creek, Ypsilanti, Mich		20,000	
Boardman River, Traverse City, Mich		10,000	
Boardman River, Mayfield, Mich		25,000	
Tributaries of Boardman River, South Boardman, Mich		25,000	
Kalkaska, Mich		25,000	
Brush Creek, Hillman, Mich		10,000	
Townline Creek, Harrison, Mich		20,000	
Asylum Creek, Kalamazoo, Mich		10,000	
Spring Brook, Kalamazoo, Mich		10,000	
Black River, Tower, Mich		20,000	
Miller Creek, Onaway, Mich		20,000	
Wolf Creek, Alpena, Mich		20,000	
Thurston Brook, Oxford, Mich		10,000	
Spring Brook, Oxford, Mich		35,000	
Tributary of Flint River, Oxford, Mich		25,000	
Parret Brook, Oxford, Mich		5,000	
Trout streams in Iosco County, near East Tawas, Mich		100,000	
Tributaries of Maple River, Pelleston, Mich		25,000	
Au Sable River, Grayling, Mich		100,000	
Tobacco River and branches, Clare, Mich		30,000	
Coldwater Creek and Chippewa River, Farwell, Mich		20,000	
Comstock Creek and Chippewa River, Evart, Mich		20,000	
Little Manistee and Au Sable rivers, Baldwin, Mich		40,000	
Little Manistee River, Canfield, Mich		50,000	
Cannon Creek, Rapid City, Mich		50,000	
Spencer Creek, Alden, Mich		30,000	
Cedar Creek, Bellaire, Mich		85,000	
Sycamore Creek, Lansing, Mich		5,000	
Pine River, Lincoln, Mich		10,000	
Bradley and Brooks creeks, Mankato, Minn			3,000
Cross River, Gunflint, Minn		10,000	
Flute Reed River, Hovland, Minn		10,000	
Cook Valley Creek, Kellogg, Minn		5,000	
Gill Lake, Duluth, Minn		5,000	
Spring Brook, Northfield, Minn		50,000	
A. Lauth, Fanning, Mo	10,000		
Cherry Creek, Madison County, Mont			5,000
Short Creek, Fivemile, Mont			5,000
Sixteen Mile Creek, Lombard, Mont			5,000
Trout Lake, Fridley, Mont			600
Spring Creek, Whitehall, Mont			2,500
Lebo Creek, Bigelk, Mont			5,000
Trout Pond, Lewiston, Mont			3,000
Penacook Lake, Concord, N. H			9,000
Bear, Dolfe, and Tannery brooks, Concord, N. H		15,000	

Details of distribution—Continued.

Species and disposition.	Eggs.	Fry and fingerlings.	Adults and yearlings.
Brook trout—Continued.			
Lake Tarleton, Pike Station, N. H			2,000
Sucker Lake, Franklin, N. H			2,000
Leighton Brook, Harrisville, N. H			1,990
Fish Pond, Rockingham Junction, N. H			1,000
Chase Brook, Hudson, N. H			3,000
Brickyard Brook, Hudson, N. H			4,500
Spring Lake, Percy, N. H			10,000
Trout Brooks, Hampstead, N. H			5,000
Fish Pond, Wentworth, N. H			1,000
Trout Brook, Hollis, N. H			1,000
Gilford and Farrar brooks, New Hampshire			2,000
Milford Brooks, Milford, N. H			2,000
Cæsar Brook, Milford, N. H			9,800
Fish Pond, Lisbon, N. H		5,000	
Sunapee Lake, Newbury, N. H			4,665
Trout Brook, Nashua, N. H			300
Chase and Brickyard brooks, Nashua, N. H		10,000	
Trout Brook, Brookland, N. H			600
Wildmeadow Brooks, Grafton, N. H		4,995	
Trout Brooks, Exeter, N. H		10,000	
Christine Lake, Groveton, N. H		15,000	
Brooks in Cheshire County, Keene, N. H		10,000	
Meadow Brook and other streams, Warner, N. H		10,000	
Indian River and Hains Brook, Canaan, N. H		10,000	
Emerson Brook, Westrindge, N. H		5,000	
Hutchinson Brook, Wilton, N. H		9,700	
Streams in Hillsboro County, Brookline, N. H		10,000	
Trout Brook, Peterboro, N. H		5,000	
New Hampshire Fish Commission, Colebrook, N. H			8,071
Laconia, N. H	25,000		
A. M. Bigelow, Bevans, N. J	20,000		
Canisteo River, Hornellsville, N. Y		10,000	
Fish Pond, Amityville, Long Island, N. Y		5,000	
Croton River, Patterson, N. Y		10,000	
Ragged Lake, Owls Head, N. Y		14,500	
Twitchell Creek, Beaver River, N. Y		12,000	
Carpenter Brook, Halfway, N. Y		10,000	
Silver Lake, Big Moose, N. Y		11,000	
Fish Pond, Moira, N. Y		2,200	
Tributaries of Oriskany Creek, Waterville, N. Y		10,000	
Long Pond, Pleasant Lake, N. Y		10,000	
Mud Pond, Pleasant Lake, N. Y		10,000	
Lily Pond, Pleasant Lake, N. Y		25,000	
Montfredy Brook, Syracuse, N. Y		30,000	
Handsome Brook, Sherburne, N. Y		10,000	
Rum Brook, Hartsdale, N. Y		5,000	
Hiepfel Lake, Brinckerhoff, N. Y		5,000	
Wiscoy Creek, Bliss, N. Y		10,000	
Wynantskill Creek, Troy, N. Y		10,000	
Loon Lake, Beaver River, N. Y		12,000	
Owego Creek, Owego, N. Y		10,000	
Lake Massawepei, Childwold, N. Y		14,500	
Trout streams near Watertown, N. Y		20,000	
Trout Lake, Babylon, N. Y		18,000	
New York Aquarium, Battery Park, N. Y			100
East Fork Pigeon River, Canton, N. C			100
Mad River, Bellefontaine, Ohio		20,000	
Spring Brook, Massillon, Ohio		20,000	
Spring Lake, Bellefontaine, Ohio		20,000	
Little Miami River, Springfield, Ohio		20,000	
Spring Branches, Troy, Ohio		5,000	
Trout Pond, West Liberty, Ohio		5,000	
Neal Creek, Hood River, Oreg			7,000
Tributaries of Willamette River, Salem, Oreg			3,500
Cox Creek, Albany, Oreg		10,000	
McElhattan Creek, McElhattan, Pa			400
Sandspring Run, Ashland, Pa			150
Beaverdam Run, Hooversville, Pa			300
Rattlesnake Run, Wetham, Pa			300
Beach Haven Creek, Plymouth, Pa			150
Pike Creek, Plymouth, Pa			150
Shickshinny Creek, Berwick, Pa			100
Lockard Dam, Berwick, Pa			100
Bowman Run, Berwick, Pa			100
Piney Creek, Altoona, Pa			100
Clover Creek, Altoona, Pa			100
Rapid Run, Lewisburg, Pa			150
Little Kettle Creek, Carters Camp, Pa			300
Lick Run, Millhall, Pa			100
Potter Creek, Martinsburg, Pa			100

Details of distribution—Continued.

Species and disposition.	Eggs.	Fry and fingerlings.	Adults and yearlings.
Brook trout—Continued.			
Clover Creek, Martinsburg, Pa			100
Spring Creek, Bellefonte, Pa			200
Logan Branch, Bellefonte, Pa			100
Spring Run, McElhattan, Pa			100
Harveys Lake, Nanticoke, Pa			150
Sandy Run, Fort Washington, Pa			150
Buckhill Creek, Cresco, Pa			150
Mill Creek, Ligonier, Pa			150
Beech Creek, Snowshoe, Pa			100
Rock Run, Snowshoe, Pa			100
Conrad Creek, Bernville, Pa			100
Tub Mill Creek, New Florence, Pa			150
Freeman Creek, Hamburg, Pa			100
Bernhardt Reservoir, Reading, Pa			100
Little Cacorsing Creek, Wernersville, Pa			300
Trout Pond, Bryn Mawr, Pa			70
Julius E. Brooks, Allegheny, Pa	20,000		
Applicants in Pennsylvania			350
Tarkiln Brook, Woonsocket, R. I		10,000	
Piggery Brook, Woonsocket, R. I		10,000	
South Fork of Little Rapid Creek, Rochford, S. Dak			10,000
Spearfish Creek, Spearfish, S. Dak		5,000	20,000
Maurice, S. Dak			10,000
West Fork of Spearfish Creek, Elmore, S. Dak			10,000
East Fork of Spearfish Creek, Elmore, S. Dak			10,000
Grant Lake, Spearfish, S. Dak			5,000
Jelbert Lake, Spearfish, S. Dak		5,000	
Crow Creek, Spearfish, S. Dak		10,000	
Branch of Jim Creek, Piedmont, S. Dak			10,000
Little Elk Creek, Piedmont, S. Dak			10,000
Box Elder Creek, Nasby, S. Dak			15,000
Englewood, S. Dak			10,000
Piedmont, S. Dak		10,000	
Nemo, S. Dak		10,000	
Squaw Creek, Custer, S. Dak			10,000
Spring Lake, Hill City, S. Dak			5,000
Spring Creek, Hill City, S. Dak		10,000	
Horse Creek, Hill City, S. Dak		5,000	
Bruce Creek, Rapid City, S. Dak			5,000
Deer Lake, Rapid City, S. Dak		5,000	
Canyon Lake, Rapid City, S. Dak		10,000	
Lonetree Lake, Rapid City, S. Dak		10,000	
Sportsmen Lake, Rapid City, S. Dak		5,000	
Rapid Creek, Rapid City, S. Dak		10,000	
Fish Ponds, Rapid City, S. Dak		5,000	
Whitewood Valley Lake, Whitewood, S. Dak			2,000
Fish Pond, Deadwood, S. Dak			5,000
Rapid Creek, Mystic, S. Dak			1,000
Trout Lake, Mystic, S. Dak		5,000	
American Creek, Chamberlain, S. Dak		10,000	
Fall River, Hot Springs, S. Dak		10,000	
Bogus Jim Creek, Blackhawk, S. Dak		5,000	
Splitrock Creek, Corson, S. Dak		10,000	
Artificial Lake, Sturgis, S. Dak		10,000	
Silver Creek, Sturgis, S. Dak		10,000	
Lower Falsebottom Creek, St. Onge, S. Dak		10,000	
Pearl Creek, Huron, S. Dak		10,000	
Ezekiel Creek, Wilmot, S. Dak		5,000	
Spring Brook, Wilmot, S. Dak		5,000	
Applicants in South Dakota			2,000
Upper Doe River and tributaries, Roan Mountain, Tenn		10,000	
Utah Fish Commission, Murray, Utah	25,000		
Mount Sterling Brook, Johnson, Vt		10,000	
Long Pond, Westmore, Vt			1,200
Schoolhouse Brook, Lunenburg, Vt			400
Caspian Lake, Greensboro, Vt		20,000	6,986
Little Leach Pond, Averill, Vt		4,990	2,200
Lyford Pond, Walden, Vt			1,050
Lake Mansfield, Stowe, Vt			6,000
Fish Pond, West Hartford, Vt			500
Spring Brooks, Mendon, Vt			1,998
Tributary to East Creek, Mendon, Vt		6,000	
North Comfret Brook, North Comfret, Vt			1,000
House of Correction Pond, Rutland, Vt			500
Shrewsbury Pond, Cuttingsville, Vt			1,000
Lake Ansel, Bethel, Vt			1,000
Martin Brook, Rochester, Vt			1,000
Shrewsbury Pond, Shrewsbury, Vt			600
Vermont Fish Commission, Roxbury, Vt			2,500
Standing Pond, Sharon, Vt		10,000	

