REPORT

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OF THE

COMMISSIONERS

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FISHERIES AND GAME

FOR THE

YEAR ENDING DECEMBER 31, 1907.

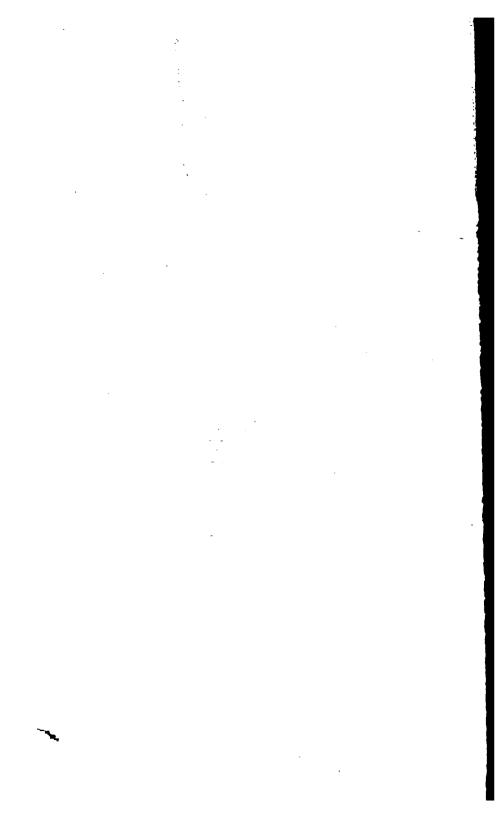
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BOSTON:

WRIGHT & POTTER PRINTING CO., STATE PRINTERS, 18 Post Office Square. 1908.



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APPROVED BY
THE STATE BOARD OF PUBLICATION.

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Commonwealth of Massachusetts.

To His Excellency the Governor and the Honorable Council.

The Commissioners on Fisheries and Game respectfully submit this their forty-second annual report.

GENERAL CONSIDERATIONS.

Appropriations. — The exact details of all expenditures are published in the annual report of the Auditor of the Commonwealth. Summarized, \$6,474.43 was expended for the benefit of the sea and shore fisheries, \$6,135.06 for maintenance of inland resources for the purchase, propagation and distribution of food fish, for the purchase, propagation and distribution of game birds (pheasants) and for the purchase and propagation of quail and ruffed grouse; for the enforcement of the fish and game and bird laws on land and sea \$26,765.93 was expended; \$5,630 for salaries of the three commissioners; and \$4,440.90 for printing, postage, travelling expenses of the commissioners and for clerical and office expenses. The total amount of fines was \$3,470.20.

Duties. — The work of the department must be mainly altruistic. The commissioners have large responsibilities, since it is their peculiar duty to act through their special knowledge and training as the accredited official advisers of citizens, corporations, municipalities, State, legislative and executive officials, upon questions of past or proposed legislation which involve problems relating to the natural history of our fish, mollusks, lobsters, birds and mammals, their relations to the environment, including their direct and indirect bearing upon the public weal, and how they may be most efficiently utilized for the benefit of all. With undivided purpose we aim to fur-

nish definite, authoritative, reliable and unprejudiced opinions upon State, municipal or private practices connected with the utilization, development and maintenance of our natural resources in the marine and inland fisheries and shellfisheries, and of our birds and mammals.

In addition to enforcing the fish and game laws in all sections of the State (except Buzzards Bay, where the enforcement of the fish and game laws continues under the State Police), the commissioners and their deputies seek to secure and disseminate information, and to indicate desirable methods of dealing with fish and game problems, thereby pointing out increased possibilities for economic gain through a better knowledge of nature's laws; to act as a clearing house for ideas; a board of conciliation and arbitration in cases where interests of farmers, fishermen, sportsmen and recreationists clash upon questions of the fisheries and game; and to guard against any untoward attempt of any one class to profit at the expense of the many, by preëmpting what are properly natural resources which should continue to be public assets.

Dogfish. — Prominent among the questions to which we have given attention is that concerning the enormous damage annually inflicted upon our sea fisheries by the species of shark commonly known as dogfish. The aggregate damage to Massachusetts fishing interests alone cannot be less than \$5,000,000 in any one year, and affects not alone the fishermen, but the public as well. Federal legislation is most desirable, and will doubtless follow the initiation of the States. If State Legislatures demonstrate willingness to do a share in maintaining their local resources, federal co-operation will be more likely to be secured.

Pacific Halibut Fisheries. — Massachusetts capital and enterprise have done much to develop the Pacific fisheries, and the bulk of our halibut supply is now brought in bond in refrigerator cars from Vancouver to Boston. The commissioners have for the benefit of Massachusetts interests recently made a brief study of the conditions involved.

Shellfisheries. — During the past three years a large portion of our time has been occupied in devising methods for ascertaining facts of economic importance concerning the now deca-

1907.]

dent shellfish industries of the State and practical methods for their rehabilitation. The clam, oyster and scallop fisheries have been an important factor in the food supply of the Indians and the colonists. Even the present generation can recall the abundance and the importance of the natural clam, ovster and scallop fisheries, and has likewise seen the decline. The work of investigation has been laid out on a broad scale, and has been carried to such a degree as now to warrant a detailed report. (See page 25.) The general results indicate clearly that the decline is due to unsystematic digging, which is made possible by laws which fail to fulfill the purpose for which they were enacted. These laws, in addition, are obscure on several important points. We feel warranted in saving that the present shellfish laws are entirely inadequate to permit a satisfactory yield of shellfish, or to guarantee proper protection to labor or to capital invested in these shellfisheries. Several other States have recently enacted complete new codes of shellfish laws, adapted to modern conditions, and the results have been of remarkable value to the State and to all interested in any manner or degree. Under the present laws, one of the Commonwealth's most valuable assets has been permitted to lapse. We are prepared to demonstrate that the areas below low-water mark can be made to produce food material of equal if not greater value to man than similar areas of agricultural land under the most intense methods of cultivation; that the net income should average \$200 per acre, and under the most favorable conditions may reach \$1,000 per acre, annually; that the income on the capital frequently exceeds 100 per cent. a month during the summer, and in isolated cases even 1,800 per cent. per year. To supply our permanent markets shellfish are brought even from Prince Edward Island, and the increasing number of summer residents along Massachusetts' shores find great difficulty in securing a satisfactory local supply. We find that at least 20,000 acres suitable for the cultivation of clams, quahaugs and oysters are lying barren; 6,000 acres of first-class clam flats are producing practically nothing; while our entire yield of soft clams comes from 2,000 acres, and even of this but a very small proportion is producing the maximum potential yield. Few States are so fortunately provided with local markets quickly accessible for such a wide

variety of shellfish. Under the present laws, by which the control is entrusted to the mayor and aldermen of cities or to the selectmen of the coast towns, the sum of the practical efforts has been almost solely directed to restricting the demand through the medium of close seasons, limitation of daily catch, size limit, etc., rather than to increasing the supply by study of the problems involved and the application of the remedies. In the present day, when the cost of food weighs heavily on the community, the Commonwealth must not permit these productive resources to remain longer idle.

Lobster Fisheries. — The passage of the law making legal the killing of lobsters above 9 inches long has led to an increase in the number of lobster fishermen, and extends still farther the fundamental biological blunder of permitting the capture of lobsters during their breeding age. Again we repeat our warning that commercial extinction of the lobster in Massachusetts waters is imminent unless the present laws are modified to such a degree as to secure protection to the lobsters of breeding age, in order that a larger number of eggs may be produced annually. (For a full discussion see page 12.)

Inland Fisheries. — During the past season our brooks and rivers showed more conspicuously than ever the disastrous effects of the denudation of hillsides by woodcutters and forest fires. In the unusually low water of the winter of 1906 and 1907 many streams were frozen solid, and millions of young trout and the animals which serve as trout food were destroyed. Subsequent floods swept many of the remaining young trout down stream. to be devoured by the larger fish. The floods impaired the spawning grounds. The summer drought completely dried up the smaller streams. As a whole, the year has been disastrous to the voung brook trout. Yet the fact that before many years our forest and cultivated land will come more nearly into equilibrium, with a diminished annual completely destructive denudation, and therefore a lesser variation in the volumes of high and low water in the streams, gives strength to our belief that with efficient methods the inland fisheries of the State may be maintained in a condition to yield a goodly amount of food and recreation to an increased population. Our present facilities for rearing fish for stocking are insufficient to meet the demands

properly and economically. Our activities in this direction are detailed on page 27.