Details of distribution—Continued.

Species and disposition.	Eggs.	Fry and fingerlings.	Adults and yearlings.
Brook trout—Continued.			
Frog Pond and tributaries, Waterford, Vt		10,000	
Hilltop Pond, Waterford, Vt		2,500	
Duck Pond, Waterford, Vt		5,000	
Tributary of Connecticut River, Waterford, Vt		5,000	
Ayers Brook and tributaries, Randolph, Vt		5,000	
Hatch Pond and Brook, Randolph, Vt		10,000	
Trout Brook, Plymouth, Vt		10,000	
Caledonia Club Trout Pond, St. Johnsbury, Vt		10,000	
Tributaries of Passumpsic River, St. Johnsbury, Vt		5,000	
Hatchery Brook, St. Johnsbury, Vt		10,000	
Gos Hollow Brook and tributaries, near St. Johnsbury, Vt		12,500	
Lake Mansfield, Waterbury, Vt		10,000	
Wells River Fish and Game Club Pond, Wells River, Vt		30,000	
Water Andrick Brook, Barnet, Vt		5,000	
Lake Mitchell, West Norwich, Vt		70,000	
Fish Lake, McIndoe, Vt		10,000	
Warden, Lake Factory and Laramore brooks, East Barnet, Vt		10,000	
Darling Pond, Groton, Vt		15,000	
Small Pond, Brandon, Vt		4,000	
Jewell Brook, Ludlow, Vt		4,000	
Washburn Brook, Maidstone, Vt		6,000	
Sandborn Pond, West Burke, Vt		2,500	
Tributaries to Center Pond, West Burke, Vt		8,000	
Fish Pond, East Concord, Vt		10,000	
Trout Brook, North Danville, Vt		5,000	
Trout Brook, Sutton, Vt		5,000	
Line Brook, Kirby, Vt		2,500	
Mill Creek, Blacksburg, Va			300
Worman River, Charlottesville, Va			300
Alum Springs Run, Goshen, Va			99
Redbud Creek, Winchester, Va			200
Laurel Creek, Bland, Va			500
Thornton River, Luray, Va			200
Thompson Creek, Millboro, Va			6,500
Tate Run, Wytheville, Va			68
Fern Lake, Seattle, Wash			1,600
Mill Pond, Seattle, Wash			1,600
Bigelow Creek, Spokane, Wash			2,500
Little Spokane River, Spokane, Wash			2,500
Fish Lake, Ellensburg, Wash			2,500
Touchet Pond, Dayton, Wash			1,600
Connowai Creek, Wilbur, Wash			2,500
Fish Pond, Marshall, Wash			1,500
Fish Pond, Winlock, Wash			1,600
Mountain and Cascade lakes, Newhall, Wash			7,000
D. Marcot, Spokane, Wash	25,000		
Stream and Pond, Rowlesburg, W. Va			250
Houstin Run, Centralia, W. Va			500
F. A. Degler, Cheatbridge, W. Va	25,000		
Nordman Creek, Hortonia, Wis			1,469
Pine and other creeks, Hixton, Wis			1,468
Bear Grass and Thompson creeks, Augusta, Wis			1,000
Muskrat Creek, Augusta, Wis			1,000
Horse Creek, Augusta, Wis			600
Otter Creek, Augusta, Wis			1,000
Reefer Creek, Orienta, Wis		6,855	
Fish Pond, Beulah, Wyo			5,000
Beaver Lake, Weston County, Wyo			10,000
Beaver Creek, Eothen, Wyo		10,000	
South Fork of Redwater Creek, Beulah, Wyo			10,000
Fish Lake, Beulah, Wyo		5,000	
Sand Creek, Crook County, Wyo		10,000	
Redwater Creek, Farrall, Wyo		10,000	
Willow and Glen creeks, Yellowstone Park, Wyo		10,000	
Wyoming Fish Commission, Wolf, Wyo	51,000		
Sheridan, Wyo	100,000		
H. G. Parlett, Tokyo, Japan	10,000		
Total	361,000	3,394,732	678,206
Lake trout:			
Public Lake, Idaho Springs, Colo			9,850
Trout Lake, Sellar, Colo			4,000
Lyle Lake, Ivanhoe, Colo			4,000
Lake Ivanhoe, Ivanhoe, Colo			8,400
Rock Creek, near Zoological Park, D. C		13,600	
St. Marys Lake, South Bend, Ind		20,000	
First Debsconeag Lake, Norcross, Me		10,000	
Second Debsconeag Lake, Norcross, Me		10,000	

Details of distribution—Continued.

Species and disposition.	Eggs.	Fry and fingerlings.	Adults and yearlings.
Lake trout—Continued.			
Morrison Pond, Dedham, Me		9,827	
Phillips Lake, Dedham, Me		150,000	
Green Lake, Dedham, Me		50,000	
Tunk Pond, Franklin, Me		100,000	
Maine Fish Commission, Enfield, Me	358,500		
Harris Pond, Lawrence, Mass		5,000	
Lake Huron, Alpena, Mich		500,000	45,000
8 miles off Alpena, Mich		125,000	
Off Sugar Island, Mich		500,000	
Off Thunder Bay Island, Mich		500,000	
Off mouth of St. Mary River, Mich		350,000	
Pine Lake, Charlevoix, Mich		240,000	
Lake Michigan, Petoskey, Mich			60,000
Mackinaw, Mich			40,000
Charlevoix, Mich		2,000,000	
Lake Superior, Long Point, Mich		280,000	
Todd, Harbor, Mich		280,000	
Fish Island, Mich		140,000	
Tobins Harbor, Mich		140,000	
Rock Harbor, Mich		140,000	
Washington Harbor, Mich		140,000	
Off Eagle Harbor, Mich		275,000	
Off mouth of Firesteel River, Mich		280,000	
Ontonagon, Mich		560,000	
Off Keystone, Mich		420,000	
St. Marys River, Sault Ste. Marie, Mich		350,000	
Straits of Mackinac, Mackinaw, Mich		1,000,000	
Clark, Loon, and Crooked lakes, Watersmeet, Mich		75,000	
Walnut Lake, North Farmington, Mich			7,996
Lake Fumee, Iron Mountain, Mich		25,000	
Round Lake, Hanover, Mich		25,000	
Michigan Fish Commission, Sault Ste. Marie, Mich	1,500,000		
Paris, Mich	500,000		
Lake Superior, Chicago Bay, Minn		280,000	
Grand Marais, Minn		560,000	
Poplar River, Minn		280,000	
Beaver Bay, Minn		280,000	
Duluth, Minn		135,000	
Leech Lake, Walker, Minn		75,000	
Jewett Lake, Fergus Falls, Minn		25,000	
Spofford Lake, Westmoreland, N. H		15,000	
New Hampshire Fish Commission, Laconia, N. H	400,000		
Crystal Lake, Albany, N. Y		20,000	
Pleasant Lake, Pleasant Lake, N. Y		35,000	
Longfellow Lake, Pleasant Lake, N. Y		25,000	
Lake Massawepei, Childwold, N. Y		20,000	
Snyder Lake, Troy, N. Y		20,000	
St. Lawrence River, Cape Vincent, N. Y		44,000	
Lake Ontario, off Grenadier Island, N. Y		824,550	
Dutchess Point, N. Y		481,450	
Adirondack League Club, Fulton Chain, N. Y	300,000		
New York Fish Commission, Caledonia, N. Y	2,500,000		
Utah Fish Commission, Murray, Utah	300,000		
Willoughby Lake, Westmore, Vt		11,400	
Stone Pond, Glover, Vt		10,000	
Caspian Lake, Greensboro, Vt		30,000	
Lake Dunmore, Salisbury, Vt		40,000	
Big Averill Pond, Averill, Vt		9,000	
Tributaries of Center Pond, West Burke, Vt		6,000	
Vermont Fish Commission, Roxbury, Vt	300,000		
Steilacoom Lakes, Lakeview, Wash		53,366	
American Lake, Lakeview, Wash		49,875	
Gravelly Lake, Lakeview, Wash		49,900	
Lake Superior, Bayfield, Wis		560,000	
Port Wing, Wis		280,000	
Wyoming Fish Commission, Wolf, Wyo	100,000		
Lake Superior, Rossput, Ontario, Canada		340,000	
Total	6,258,500	13,292,968	174,246
Scotch sea trout:			
Fishing Creek, Frederick, Md		11,191	
Tehanto Club, Wenaumet, Mass	10,000		
Lake George, Caldwell, N. Y			4,907
Total	10,000	11,191	4,907
Grayling:			
Lake Tesemini, Rathdrum, Idaho			3,500
Spring Brook, Manchester, Iowa			3,000

Details of distribution—Continued.