Game. - For the chief game bird, the ruffed grouse or partridge, the present breeding season has been exceedingly unfavorable, due to a combination of causes: an inclement spring, coupled with an ever-increasing number of enemies, notably cats, foxes, infectious diseases, dogs and hunters, and a rapidly progressive destruction of the covers. Man is largely responsible for the introduction of many conditions prejudicial to the wild creatures, but with adequate forethought and improved knowledge man may in a large degree apply adjustive measures. demands made upon all our species of game are unusually heavy, for the reason that practically all the shooting grounds are made remarkably accessible through the wide extension of trolley lines and State highways. The automobile now permits the hunter to cover far wider areas than formerly, and with improved guns and thoroughly trained dogs he lays annually a heavier tribute upon all species of game. Excessive shooting, both legal and illegal, because more conspicuous and therefore more readily controlled, is, perhaps, less dangerous to the permanence of the annual crop of game than are the insidious attacks of carnivorous animals, such as the goshawk and Cooper's hawk, among the birds of prey; the skunk, red squirrel, mice, fox, and particularly the domestic cat, among the mammals; and the still more obscure infectious diseases to which all birds are susceptible. Our investigations indicate that the ruffed grouse, quail and turkey are particularly susceptible to an intestinal parasite, Amaba melæagridis, apparently spread by domestic hens. Hens, and, so far as we know, pheasants, are generally immune from any obvious effects; but when the hens infect the ground with this parasite it results in a disease known as Enterohepatitis, or "black head," notoriously fatal to turkeys, and by us found to be even more rapidly fatal to ruffed grouse and quail. The Bureau of Animal Industry at Washington have investigated fatal infectious disease among southern quail. jority of the quail purchased by the commission in Alabama for breeding purposes were found to be infected with this chickencholera-like bacillus. Fortunately, these birds were kept in quarantine and under observation, so that all our breeding pens

were not infected. We are informed that many southern quail were liberated in the State last spring by individuals and associations, without a quarantine. Such hasty action is greatly to be deplored, and should be carefully avoided in the future, as the probability of infecting whatever remains of our native game birds is strong. There is, too, the possibility of introducing disease with such foreign species as the European partridge, migratory quail, black cock, Scotch grouse, pheasants, etc. In our experience with the pheasants we have not found a case of "black head," but many young die from infection with the microscopic Coccidium avium. This parasite, however, is by no means peculiar to the pheasants, but has been reported in upwards of twenty species of domesticated and wild birds. A lot of quail quarantined upon arrival in a pen long tenanted by pheasants contracted the Coccidium disease, and many died from this parasite, with probably other complications.

The results of attempts at rearing game birds in confinement for subsequent liberation in the State are detailed on page 37.

Protection of Insectivorous and Song Birds. — The chief factors in the destruction of our native birds, named in the order of their importance, are cats, English sparrows, alien and market hunters, collectors for millinery purposes, boys with 22-caliber rifles and air guns, private collectors for "birds to set up," the destruction of nesting sites, the Cooper's and sharpshinned hawks.

Public opinion has not yet realized the annual damage done by some of these, notably the cat, the English sparrow and the destruction of nesting sites. The other factors are at present covered by law. The maintenance of our native birds is one of the most important problems of economic biology. Its solution depends upon an advanced state of public opinion, and upon the co-operative efforts of all classes of people. Birds are slaughtered and sold by millions for millinery purposes. This economic waste can be stopped only by total abstinence from feather fashions, and increased attention to educating the people to a proper understanding of the birds' place in nature.

Shore Birds and Ducks. — The number of these birds breeding in Massachusetts has been tremendously reduced since colonial days. Birds migrate to find a secure breeding ground. In

the absence of spring shooting, many birds would remain here to breed.

The period has arrived when it is necessary to make an earlier date when shooting of all game, whether inland or shore, should cease. It is now legal to hunt for one species or another from July 15 to May 20 following. The laws should be so modified that all shooting of migratory birds should cease December 31.

There are several species of "peeps" which, on account of their beneficent habit of feeding upon mosquito larvæ and other aquatic larvæ of insects, should be protected from the slaughter meted out to them by the near-sportsmen. Too small to be of food-market value, they fill an important place in nature in the mosquito-infested marshes of the south and of the northland.

Foxes, Deer and Game Birds. — An interesting biological chain of events has developed in the State. The general public takes especial pleasure in the sight of wild deer, and objects to the killing of these animals. Without question they are an attractive and valuable asset of the State, and one worthy of consideration. Unfortunately, they are indiscriminate feeders, and the annual damage to farm and garden crops is considerable, though if the damage is carefully analyzed it is but a small fraction of the market or food value of the annual increment of the deer crop. It would be a lucrative business to raise deer by range methods. In some sections of the State deer are not popular with the farmers, unless the deer's carcass may be taken to pay the deer's board bill.

The fox hunters, too, have a grievance. The deer trails disconcert the dogs, and a dog which hunts deer (and nearly all dogs do) may bring its owner to court. The fox hunters claim that foxes have increased in this State because the annoying deer tracks make fox hunting less attractive, and fewer foxes are killed. The full measure of their demands would require extermination of the deer and a close season on foxes.

The poultry farmers, on the other hand, are earnestly demanding a bounty on foxes, on account of the very considerable damage to poultry. While we know of no statistics, it is the writer's opinion that the damage to poultry interests by foxes far exceeds that done by deer to farm and garden crops.

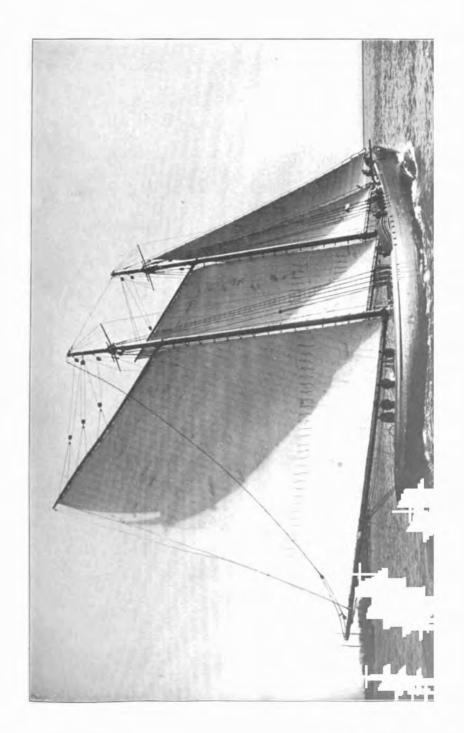
On the other hand, the fox kills enormous numbers of mice,

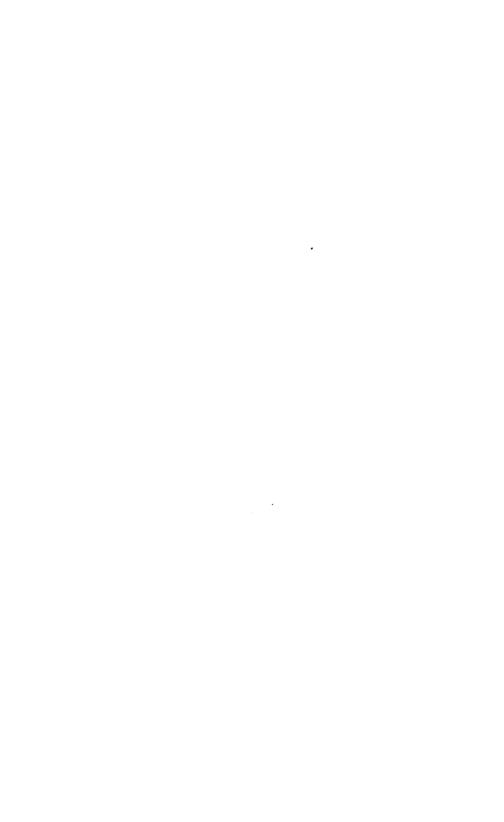
and thus benefits the farmer by destroying an insidious enemy which levies and collects a tax on farm products far exceeding the farmer's State, county and town tax. The game birds doubtless suffer to some extent by the killing of the adults and young by foxes, and possibly from deer as well as wild mice, which eat the eggs.

The correct procedure must be ascertained whereby the numbers of deer and foxes can be limited to approximately the number which our wild lands can support, and any excessive over-population which tends to enter cultivated land must be eliminated in such a manner as to give no special privileges, but yield a public revenue. A general hunting license law should be enacted, covering all resident hunters, to supplement the alien and non-resident hunting licenses now in force. The fee for non-residents should be \$10, and for residents it should be nominal, e.g., \$1 for small game, with an additional fee in each case of \$15 if a license to shoot one deer was desired.