Species and disposition.	Eggs.	Fry and fingerlings.	Adults and yearlings.
Grayling—Continued.			
Michigan Fish Commission, Paris, Mich	200,000		
Petoskey, Mich			6
Elk Creek, Madison County, Mont		1,362,300	
Diamond Brook, Colebrook, N. H			519
Tributaries of Willamette River, Salem, Oreg			3,500
Bear and McKay creeks, Pendleton, Oreg		10,000	
North Fork of Meacham Creek, Pendleton, Oreg		36,000	
Catharine Creek, Union, Oreg		45,161	
Utah Fish Commission, Murray, Utah	70,000		
Caspian Lake, Greensboro, Vt			900
Beaver Pond, Proctor, Vt			296
Total	270,000	1,453,461	11,721
White-fish:			
R. E. Follett, Chicago, Ill	640,000		
Lake Michigan, Michigan City, Ind		4,000,000	
Charlevoix, Mich		19,000,000	
Mackinaw City, Mich		6,000,000	
Lake Erie, Stony Point, Mich		3,000,000	
Lake Huron, off Starve Island, Mich		4,000,000	
Thunder Bay Island, Mich		4,000,000	
Sturgeon Point, Mich		4,000,000	
North Point, near Alpena, Mich		11,000,000	
Presque Isle, Mich		4,000,000	
Scarecrow Island, Mich		3,000,000	
Near Detour, Mich		3,000,000	
Lake Erie, off Monroe Pier, Mich		10,000,000	
West Sister Island, Mich		9,500,000	
Lake Superior, Fishermans Home, Mich		2,400,000	
Isle Royale, Mich		3,000,000	
Ontonagon, Mich		4,400,000	
Near Whitefish Point, Mich		10,000,000	
Near Tequanemon Island, Mich		4,000,000	
Lake St. Clair, Lake St. Clair, Mich		13,000,000	
Long Lake, near Alpena, Mich		50,000	
St. Marys River, near Sault Ste. Marie, Mich		1,000,000	
Upper Detroit River, Detroit, Mich		35,000,000	
New Hampshire Fish Commission, Laconia, N. H	500,000		
St. Lawrence River, near Cape Vincent, N. Y		2,600,000	
Lake Ontario, off Grenadier Island, N. Y		10,952,000	
New York Fish Commission, Caledonia, N. Y	25,000,000		
Lake Erie, Starve Island Reef, off Put-in Bay, Ohio		3,000,000	
Niagara Reef, Put-in Bay, Ohio		2,000,000	
West Sister Island Reef, Put-in Bay, Ohio		3,000,000	
Green Island Reef, Put-in Bay, Ohio		2,000,000	
North Bass Island Reef, Put-in Bay, Ohio		37,500,000	
Middle Bass Island Reef, Put-in Bay, Ohio		3,000,000	
Michaels Reef, Put-in Bay, Ohio		6,000,000	
South Shore Reef, Put-in Bay, Ohio		6,000,000	
Rattlesnake Island Reef, Put-in Bay, Ohio		6,000,000	
Long Point Reef, off Kelly Island, Ohio		6,000,000	
Gull Island Reef, off Kelly Island, Ohio		10,000,000	
Port Clinton, Ohio		8,100,000	
off Kelly Island, Ohio		8,000,000	
Maumee Bay, off Toledo, Ohio		2,000,000	
Pennsylvania Fish Commission, Erie, Pa	10,554,000		
Harvey Lake, Harvey Lake, Pa		314,000	
American Lake, Lakeview, Wash		500,000	
Gravelly Lake, Lakeview, Wash		291,295	
J. B. Johnson, Morgantown, W. Va	5,000		
Lake Superior, off Iron River, Wis		2,400,000	
Raspberry Bay, Wis		2,400,000	
Wisconsin Fish Commission, Madison, Wis	10,000,000		
Total	46,699,000	279,407,295	
Pike perch:			
Sharon Pond, Sharon, Conn		500,000	
Cherokee Fishing Lake, East St. Louis, Ill		500,000	
White River, Bedford, Ind		1,000,000	
Mitchell, Ind		1,000,000	
Big Blue River, Corydon Junction, Ind		1,000,000	
Milltown, Ind		1,000,000	
Ohio River, Madison, Ind		1,000,000	
Brock and Fishing creeks, Salem, Ind		1,000,000	
Lake Calumet, Jasper, Ind		1,000,000	
Bass Lake, Basslake, Ind		1,000,000	
Lake Caldwell, Claypool, Ind		500,000	
Tippecanoe River, Winamac, Ind		500,000	

Details of distribution—Continued.

Species and disposition.	Eggs.	Fry and fingerlings.	Adults and yearlings.
Pike perch—Continued.			
Chain Lake, South Bend, Ind		500,000	
Upper Iowa River, Chester, Iowa		1,000,000	
Lake Reba, Richmond, Ky		500,000	
Lake Ellerslie, Lexington, Ky		1,000,000	
Fern Lake, Middlesboro, Ky		500,000	
Potomac River, Sycamore Island, Md		1,750,000	
Dorothy and Singletary ponds, Millbury, Mass		1,250,000	
Massachusetts Fish Commission, Wilkinsonville, Mass	2,000,000		
Hadley, Mass	2,000,000		
Big Lake, Gaylord, Mich		1,000,000	
Kalamazoo River, Allegan, Mich		1,000,000	
Peach, Edwards, and Craps lakes, Westbranch, Mich		1,000,000	
Huron River, Ypsilanti, Mich		1,000,000	
Clark, Crooked, and Loon lakes, Watersmeet, Mich		900,000	
Island Lake, Brighton, Mich		1,000,000	
Lake Erie, off Bay Point, Monroe, Mich		25,000,000	
Michigan Fish Commission, Detroit, Mich	32,100,000		
Wild Rice River, Twin Valley, Minn		1,000,000	
Moose Lake, Hancock, Minn		1,000,000	
Bear Lake, Akely, Minn		500,000	
Shetek Lake, Currie, Minn		1,000,000	
Lake Washington, Mankato, Minn		1,000,000	
Duck Lake, Mankato, Minn		800,000	
Missouri Fish Commission, St. Joseph, Mo	10,000,000		
Morris Lake, Newton, N. J		1,000,000	
Mirror Lake, Browns Mills, N. J		500,000	
Susquehanna and Chenango rivers, Binghamton, N. Y		1,000,000	
Dewey Lake, Rockville Center, N. Y		1,250,000	
Lake Ozonia, St. Regis Falls, N. Y		1,000,000	
Cuba Lake, Cuba, N. Y		1,000,000	
St. Lawrence River, off Cape Vincent, N. Y		12,800,000	
Scioto and Sandusky rivers, Marion, Ohio		1,000,000	
Lake Erie, North Bass Island Reef, off Put-in Bay, Ohio		35,000,000	
Middle Bass Island Reef, off Put-in Bay, Ohio		10,000,000	
Green Island Reef, off Put-in Bay, Ohio		10,000,000	
Off Bells Point, Port Clinton, Ohio		20,000,000	
Ballast Island Reef, off Put-in Bay, Ohio		10,000,000	
Peach Point, off Put-in Bay, Ohio		587,200	
Youghiogheny River, Ohiopyle, Pa		500,000	
Clarion River, Kane, Pa		500,000	
Susquehanna River, Selinsgrove, Pa		1,000,000	
Harveys Lake, Alderson, Pa		500,000	
Allegheny River, Irvineton, Pa		500,000	
Oil City, Pa		1,000,000	
Lycoming Creek, Ralston, Pa		1,000,000	
Rockwell Lake, Clarendon, Pa		500,000	
Moosic Lake, Moosic Lake, Pa		1,000,000	
Lake Poponoming, Bethlehem, Pa		500,000	
Sailor Lake, Bethlehem, Pa		500,000	
Forest Lake, Montrose, Pa		500,000	
Elk Lake, Montrose, Pa		500,000	
Heart Lake, Montrose, Pa		500,000	
Tripp Lake, Montrose, Pa		500,000	
Eley Lake, Montrose, Pa		500,000	
Little River, Marysville, Tenn		1,000,000	
Tennessee River, Knoxville, Tenn		1,500,000	
Ocase and Hiawassee rivers, Cleveland, Tenn		1,000,000	
Emory River, Lancing, Tenn		1,000,000	
Tellico River, Athens, Tenn		1,000,000	
Crooked Fork Creek, Petros, Tenn		1,000,000	
Big Creek, Rogersville, Tenn		1,000,000	
Vermont Fish Commission, St. Johnsbury, Vt		16,750,000	
Lemonweir River, Mauston, Wis		1,000,000	
Pewaukee Lake, Waukesha, Wis		700,000	
Black River, Greenwood, Wis		1,000,000	
Total	46,100,000	194,787,200	
Lake herring:			
Lake Erie, off Put-in Bay, Ohio		8,000,000	
Lutes Point, Ohio		3,000,000	
North Bass Island Reef, off Put-in Bay, Ohio		4,000,000	
Gull Island Reef, off Kelly Island, Ohio		5,200,000	
Pennsylvania Fish Commission, Erie, Pa	30,820,000		
Total	30,820,000	20,200,000	
Sturgeon:			
Missisquoi River, Swanton, Vt		20,000	

Details of distribution—Continued.