Enforcement of Law. — The most prominent offences against the fish and game laws are illegal hunting by aliens, and Sunday hunting. In the former case the law is difficult of enforcement, for the reason that it is extremely difficult to ascertain with certainty whether any foreigner who is found in the woods is or is not naturalized, unless he can be made to identify himself. The passage of a general hunting license law would increase the efficiency of this and other laws and of our deputy service. The Sunday hunting law would be improved by a legal definition of what constitutes hunting. Many judges rule that the pursuit of living animals, either with or without a gun, with intent to injure or kill, or the presence on the hunting ground with a gun, whether loaded or not, or with a hunting dog, is sufficient ground for conviction.

We have endeavored to enforce the laws with intelligence and justice to all. Even an efficient officer cannot expect unanimous approval, for there is an extremely wide diversity of opinion concerning methods of enforcing the fish and game laws. We believe that the increase in the number of paid deputies to twenty-four has been wise, and that there has been a lesser number of violations. On the other hand, the violators are





studying more carefully the letter of the law, and are constantly developing new methods of evasion. A law requiring a person hunting to show to the officer, when requested, all the game in possession, would greatly benefit the honest hunter and the public. The useful birds so numerously shot by aliens are of such small size as to be readily concealed, and under the present laws the great majority of such cases cannot be successfully dealt with.

The moiety system, whereby the fines are equally divided between the complainant and the Commonwealth, has led to such flagrant abuses that we most emphatically call renewed attention to our statements of last year:—

The experience of another year has still further demonstrated the undesirable conditions which may prevail under a law which exposes deputies appointed for the enforcement of law to the temptation of seeking prosecutions under the stimulus of half the fines secured by their activity. Such a system is pernicious, and cannot fail to result in many instances of service discredited and justice prostituted.

With but a few isolated exceptions, our unpaid deputies undertake the work in the purest and cleanest spirit of public service, and often at a considerable sacrifice of time and money. Unfortunately, each year there appear several instances where the mighty dollar or personal spite are the moving features in prosecutions.

MARINE FISHERIES.

The Deep Sea Fisheries. — The past year has been a prosperous one for Massachusetts' oldest industry. The general record has been a catch well above the average of recent years, with a ready market at good prices. There have been no remarkable developments. Some improvements in methods of marketing fish have been devised. Of fishing vessels, the knock-about type, furnishing a craft more easily handled in rough seas, better fitted to withstand tremendous strains in the bow rigging and giving more room forward, appears to be coming into distinct favor. It is a remarkable tribute to the Gloucester type of fishing vessel, and to the seamanship of the crews, that again we are able to record the fact that not a single

Massachusetts fishing vessel has foundered, in spite of the daring trips in distant seas, even as remote as Davis Strait and the waters of western Greenland.

Our commercial fishing relations in Newfoundland and in Canadian waters are not yet completely and definitely adjusted.

In the evolution of the fishing industry Gloucester has come to be the market for salt fish, while Boston is the chief market for fresh food fish.

The aggregate of fish landed at Gloucester and Boston in 1907 was 197,990,995 pounds, as compared with 183,509,654 pounds in 1906.

The Gloucester Fisheries. — The total weight of fish landed from Gloucester vessels at that and other ports in 1907 was 148,979,859 pounds, as compared with 128,087,284 pounds in 1906, or a net gain of over 20,000,000 pounds.

Codfish. — The rip fleet found unusually good fishing, and on account of the high prices less than usual went to Gloucester for salting. Many of the salt bankers omitted their usual second trip. The total catch, particularly of small fish, for some of which credit should be given to the activities of the local hatcheries of the Bureau of Fisheries, reached the very handsome total of 12,689,295 pounds, valued at \$325,011, compared with 11,883,613 pounds in 1906, valued at \$253,001.

The shore catch of cod has also been extremely satisfactory. The fish are coming so close to shore that the Italian power dories fishing about the lightship off Boston harbor are reported to frequently take 500 to 5,000 pounds of cod, mostly of fair size, 5 to 9 pounds, and considerably greater quantities of haddock and other fish.

Among the high liners are noted: -

Schooner "W. H. Moody," Capt. Andrew Gorveneau, who in the Georges handline cod fishery stocked \$14,000.

Schooner "Elector," Capt. Clayton Morrissey, who in the salt bank trawl cod fishery stocked on two trips \$19,200; and schooner "Hazel R. Hines," Capt. Lovitt E. Hines, on two trips, \$18,000.

Schooner "Tattler," Capt. Alden Geel, engaged in salt bank cod fishery (dory handlining), sailed from Gloucester July 2, 1907, fished on Quero Bank, and returned to port Sept.

17, 1907, having been gone the remarkably short time of eleven weeks. As a result of this trip, she weighed off the enormous aggregate of 447,827 pounds of salt cod, on which a stock of \$17,206.62 was made. The vessel carried a crew of 27 men. The high line share was \$406.75, and the average share \$308.92. It was the largest dory handline salt cod trip ever landed, and it is also claimed that no trawl salt cod fare ever equalled it. The stock was the largest ever made on a salt cod fishing trip, and, considering the short time the vessel was gone and the enormous money return received, it was the most notable salt fishing trip ever landed.

Mackerel. — The catch of the present year was a pleasing contrast to that of 1906, when the catch was the smallest on record, with one exception, since 1814. The general catch of Massachusetts vessels is considerably greater than last year. But higher prices made a still more satisfactory yield to the fishermen and vessel owners. Again Capt. Sol Jacobs was the first arrival at Fortress Monroe, Va., landing 3,500 medium fish on April 25, which sold at 25 cents each. The total catch of mackerel by Massachusetts vessels was: fresh, 56,169 barrels; salt, 31,396 barrels; as compared with 1906: fresh, 35,-240 barrels; salt, 10,138. The best stocks were:—

VESSEL.						Captain.	Gross Stock		
"Grayling,".				_		Joseph Smith,			\$28,000
"Constellation,"						Thad. Morgan,			26,000
"Ingomar," .						Wallace Parsons, .			25,113
"Slade Gorton,"						George Heckman, .			23,400
"Saladin," .						Flor. McKnown, .			20,471

The high line vessel of the Gloucester fishing fleet for 1907 was schooner "Slade Gorton," Capt. George Heckman, with a stock of \$39,400, made in the haddock fishery and the mackerel seining fishery.

Schooner "Lucania," Capt. Martin L. Welch, stocked in 1907 \$38,000 in mackerel seining and haddock fisheries.

Halibut. — The Georges fishermen located fewer halibut than usual. The receipts of fresh Atlantic halibut at Boston were

356,620 pounds less than in 1906. The Grand Banks fleet encountered an unusual amount of bad weather. Though the aggregate catch was smaller by nearly a million pounds, some notable fares were made.

The Boston "Globe" of Feb. 9, 1907, says: -

Capt. Robert B. Porper of the schooner "Cavalier" has achieved one of the record-breaking stocks in the history of the local halibut fishery.

He arrived here Thursday from the Grand Banks with a fare of 63,000 pounds of halibut and 12,000 pounds of salted codfish, after an absence of about four weeks.

The stock aggregated \$5,063, which, after the vessel's share had been deducted, gave each of her crew of 20 \$114.35 as their individual share of the voyage. The amount realized has not been exceeded a half-dozen times in the history of the halibut fishery, in the times when such well-known masters as Nathaniel Greenleaf, Alexander Griffin, William MacDonald, William Thompson, Thomas Hodgdon and others were in the forefront of this once profitable branch of New England's fishing industry.

Captain Porper, who is one of the best-known master mariners from this port, is making a record, devoting his attention exclusively to his vocation of halibut fishing, both winter and summer.

The best stocks were: —

IN BANK HALIBUTING.

Schooner "Cavalier," Capt. Robert Porper, stock for 1907, \$25,-986.61; largest stock ever made in this branch of the fisheries.

Schooner "Monitor," Capt. John McKay, stock for 1907, \$24,147; also a remarkably big stock, and second only to the "Cavalier's."

GEORGES HALIBUTING.

Schooner "Kineo," Capt. John G. Stream, stock for season of 1907, nine months, \$26,200.

FLITCHED HALIBUTING.

Schooner "Admiral Dewey," Capt. James Hayes, stock for season of 1907, one trip of five months, \$14,188.