Species and disposition.	Adults and yearlings.
Pickerel:	
Devils Lake, Devils Lake, N. Dak.	300
Cat-fish:	
Pistakee Lake, Nippersink, Ill.	100
Spiritwood Lake, Jamestown, N. Dak	1,300
Lake Hiawatha, Sykeston, N. Dak	100
Stump Lake, Lakota, N. Dak.	437
Devils Lake, Devils Lake, N. Dak.	437
Total	2,374
Yellow perch:	
Clements Lake, Danville, Ill.	100
Pistakee Lake, McHenry, Ill.	25
Lake Hiawatha, Sykeston, N. Dak	50
Stump Lake, Lakota, N. Dak.	223
Devils Lake, Devils Lake, N. Dak.	223
Total	621
Black bass:	
Millpond, Dothan, Ala	10
Millpond, Gordon, Ala	25
Millpond, Sprucepine, Ala	100
Clear Creek, Nauvoo, Ala	150
Ingram Millpond, Opelika, Ala.	200
Spring Pond, Gadsden, Ala	150
Kelly Lake, Jeff, Ala	200
Whetstone Lake, Montgomery, Ala	35
Rogers Lake, Letohatchee, Ala	25
Millpond, Jamestown, Ala.	200
Spring Branch, Troy, Ala	20
McCarty Millpond, Gerald, Ala	50
Applicants in Alabama	1,185
Reservoir, Fairbanks, Ariz	50
Ash Creek, Hillside, Ariz	100
Kirkland Creek, Kirkland, Ariz.	50
Applicants in Arizona	200
Bull Bayou, Hot Springs, Ark.	50
Millpond, Pinebluff, Ark	58
Lake Chicot, Lake Village, Ark.	50
Old River Lake, Colton, Ark	50
Applicants in Arkansas	407
Twin Lakes, Canaan, Conn	400
Twin Pond, New Haven, Conn.	100
Bantam Lake, Lake Station, Conn	100
Lake Waremaug, New Milford, Conn	200
Lake Waremaug, New Preston, Conn	200
Spring Pond, Center Village, Conn	250
Beecher Pond, Seymour, Conn.	100
Matchshop Pond, Seymour, Conn	100
Copeland Reservoir, Seymour, Conn	100
Emery Ice Pond, Seymour, Conn.	100
Sawmill Pond, Seymour, Conn.	100
Little River, Seymour, Conn.	100
Highland Lake, Winsted, Conn.	200
Applicants in Connecticut	100
Connecticut Fish Commission, Windsor Locks, Conn	500
Spring Pond, Houston, Del.	100
E. G. Shortlidge, Wilmington, Del	500
Potomac River, Chain Bridge, District of Columbia	200
Applicants in District of Columbia	82
Lake Flora, Hernando, Fla	350
Lake Windmere, Espanola, Fla.	200
Lake Wenonah, Plymouth, Fla.	150
Blue Lake, Eustis, Fla	400
Lake Juano, Eustis, Fla	200
Lake Saunders, Eustis, Fla	200
Altoona Lake, Altoona, Fla	200
Lake Umatilla, Umatilla, Fla.	200
Trout Lake, Thomasville, Ga.	150
Dennis Creek, N da, Ga.	100
Lookout Creek, Dade County, Ga.	20
Daughtry Lake, McRae, Ga	100
Black bass—Continued.	
School Creek Millpond, Griffin, Ga	150
Spalding Millpond, Griffin, Ga.	100
Yarbrough Millpond, Williamson, Ga	100
Moffett Pond, Greenville, Ga.	75
Spring Pond, Mount Airy, Ga	50
Bowden Millpond, Raleigh, Ga.	100
Jones Pond, Leesburg, Ga	150
Walnut Pond, Nicholson, Ga	100
Big Sandy Run, Gordon, Ga.	150
McDonald Pond, Cuthbert, Ga.	250
Ocmulgee River, Juliett, Ga.	300
Savannah River, Woodlawn, Ga	250
Millpond, Lulaville, Ga	150
King Millpond, Boxspring, Ga.	200
Applicants in Georgia	3,225
Fox River, Olney, Ill.	300
Druce Lake, Grayslake, Ill.	300
Grays Lake, Grayslake, Ill.	30
Pistakee Lake, McHenry, Ill.	129
Channel Lake, Antioch, Ill.	300
Spring Lake, Oakland, Ill	15
Long Lake, Long Lake, Ill	30
Clement Lake, Danville, Ill	440
Wabash Pond, Taylorsville, Ill.	100
Pistakee Bay, Nippersink, Ill	300
Applicants in Illinois	1,335
Spring Lake, Indianapolis, Ind.	150
Denzel Lake, New Haven, Ind.	100
Calumet Lake, Jasper, Ind	500
White River, Muncie, Ind.	250
Bethany Park Lake, Brooklyn, Ind	150
Guthrie Creek, Bedford, Ind	200
Carr Lake, Claypool, Ind.	200
Yellow Creek Lake, Claypool, Ind	200
Bass Lake, Bass Lake, Ind	200
Spring Lake, Argus, Ind.	100
Stone Quarry Pond, Bloomington, Ind	50
Manlove Park Lake, Milton, Ind.	150
Oakhurst Lake, Evansville, Ind.	100
St. Joseph and St. Mary Lakes, Evansville, Ind	200
Lake James, Angola, Ind.	250
Lower Bayou, Howell, Ind.	250
Long Pond, Princeton, Ind	300
Pine Lake, La Porte, Ind	200
Pigeon Creek, Boonville, Ind	250
Spring Lake, Plymouth, Ind.	150
Lake of the Woods, Plymouth, Ind	150
Koontz Lake, Walkerton, Ind.	100
Crystal Lake, Anderson, Ind	150
Loon Lake, Columbia City, Ind.	200
Wabash River, Williamsport, Ind	250
Stone Quarry Pond, Batesville, Ind	150
Bruce Lake, Winamac, Ind	200
Catfish Lake, Westville, Ind.	100
Applicants in Indiana	2,750
Lake Elmwood, Fort Gibson, Ind. T	66
Silver Lake, Adair, Ind. T	67
Twinoak Tank, Marietta, Ind. T.	100
Cow Creek, Comanche, Ind. T.	150
Applicants in Indian Territory	167
Maquoketa River, Manchester, Iowa	74
North Fork Maquoketa River, Worthington, Iowa	20
Upper Iowa River, Chester, Iowa.	10
Big Cedar River, Orchard, Iowa.	10
Volga River, Fayette, Iowa	10
Turkey River, Maban, Iowa	10
Crane Creek, Chester, Iowa	10
Cedar River, Charles City, Iowa	10
Applicants in Iowa	300
Elm Run, Oswego, Kans	30
McDowell Creek, Manhattan, Kans	200
Cedar Creek, Manhattan, Kans	100

Details of distribution—Continued.

Species and disposition.	Adults and yearlings.
Black bass—Continued.	
Wildcat Creek, Manhattan, Kans.	300
Deep Creek, Manhattan, Kans.	400
Big Blue River, Manhattan, Kans.	200
Eureka Lake, Manhattan, Kans.	100
Reservoir, Garden City, Kans.	60
Rock Creek, Brenner, Kans.	200
Lake View, Lakeview, Kans.	200
Railroad Lake, Abilene, Kans.	200
Pawnee Creek, Larned, Kans.	500
Reservoir, Larned, Kans.	160
Waldock Lake, Pratt, Kans.	100
Lake Jeannette, Leavenworth, Kans.	100
Reservoir, Colby, Kans.	100
Lake Rollings, Chenute, Kans.	30
Smoky Hill River, Enterprise, Kans.	300
Smoky Hill River, Salina, Kans.	200
Five Mile Lake, Dodge City, Kans.	45
Mulberry Creek, Ford, Kans.	30
Broke and Grasshopper creeks, Sabetha, Kans.	150
Spring Lake, Wichita, Kans.	30
Ash Creek, Hill City, Kans.	100
Wea and Bull creeks, Paoli, Kans.	200
Cottonwood River, Emporia, Kans.	200
Strawberry Lake, Fort Scott, Kans.	30
Circle Lake, Yates Center, Kans.	30
Spring Creek, Gove, Kans.	300
Reservoir, St. Francis, Kans.	100
Forest Lake, Bonner Springs, Kans.	150
Spring Lake, Raymond, Kans.	100
Spring Creek, Meade, Kans.	25
Reservoir, Meade, Kans.	175
Applicants in Kansas	3,035
Martin Pond, Frankfort, Ky.	100
Boyd Pond, Eagle Mills, Ky.	100
Fern Lake, Middleboro, Ky.	100
Crystal Lake, Ryland, Ky.	150
Lake Corinne, Eddyville, Ky.	150
Spring Lake, Louisville, Ky.	200
Slate Creek, Owingsville, Ky.	200
Wilson Creek, Lebanon, Ky.	200
Rolling Fork Creek, Lebanon, Ky.	200
Middle Fork of Red River, Lexington, Ky.	300
Chaplin River, Springfield, Ky.	150
Beach Creek, Springfield, Ky.	100
Spring Lake, Salem, Ky.	150
Dick River, Danville, Ky.	200
Lancaster, Ky.	100
Little River, Hopkinsville, Ky.	200
Lake Clough, Kuttawa, Ky.	200
Slaughters Reservoir, Slaughters, Ky.	150
Elkhorn Creek, Frankfort, Ky.	200
Barren River, Bowling Green, Ky	150
Lake Mingo, Nicholasville, Ky.	100
Kentucky River, Beattyville, Ky.	150
Rockcastle River, Livingston, Ky	200
Applicants in Kentucky	4,900
Red Bayou, Gilliam, La.	100
Cottonwood Bayou, Dixie, La.	100
Lake Martin, Cades, La.	50
Bayou Robert, Alexandria, La.	100
City Park Lake, New Orleans, La	125
Lake Tasse, Jeanerette, La.	50
Artificial Lake, Cypremort, La.	50
Lake Chaplin, Natchitoches, La.	50
Lake Julia, Bermuda, La.	50
Applicants in Louisiana	350
Chesapeake and Delaware Canal, Baltimore, Md	150
Severn River, Waterbury, Md.	150
Monocacy River, Frederick, Md.	600
Spring Lake, Forest Glen, Md.	100
Gunpowder River, Shamburg, Md	150
Little Antietam River, Rockbridge, Md	150
Pocomoke River, Snowhill, Md.	1,500

Species and disposition.	Adults and yearlings.
Black bass—Continued.	
Fred Avon River, Easton, Md.	150
Potomac River, Woodmont, Md.	3,250
Glen Echo, Md.	5,000
Applicants in Maryland	625
Greenland Pond, Brewster, Mass.	200
Oldham Pond, South Hanson, Mass.	200
Singletary Lake, Millbury, Mass.	250
Turner Park Pond, Springfield, Mass.	100
Connecticut River, Holyoke, Mass	100
Silver Lake, Plympton, Mass.	200
Pimlico Pond, Sandwich, Mass.	400
Applicants in Massachusetts	100
Deer Lake, Onota, Mich.	20
Clark Lake, Watersmeet, Mich.	20
Saddle and Silver lakes, Grand Junction, Mich.	200
Duck Lake, Springport, Mich.	200
Peach and Edwards lakes, Westbranch, Mich.	150
Portage Lake, Ypsilanti, Mich.	150
Jones Lake, Lansing, Mich.	150
Kettle Lake, Kalkaska, Mich.	100
Spring Lake, Coral, Mich.	200
South Branch Tobacco River, Clare, Mich.	200
Farm Lake, Lake Station, Mich.	100
Dewey Lake, Clare, Mich.	200
Spring Lake, Spring Lake, Mich.	150
Round Lake, Hanover, Mich.	150
Spring Lake, Silverwood, Mich	100
Pleasant Lake, Leslie, Mich.	300
Little and Big Portage lakes, Dexter, Mich	150
Lane Lake, Marshall, Mich.	150
Applicant at Richville, Mich	100
Lake Shetek, Tracy, Minn	200
Lake Minnewaska, Glenwood, Minn.	10
Redwood River Pond, Redwood Falls, Minn	20
Round Pond, Shuqualak, Miss.	140
Anderson Pond, Shuqualak, Miss.	140
Bardwell Pond, Shuqualak, Miss.	280
Jackson Pond, Shuqualak, Miss.	210
Millpond, Shuqualak, Miss	210
Lake Lutz, Canton, Miss.	280
Mitchell Lake, New Albany, Miss.	200
Ford Pond, Waterford, Miss.	300
Mill Pond, Oakland, Miss.	150
Middle Fork Creek, Hamburg, Miss	420
Horseshoe Lake, Aberdeen, Miss.	150
Applicants in Mississippi	10,980
Railroad Reservoir, Willow Springs, Mo.	50
Chick Lake, Excelsior Springs, Mo	150
Spring Lake, Nevada, Mo.	50
Spring Lake, Joplin, Mo	82
Applicants in Missouri	438
Kootenai River, Libby, Mont.	150
Chimney Lake, Toston, Mont.	150
Prairie Grove Lake, Toston, Mont.	150
Fay Lake, Kalispell, Mont	150
Mohn Lake, Kalispell, Mont	150
Echo Lake, Creston, Mont	150
Applicant at Townsend, Mont.	150
Frenchman River Millpond, Imperial, Nebr	25
Seymour Lake, Seymour Park, Nebr	30
Spring Lake, Grand Island, Nebr.	25
Applicant at Tobias, Nebr	25
Crystal Lake, Concord, N. H.	450
Decker Pond, Boonton, N. J	150
Jaquie Lake, Morris Plains, N. J.	100
Prickett Millpond, Woodbury, N. J	150
Lenapee Lake, Blair, N. J.	150
Millstone River, Princeton Junction, N. J	150

Details of distribution—Continued.

Species and disposition.	Adults and yearlings.
Black bass—Continued.	
Falcon Lake, Sicklertown, N. J	150
Reservoir, Socorro, N. Mex	50
Lake Van, Hagerman, N. Mex	100
Lake LaCueva, Raton, N. Mex	100
Willow Lake, Malaga, N. Mex	50
Gila River, Silver City, N. Mex	100
Rio Grande River, N. Mex.—	
Bernalillo	100
Thornton	100
Espanola	100
Embudo	100
Spring Lake, Springer, N. Mex	100
Reservoir, Santa Fe, N. Mex	50
Indian School Pond, Tularosa, N. Mex	50
Marian Lake, Gallup, N. Mex	100
Applicants in New Mexico	200
Tuscarora River, Wilson, N. Y	600
Canisteo River, Addison, N. Y	200
Round Lake, Monroe, N. Y	400
Summit and Twin lakes, Central Village, N. Y	400
Cromwell Lake, Highland Mills, N. Y	200
Potagu Lake, Sterlington, N. Y	150
Lake Cuba, Cuba, N. Y	200
Spring Lake, Briarcliff Manor, N. Y	150
Lake and stream, Sterlington, N. Y	150
Wallkill Creek, New Paltz, N. Y	150
Salmon River, Fort Covington, N. Y	500
Mountain Lake, Sullivan County, N. Y	150
Schroon Lake, Riverside, N. Y	500
Williamsville Fishponds, Williamsville, N. Y	400
Far Pond, Shinnecock Hills, N. Y	100
New Pond, Fayetteville, N. C	100
Briny Branch, Fayetteville, N. C	100
Carver Pond, Fayetteville, N. C	100
Blount Creek, Fayetteville, N. C	100
Little Alamance Creek, Burlington, N. C	100
Rocky River, Harrisburg, N. C	100
Ruin Creek, Oxford, N. C	100
Pigeon River, Canton, N. C	100
Fairfield Lake, Brevard, N. C	150
Rule's Old Pond, Warren Plains, N. C	100
King's Mountain Pond, Grover, N. C	100
Swift Creek, Clayton, N. C	100
Ladd Creek Millpond, Pinehall, N. C	100
Spring Creek, Wilkesboro, N. C	100
Bleven Branch, Cranberry, N. C	100
Applicants in North Carolina	2,700
Spiritwood Lake, Jamestown, N. Dak	2,100
Willow Lake, Coopertown, N. Dak	150
Lake Hiawatha, Sykeston, N. Dak	80
Devils Lake, Devils Lake, N. Dak	375
Stump Lake, Lakota, N. Dak	380
Applicant at Edgerly, N. Dak	150
Rockfork Creek, Newark, Ohio	150
Hocking River, Nelsonville, Ohio	150
Miami River, Dayton, Ohio	550
Spring Lake, Aurora, Ohio	150
Grand River, Painsville, Ohio	150
Stream at Portsmouth, Ohio	200
Muth Lake, Cumminsville, Ohio	200
Mill Creek, Wyoming, Ohio	200
Long Pond, Moran, Ohio	100
Cuyahoga River, Mantua, Ohio	150
Whitewater River, Harrison, Ohio	200
Odell Lake, Lakeville, Ohio	100
Mad River, West Liberty, Ohio	150
Olentangy and Scioto Rivers, Marion, Ohio	250
Black bass—Continued.	
Grand River, East Orwell, Ohio	150
Lake Pippin, Brady Lake, Ohio	165
Stillwater River, West Wilton, Ohio	200
Congress Lake, Congress Lake, Ohio	2,755
Applicants in Ohio	1,340
Willow Pond, Perry, Okla	50
Crutcho Creek, Oklahoma, Okla	50
Little Deer Lake, Weatherford, Okla	200
Applicants in Oklahoma	1,650
Juniata River, Sprucecreek, Pa	66
Juniata River, Huntingdon, Pa	133
Delaware River, Shohola, Pa	300
Crystal Lake, Carbondale, Pa	200
Sims Pond, Masthope, Pa	150
Lake Teedyuskung, Rowland, Pa	150
Beaverdam Creek, Coalport, Pa	66
Swatara Creek, Tremont, Pa	150
Tulpehocken Creek, Reading, Pa	200
Forest Lake, East Stroudsburg, Pa	200
Mud Lake, East Stroudsburg, Pa	200
Lake Taminent, East Stroudsburg, Pa	200
Lake Minisink, East Stroudsburg, Pa	150
Spring Creek, Elverson, Pa	50
Schuylkill River, Norristown, Pa	75
Perkiomen Creek, Norristown, Pa	75
Pickering Creek, Phoenixville, Pa	50
Lake Memeta, Wernersville, Pa	50
Mountain Lake, Troy, Pa	150
Lake Silkworth, Plymouth, Pa	150
Fulton Millpond, Everett, Pa	130
Spruce Creek, Sprucecreek, Pa	50
Wrighter and Dunn lakes, Thompson, Pa	150
Coxtown and Comfort lakes, Thompson, Pa	150
Honeoye Creek, Shinglehouse, Pa	200
Triangular Lake, Wilkesbarre, Pa	750
Pennypack Creek, Hatboro, Pa	75
Reservoir, McDonald, Pa	33
Harvey Lake, Harvey Lake, Pa	200
Susquehanna River, Susquehanna, Pa	375
Spring Lake, Edinboro, Pa	50
Allegheny River, Kittanning, Pa	66
Lake Lebouff, Waterford, Pa	50
Green Pond, Port Carbon, Pa	150
Ridley Creek, Media, Pa	50
Brandywine Creek, Chadds Ford, Pa	50
Elk Lake, Alford, Pa	150
Moosic Lake, Wimmer, Pa	150
Aughwick River, Huntingdon, Pa	50
Stone Creek, Huntingdon, Pa	66
Stone Creek and tributaries, Johnstown, Pa	50
Applicants in Pennsylvania	225
Bowen Pond, Riverside, R. I	200
Stillwater Pond, Stillwater, R. I	225
Yorker Pond, Kingston, R. I	200
Silver Lake, Wakefield, R. I	200
Applicant at Wickford, R. I	150
Rhode Island Fish Commission, Westerly, R. I	1,000
Mountain Creek, Greenville, S. C	100
Broad River, Hickory Grove, S. C	150
Anderson Millpond, Harrold, S. C	75
Willow Pond, Abbeville, S. C	100
Fairforest Creek, Spartanburg, S. C	100
Millpond, Spartanburg, S. C	100
Ingleside Lake, Charleston, S. C	100
Little River, Honeapath, S. C	50
Suggs Millpond, Sanford, S. C	150
Applicants in South Carolina	1,075

Details of distribution—Continued.

Species and disposition.	Adults and yearlings.
Black bass—Continued.	
Water company's reservoir, Sturgis, S. Dak	25
Sylvan Lake, Custer, S. Dak	25
Spring Brook, Spearfish, S. Dak	20
Lake Hendricks, White, S. Dak	100
Artificial lake, Tripp, S. Dak	200
Pickerd Lake, Webster, S. Dak	150
Fish Lake, Armour, S. Dak	150
Clear Lake, Clear Lake, S. Dak	250
Foot Creek, Aberdeen, S. Dak	200
Vermilion River, Montrose, S. Dak	200
Applicants in South Dakota	540
Millpond, Winchester, Tenn	50
Barren Fork River, McMinnville, Tenn	200
Paint Creek, Greenville, Tenn	200
Nine-Mile Creek, McGhee, Tenn	150
Spring Lake, McGhee, Tenn	150
Watauga River, Watauga, Tenn	500
Poplar Creek, Clinton, Tenn	100
Mountain Lake, Leas Springs, Tenn	100
Tributaries of Cumberland River, Jellico, Tenn	200
Millpond, Cedarhill, Tenn	20
Springdale Park Lake, Covington, Tenn	150
Oakview Pond, Gibson, Tenn	100
Willow Pond, Gibson, Tenn	250
Big Creek, Rogersville, Tenn	80
Flint River, Fayetteville, Tenn	150
Cane Creek, Fayetteville, Tenn	100
Fall Creek, Russellville, Tenn	100
Sequahatchie River, Dunlap, Tenn	150
Big Creek, Del Rio, Tenn	100
Bent Creek, Whitesburg, Tenn	100
Millpond, Lawrenceburg, Tenn	100
Duck River, Lewisburg, Tenn	200
Spring Creek, Normandy, Tenn	20
Spring Lake, Woodstock, Tenn	150
Electric Lake, Chattanooga, Tenn	340
Watauga River, Elizabethton, Tenn	250
Pinewood Lake, Clarksville, Tenn	20
Applicants in Tennessee	1,510
Lake Thorne, Longview, Tex	550
Hill Lake, Longview, Tex	600
Horseshoe Lake, Longview, Tex	200
Fish Lake, Overton, Tex	300
Spring Lake, Overton, Tex	300
Graham and Allen Lakes, Overton, Tex	1,000
Clear Creek, Stone, Tex	500
Rucker Lake, Farmville, Tex	100
Asylum Lake, Austin, Tex	125
Middle Lake, Georgetown, Tex	300
San Gabriel River, Georgetown, Tex	1,100
Cypress Creek, Marble Falls, Tex	100
Artificial lake, Kenedy, Tex	1,500
Highland Lake, Palestine, Tex	100
Jackson Lake, Palestine, Tex	100
Cartmell Lake, Palestine, Tex	200
Lake Leroy, Palestine, Tex	100
Waterworks Lake, Palestine, Tex	1,030
Lake McDonough, Phelps, Tex	1,000
Chittopin Creek, Sinton, Tex	500
Field Creek, Llano, Tex	75
El Caney Pond, Crockett, Tex	600
Lakeside Lake, Marshall, Tex	125
Bonita Lake, Marshall, Tex	1,000
Kate Era Lake, Marshall, Tex	1,000
Artificial lake, Cleburne, Tex	150
Trinity Rod and Gun Club lakes, Dallas, Tex	1,500
Exall Lake, Dallas, Tex	500
Brown Tank, Wylie, Tex	75
Reservoir, Lufkin, Tex	400
Fish Lake, Lufkin, Tex	500

Species and disposition.	Adults and yearlings.
Black bass—Continued.	
Lake Thorn, Waskom, Tex	300
Artificial lake, Orphans Home, Tex	150
Reservoir, Alice, Tex	150
Panther Creek Millpond, Memphis, Tex	100
Spring Lake, Terrell, Tex	450
Rito Blanca Creek, Channing, Tex	1,000
Giles Lake, Mineola, Tex	400
Spring Lake, Eskota, Tex	150
Mason Lake, Duke, Tex	1,000
Clear Lake, Duke, Tex	1,800
Natural Lake, Panhandle, Tex	1,700
Salado Creek, San Antonio, Tex	300
Salado and Santa Rosa creeks, Monahans, Tex	1,900
San Antonio River, San Antonio, Tex	4,000
Alazan Creek, San Antonio, Tex	200
San Pedro Springs, San Antonio, Tex	100
Tecovas Creek, Amarillo, Tex	1,100
Champion Creek, Loraine, Tex	200
Pope Creek, Honeygrove, Tex	150
City reservoir, Honeygrove, Tex	75
Chief Lake, Taylor, Tex	200
Brushy Lake, Taylor, Tex	125
Fish Pond, Iatan, Tex	500
South Fork Washita River, Canadian, Tex	500
Clear Creek, Canadian, Tex	500
John Creek, Canadian, Tex	200
Washita River, Canadian, Tex	1,500
Big Timber Lake, Canadian, Tex	150
Williams Creek, Canadian, Tex	500
Johnson Hole, Abilene, Tex	300
Horsehead Creek, Abilene, Tex	450
Lytle Lake, Abilene, Tex	475
Mannewitzer Lake, Abilene, Tex	300
Cameron Dam, Abilene, Tex	200
Steffen Lake, Abilene, Tex	300
Clack Pool, Abilene, Tex	300
Thompson Pool, Abilene, Tex	300
Rainy Creek, Abilene, Tex	1,300
Swan Lake, Abilene, Tex	300
Fish Lake, Dundee, Tex	200
Lake Polk, Temple, Tex	800
Doe Creek, Memphis, Tex	300
Lake Katrine, Timpson, Tex	125
Shipp Lake, Smithville, Tex	1,000
Lake Sandhill, Jonesville, Tex	1,000
Lake Eloise, Waco, Tex	400
Spring Lake, Yorktown, Tex	500
Spring Lake, Nacogdoches, Tex	100
Fern Lake, Nacogdoches, Tex	3,300
Taylor Mill Pond, Nacogdoches, Tex	300
Tubbs Mill Pond, Nacogdoches, Tex	300
Waterworks Pond, Nacogdoches, Tex	200
Poe Lake, Nacogdoches, Tex	1,000
Cantonment Creek, Miami, Tex	500
Chicken Creek, Miami, Tex	600
Spring Creek, Miami, Tex	500
Jones Creek, Miami, Tex	500
Maine Call Creek, Miami, Tex	300
Turner Creek, Miami, Tex	300
Dugout Creek, Miami, Tex	400
Conch Creek, Miami, Tex	300
Bass Lake, Wichita Falls, Tex	1,000
Lake Wichita, Wichita Falls, Tex	1,000
Spring Lake, Higgins, Tex	125
Long Creek, Higgins, Tex	125
Benson Fork of Red River, Canyon City, Tex	1,000
Bass Lake, Canyon City, Tex	1,000
Spring Lake, Henrietta, Tex	300
Reilly Lake, Iowa Park, Tex	5,000
Fish Lake, Claude, Tex	1,000
White Deer Creek, Pampa, Tex	1,000
Santa Fe Lake, Celeste, Tex	2,075
Stream at Weatherford, Tex	500

Details of distribution—Continued.

Species and disposition.	Adults and yearlings.
Black bass—Continued.	
Mann Lake, Weatherford, Tex	150
Pedernales River, Fredericksburg, Tex	4,000
Little Brazos River, Hearne, Tex	500
Bear, Slaughter and Onion creeks Manchaca, Tex	450
Wildcat Creek, Vernon, Tex	450
Spring Creek, Victoria, Tex	200
Railroad Reservoir, Moore, Tex	1,000
Colorado and Llano rivers, Kingsland, Tex	2,500
Birdwell Lake, Bigsprings, Tex	225
Applicants in Texas	13,205
North Pond, Johnson, Vt	200
Hinesburg Pond, Williston, Vt	200
Millpond, South Londonderry, Vt	200
Great Back Bay, St. Albans, Vt	200
Lake Hortonia, Brandon, Vt	200
Potomac River, Dayesville, Va	100
Millpond, Roxbury, Va	50
Reservoir, Petersburg, Va	100
Rawlett Millpond; Petersburg, Va	100
Lees Pond, Petersburg, Va	100
Baxter Pond, Petersburg, Va	200
Totty Millpond, Petersburg, Va	100
Brander Millpond, Petersburg, Va	50
Falls Branch, Cleveland, Va	50
Vanity Millpond, Arrington, Va	50
Merriken Lake, Staunton, Va	50
Middle River, Staunton, Va	100
Jones Lake, Guinea, Va	100
Licking Creek Pond, Fairoaks, Va	200
Holly Springs, Cotman, Va	50
Hughs River, Culpeper, Va	100
Corbon Pond, Avalon, Va	100
Tinker Creek, Hollins, Va	100
Cedar Run, Catletts, Va	100
Stony Creek, Edinburg, Va	100
Stinting River, Franklin Junction, Va	100
Banister River, Franklin Junction, Va	400
Allen Creek, Franklin Junction, Va	100
Sharcoe Creek, Franklin Junction, Va	100
Whitethorn Creek, Franklin Junction, Va	100
West Fork Shenandoah River, Strasburg Junction, Va	100
Finches Millpond Goochland, Va	25
Spring Lake, Esmont, Va	50
Maplewood Pond, Richmond, Va	75
Spring Lake, Richmond, Va	100
Mordecai Pond, Richmond, Va	100
Edgemeer Pond, Richmond, Va	100
Spring Lake, Richmond, Va	300
Granite Lake, Richmond, Va	150
Little River, Pulaski, Va	100
Ice Pond, Urbanna, Va	100
Rappahannock River, Remington, Va	100
Millpond, Burkeville, Va	100
Goose Creek, Plains, Va	300
Buttonwood Creek, Ford, Va	100
Little River, Beaverdam, Va	100
Bluestone Creek, Graham, Va	200
Rock Hill Lake, Charlottesville, Va	50
Reservoir, Harrisonburg, Va	50
Sugar Creek, Herndon, Va	100
James River, Glengyle, Va	100
Balcony Falls, Va	70
Gilmores Mills, Va	100
Granite Lake, Chesterfield, Va	50
Shenandoah River, Boyce, Va	200
Page Spring, Boyce, Va	1,000
Wirt Millpond, Oakgrove, Va	400
Millpond and Jones Branch, Providence Forge, Va	300
Black bass—Continued.	
Pohoke Pond, Whitehouse, Va	500
Denton Pond, Doswell, Va	200
Jones Creek, Dispatch, Va	300
Stubbs Millpond, Sassafras, Va	200
South Fork Roanoke River, Shawsville, Va	300
Cave Creek, Wytheville, Va	1,200
Tate Run, Wytheville, Va	2,500
Tinker Creek, Hollins, Va	800
Applicants in Virginia	3,125
Opequan Creek, Martinsburg, W. Va	200
Tuscarora Creek, Martinsburg, W. Va	400
Shenandoah River, Charlestown, W. Va	500
Elk River, Charleston, W. Va	50
Little Kanawha River, Fishing Camp, W. Va	60
Tug River, Williamson, W. Va	80
Cheat River, Parsons, W. Va	200
Applicant at Harpers Ferry, W. Va	100
Elbow and Newton lakes, Athelstane, Wis	30
Pike Lake, Iron River, Wis	10
Yellow River, Necedah, Wis	20
Applicant at Augusta, Wis	10
Lake Desmet, Sheridan, Wyo	35
Reservoir at Taylor, Ontario, Canada	150
Piedras Verdes River, Colonia Juarez, Mexico	2,500
Total	228,105
Crappie:	
Millpond, Dothan, Ala	50
Ingram Millpond, Opelika, Ala	90
Millpond, Waverly, Ala	45
Hill Lake, Eufaula, Ala	225
Frog Creek, Rock Run, Ala	75
Bethea Lake, Faunsdale, Ala	100
Applicants in Alabama	1,005
Lake Como, Como, Fla	200
Waterworks Lake, Marietta, Ga	30
Fouche Pond, Rome, Ga	25
Clemmons Millpond, Summerville, Ga	75
Shropshire Millpond, Summerville, Ga	50
Norton Creek, Jasper, Ga	300
Dennis Creek, Neda, Ga	106
Reservoir, Atlanta, Ga	100
Lakewood Lake, Atlanta, Ga	15
Burpee Millpond, Newnan, Ga	15
Big Spring, Calhoun, Ga	15
Hall Lake, Calhoun, Ga	15
Charlie Creek Dam, Blue Ridge, Ga	50
Lake Clara Meer, Atlanta, Ga	15
Spring Lake, Jasper, Ga	150
East Lake, Atlanta, Ga	15
Applicants in Georgia	1,035
Spring Lake, Oakland, Ill	40
Pistakee Lake, McHenry, Ill	30
Channel Lake, Antioch, Ill	40
Long Lake, Long Lake, Ill	50
Millpond, Germantown, Ill	180
Clear Lake, Germantown, Ill	180
Clement Lake, Danville, Ill	100
Grays Lake, Grayslake, Ill	50
Pistakee Bay, Nippersink, Ill	700
Sangamon River, Decatur, Ill	500
Applicants in Illinois	485
Cedar River, Orchard, Iowa	200
Charles City, Iowa	200
Maquoketa River, Dundee, Iowa	75
Manchester, Iowa	79
North Fork, Maquoketa River, Worthington, Iowa	175
Upper Iowa River, Chester, Iowa	50

Details of distribution—Continued.

Species and disposition.	Adults and yearlings.
Crappie—Continued.	
Crane Creek, Chester, Iowa	50
Volga River, Fayette, Iowa	50
Little Turkey River, Navan, Iowa	50
Applicants in Iowa	1,200
Reservoir, Kendall, Kans	200
Applicants in Kansas	50
Greenwood Lake, Greenwood, La	100
Deer Lake, Onota, Mich	200
Clark Lake, Watersmeet, Mich	100
Eagle Lake, Willmar, Minn	200
Lake Minnewaska, Glenwood, Minn	200
Redwood River Pond, Redwood Falls, Minn	200
Chick Lake, Excelsior Springs, Mo	150
Applicant at Perryville, Mo	50
Frenchman River Millpond, Imperial, Nebr	100
Seymour Lake, Seymour Park, Nebr	100
Spring Lake, Grand Island, Nebr	100
Applicant at Tobias, Nebr	100
Spiritwood Lake, Jamestown, N. Dak	300
Devils Lake, Devils Lake, N. Dak	96
Stump Lake, Lakota, N. Dak	96
Stillwater River, West Wilton, Ohio	100
Congress Lake, Congress Lake, Ohio	1,800
Lake Erie, Cleveland, Ohio	300
Lake Hendricks, White, S. Dak	200
Sylvan Lake, Custer, S. Dak	100
Water Company's Reservoir, Sturgis, S. Dak	125
Spring Brook, Spearfish, S. Dak	100
Applicant at Castalia, S. Dak	300
Lake Blanche, Austin, Tex	200
Spring Pond, Thurber Junction, Tex	300
Chicken Creek, Amarillo, Tex	100
Berry Creek, Georgetown, Tex	100
Middle Lake, Georgetown, Tex	150
San Gabriel River, Georgetown, Tex	700
Lake Farrar, Ennis, Tex	100
Spring Lake, Ennis, Tex	275
Cotton Oil Company's Pond, Kaufman, Tex	100
Guadalupe River, Kerrville, Tex	930
Spring Creek, Victoria, Tex	100
Spring Lake, Waco, Tex	250
Lake Eloise, Waco, Tex	300
Bold Spring Lake, Waco, Tex	100
Reservoir, Cuero, Tex	50
Lone Pine Lake, Cooper, Tex	50
Llano River, Llano, Tex	450
Colorado River, Kingsland, Tex	300
El Caney Lake, Crockett, Tex	200
Artificial Lake, Naples, Tex	75
Trinity Rod and Gun Club Lake, Dallas, Tex	500
Colorado River, Fairland, Tex	300
Hamilton and Morgan creeks, Burnett, Tex	300
Graham and Allen lakes, Overton, Tex	300
Giles Lake, Mineola, Tex	200
Salado Creek, San Antonio, Tex	300
San Antonio River, San Antonio, Tex	100
Hust Lake, Fort Worth, Tex	200
Lake Katrine, Timpson, Tex	75
Pine Lake, Palestine, Tex	100
Spring Lake, Palestine, Tex	350
Moore Lake, Moore, Tex	200
Railroad Reservoir, Moore, Tex	50
Nueces River, Cotulla, Tex	500
Cold Spring Lake, Yoakum, Tex	150
Beaver Creek, Burnett, Tex	100
Lake Kyle, Kyle, Tex	50
Crappie—Continued.	
Lake Hayes, Marshall, Tex	100
Applicants in Texas	3,740
James River, Gilmores Mills, Va	35
Glengyle, Va	150
Balcony Falls, Va	100
Buffalo Creek, Fairmont, W. Va	72
Wheeling Creek, Elmgrove, W. Va	240
Elk River, Charleston, W. Va	100
Hughes River, Pennsboro, W. Va	96
Little Kanawha River, Fishing Camp, W. Va	480
Tug River, Williamson, W. Va	75
Quarry Lake, Cornwallis, W. Va	72
Elbow and Newton lakes, Athelstane, Wis	250
Pike Lake, Iron River, Wis	100
Yellow River, Necedah, Wis	125
Applicant at Augusta, Wis	50
Lake Desmet, Sheridan, Wyo	300
Big Goose Creek, Sheridan, Wyo	2,125
Total	30,467
Rock bass:	
Ingram Millpond, Opelika, Ala	400
Millpond, Opelika, Ala	150
Applicants in Alabama	1,050
Applicants in Arkansas	100
Applicants in Delaware	150
Spring Branch, Mount Pleasant, Fla	50
Hudson Pond, Tucker, Ga	50
Millpond, Cuthbert, Ga	50
Applicants in Georgia	850
Sulphur Creek, Sulphur, Ind. T	250
Applicants in Indian Territory	100
Smoky Hill River, Enterprise, Kans	300
Reservoir, Kendall, Kans	200
Waldock Lake, Pratt, Kans	200
Crooked Creek, Fowler, Kans	75
Spring Creek, Meade, Kans	25
Reservoir, Meade, Kans	200
Little Arkansas River, Wichita, Kans	300
Solomon River, Minneapolis, Kans	300
Wea and Bull creeks, Paoli, Kans	500
Elk and Cana rivers, Grenola, Kans	300
Forest Lake, Bonner Springs, Kans	200
John Creek, Ashland, Kans	300
Applicants in Kansas	3,100
Applicant in Louisiana	100
Locust Run, Mechanicsville, Md	100
Branch of Patuxent River, Laurel, Md	226
Applicant in Maryland	100
Cut-off Lake, Brunswick, Mo	200
Clay Lake, Jefferson City, Mo	150
Spring Lake, Nevada, Mo	200
Spring Lake, Joplin, Mo	445
James River, Aurora, Mo	100
Applicants in Missouri	400
Prickett Mill Pond, Woodbury, N. J	100
Reservoir, Folsom, N. Mex	100
Applicant at Deming, N. Mex	300
Ewen Creek, Pinehall, N. C	150
Beaver Lake, Fayetteville, N. C	250
Twitle Pond, Roxboro, N. C	85
Lochlily Pond, Roxboro, N. C	85
Rogers Lake, Warren Plains, N. C	120
King's Mountain Pond, Grover, N. C	100
Fish Club Pond, Wilson, N. C	150
Applicants in North Carolina	600
Little Deer Lake, Weatherford, Okla	100

Details of distribution—Continued.

Species and disposition.	Adults and yearlings.
Rock bass—Continued.	
Applicants in Oklahoma	800
Lake Rowena, Ebensburg, Pa	100
Ridley Creek, Media, Pa	100
Brandywine Creek, Westchester, Pa	200
Dorland, Pa	300
Pennypack Creek, Hatboro, Pa	100
Applicants in Pennsylvania	100
Applicants in South Carolina	350
Millpond, Newport, Tenn	100
Toms Creek, Del Rio, Tenn	100
Cedar Creek, Coalcreek, Tenn	50
Doe River, Elizabethton, Tenn	200
Applicants in Tennessee	550
Chicken Creek, Amarillo, Tex	275
Cypress Creek, Marble Falls, Tex	250
Dry Creek, Richmond, Tex	700
Big Creek, Richmond, Tex	725
Rogers Lake, Corpus Christi, Tex	300
Lakes in North Creek, Canadian, Tex	100
Washita River, Canadian, Tex	100
Colony Fork Reservoir, Ranger, Tex	225
Bold Springs Lake, Waco, Tex	75
Onion Creek, Kyle, Tex	200
Lake McDonough, Phelps, Tex	400
Clear Fork Trinity River, Fort Worth, Tex	100
Spring Lake, Ennis, Tex	400
Cold Spring Lake, Yoakum, Tex	75
San Antonio River, San Antonio, Tex	300
Guadalupe River, San Antonio, Tex	100
San Marcos River, San Marcos, Tex	500
Applicants in Texas	3,440
Tinker Creek, Roanoke, Va	100
Hollins, Va	100
Chinn Creek, Plains, Va	100
Maplewood Pond, Richmond, Va	100
Reedy Creek, Ford, Va	100
Whiteoak Creek, Ford, Va	100
Buttonwood Creek, Ford, Va	400
Tate Run, Wytheville, Va	155
Applicants in Virginia	1,200
Applicant at Bluefield, W. Va	100
Total	27,131
Strawberry bass:	
Bull Bayou, Hot Springs, Ark	100
Applicants in Indian Territory	200
Crooked Lake, Fowler, Kans	50
Reservoir, Meade, Kans	150
John Creek, Ashland, Kans	200
Applicants in Kansas	300
Lake Martin, Cades, La	125
Foster Lake, Shreveport, La	200
Bayou Robert, Alexandria, La	125
Lake Chaplin, Natchitoches, La	150
Lake Julia, Bermuda, La	150
Applicants in Louisiana	225
James River, Aurora, Mo	300
Clay Lake, Jefferson City, Mo	100
Willow Pond, Perry, Okla	100
Lake Hayes, Marshall, Tex	100
Total	2,575

Species and disposition.	Adults and yearlings.
Warmouth bass:	
Warm and Cold Springs creeks, Bullochville, Ga	306
Pistakee Lake, McHenry, Ill	20
Clements Lake, Danville, Ill	150
Pistakee Bay, Nippersink, Ill	300
Applicants in Illinois	80
James River, Gilmores Mills, Va	25
Glengyle, Va	100
Balcony Falls, Va	50
Total	1,031
Sun-fish:	
Pistakee Lake, McHenry, Ill	20
Clement Lake, Danville, Ill	150
Pistakee Bay, Nippersink, Ill	100
Applicants in Illinois	105
Stump Lake, Lakota, N. Dak	82
Devils Lake, Devils Lake, N. Dak	33
James River, Gilmores Mills, Va	40
Glengyle, Va	200
Balcony Falls, Va	150
Little Kanawha River, Fishing Camp, W. Va	180
Total	1,010
Bream:	
Hill Lake, Eufaula, Ala	400
Silver Lake, Seale, Ala	150
Euchre Creek, Seale, Ala	200
Tadlock Lake, Seale, Ala	100
Applicants in Alabama	400
Soap Creek, Marietta, Ga	100
Warm Springs Creek, Bullochville, Ga	258
Bowden Millpond, Raleigh, Ga	100
Mallory Pond, Forsyth, Ga	100
Crystal Lake, Cuthbert, Ga	100
Ocmulgee River, Juliette, Ga	150
Spring Lake, Macon, Ga	300
Ingleside Lake, Macon, Ga	100
Lake Benson, White Sulphur Springs, Ga	100
Warm and Cold Springs creeks, Bullochville, Ga	287
Applicants in Georgia	450
Crooked Creek, Fowler, Kans	400
Spring Creek, Meade, Kans	100
Reservoir, Meade, Kans	500
Applicants in Kansas	700
Applicants in Louisiana	400
Spring Branch, Neosho, Mo	3,430
Shawver Lake, Seymour, Tex	150
Seymour Creek, Seymour, Tex	400
Clear Fork of Trinity River, Fort Worth, Tex	350
Trinity River, Fort Worth, Tex	650
San Antonio River, San Antonio, Tex	1,500
San Marcos River, San Marcos, Tex	1,000
Colorado River, Marble Falls, Tex	1,000
Lake Kyle, Kyle, Tex	100
Applicants in Texas	2,545
Total	16,500

Details of distribution—Continued.

Species and disposition.	Fry.
Cod:	
Vineyard Sound, Mass.—	
At mouth	1,406,000
Off Robinson Hole, Mass	4,869,000
Tarpaulin Cove, Mass	36,106,000
Jobs Neck, Mass	27,693,000
Gayhead, Mass	15,370,000
Waquoit, Mass	4,020,000
Lackey Bay, Mass	7,155,000
Can Buoy, Mass	3,271,000
Atlantic Ocean, Gloucester, Mass	96,541,000
Beverly, Mass	3,925,000
Eel Pond, Woods Hole, Mass	1,558,000
Green Pond, Falmouth, Mass	957,000
Total	202,871,000
Flat-fish:	
Woods Hole Harbor—	
Off Woods Hole, Mass	32,495,000
Grassy Island, Mass	1,527,000
Lackey Bay, Mass	585,000
Green Pond, East Falmouth, Mass	3,313,000
Great Pond, East Falmouth, Mass	1,523,000
Vineyard Sound, Lambert Cove, Mass	1,681,000
Hadley Harbor, Naushon Island, Mass	2,668,000
Acushnet Harbor, New Bedford, Mass	438,000
Total	44,230,000
Lobster:	
Fisher Island Sound, off Noank, Conn	727,000
Gulf of Maine—	
Off Cape Porpoise Light, Me	750,000
Between Heron and Damascus Cove islands, Me	250,000
Northeast shore Georges Island, Me	1,000,000
Off southeast shore Mosquito Island, Me	1,000,000
Northeast side Seal Harbor, Me	1,000,000
Southeast side Owls Head Bay, Me	500,000
Wood Island Harbor, Me	600,000
Off Deer Island, Me	250,000
Lunts Harbor, Long Island, Me	250,000

Species and disposition.	Fry.
Lobster—Continued.	
North shore Long Island, Me	250,000
Between Schoodic and Petit Manan, Me	250,000
Cutler Harbor, Me	250,000
Johnson Bay, Me	150,000
Boothbay Bay, off Cape Newagen, Me	250,000
Casco Bay—	
Off Small Point, Me	250,000
Near north point Long Island, Me	1,100,000
South shore Great Diamond Island, Me	1,100,000
Off south shore Cow Island, Me	1,500,000
Midway between Peaks and Long islands, Me	1,500,000
Near west shore Peaks Island, Me	1,300,000
Near south shore Little Diamond Island, Me	1,500,000
Woods Hole Harbor—	
Woods Hole, Mass	1,975,000
Off Grassy Island, Mass	1,524,000
Devils Foot Island, Mass	572,000
Vineyard Sound, off—	
Ce lartree Neck, Mass	1,165,000
Nobska Point, Mass	624,000
Great Ledge, Mass	585,000
Woods Hole Harbor, Mass	798,000
Atlantic Ocean, Gloucester, Mass	23,370,000
off Scituate Harbor, Mass	1,423,000
Beverly, Mass	2,450,000
Rockport, Mass	2,800,000
Lanesville, Mass	1,850,000
Barnstable Harbor, Barnstable, Mass	986,000
Cape Cod Bay, off Manomet, Mass	646,000
Buzzards Bay, off Weepecket Island, Mass	787,000
Long Neck, Mass	531,000
Massachusetts Bay, east of Minots Light, Mass	1,800,000
Newport Harbor, Newport, R. I.	1,266,000
Total	60,879,000

COLD SPRING—PART OF WATER SUPPLY AT BULLOCHVILLE.