Schooner "Henry M. Stanley," Capt. Henry Arsenault, stock for season of 1907, one trip of five months, \$12,883.75.

Lobster. — The decrease in the lobster supply continues. Becoming first apparent in the regions nearest the markets, the circle of scarcity continually widens. With the increased de-

mands comes the stimulus to seek new and necessarily more re-The past summer has been notable for the mote grounds. exploitation of regions as far distant as Cashes Bank. It is reported that about July 10 the schooner "J. R. Atwood," owned by J. A. Young & Co., was fitted out for a lobstering trip to Cashes Bank. It was stated that 5 men, with 100 pots hauled daily, with exceptionally favorable weather, caught 220 lobsters, weighing about 2% pounds each, on the average, and the sharesmen cleared \$92 apiece on the venture. It seems probable that lobsters resort to the shallow waters of Georges and other banks to hatch their eggs and to moult. This region, hitherto unexploited, may be the nursery whence our supply is being maintained, and with the destruction of the breeding lobsters in this region the decrease in the market supply will become still more accelerated. For, looking at the matter how we will, no man can gainsay the fact that the lobster has almost completely disappeared from wide areas where it was formerly abundant, and that the Massachusetts catch has become an almost negligible factor in the Boston market supply. A résumé of the sworn reports of the fishermen indicates this: --

	YM	i.	 Pishermen.	Traps.	Lobsters.	Average Catch per Pot.	Egg Lobsters.	Ratio of Egg Lobsters to Total Catch.
1890,			479	19,544	1,612,129	82	70,907	1:22
1906,			335	21,918	487,882	22	9,378	1:52
1907,			379	21,342	1,034,866	49	10,848	1:100

These figures indicate that in 1890 the fishermen used on the average about 40 pots per man, and caught 82 lobsters per pot; while in 1906 they used on the average about 65 pots per man, and caught 28 lobsters per pot. There is also convincing testimony that the average size and weight of the lobsters caught have continually diminished. But most serious of all is the fact that the relative number of breeding lobsters has declined. Whereas in 1890 there was 1 lobster carrying eggs to every 22 in the total catch (or about 4½ per cent.), in 1906 there was only 1 egged lobster to every 52 in the general catch (or less than 2 per cent.), while in 1907 the ratio fell to 1 in every 100.

This fact seems to prove that the reproductive capacity of the race has been correspondingly diminished, and that in 1890 this reproductive capacity was at least two and one-half times that in 1906. The decline between those dates was so gradual as to escape attention. That such a serious reduction in the number of eggs laid annually causes inevitably a decreased number of young lobsters which in time would become breeders, and that therefore the maintenance of our lobster supply is primarily dependent upon the number of eggs produced, is perfectly obvious, and it remains only to ascertain the causes which contribute to this reduction in the annual crop of lobsters. chief cause is the destruction of the adults of breeding age. The following table covers our observations upon the measurements of 6,159 egg-bearing lobsters during the past two years. It will be seen that of this total number of lobsters bearing eggs but 423 were below 10½ inches long, and a still smaller number. 7. were less than 9 inches long. The majority of the breeding lobsters were above 10½ inches long, therefore the law passed in 1873 and copied by the other States embodied a wrong biological principle, inasmuch as it encouraged the destruction of the lobsters of breeding age, i.e., those above 101/2 inches long. The still more pernicious law of 1907 greatly increased the destruction of adults, since it legalized the killing of those above 9 inches. The chief argument in favor of this 9-inch law was that no more lobsters would be killed, but that it would, by thus legalizing the widely existing practice of killing the "shorts" as well as the larger lobsters, place the honest and dishonest fishermen on a plane of equal opportunity for gain. The fatal defect of any law based upon size measurements, or which permits the capture of those of illegal size, is that it can be enforced only by the presence on the fishing grounds of a large number of officers and boats.

Table showing Measurements of Egg-bearing Lobsters collected by Launch "Egret" during 1906 and 1907, with Number of Each Size.

Simu n Innhea).	Number-	Site (in Inches),	Number.	(in Inches).	Number.	fin Inches),	Number
455	1	1014	75	12%	361	40%	-91
16	1	10%	534	13	572	17/5/2	12
851.	r	1991	257	1814	152	10%	2
196	1	11	884	1839	176	16	7
Mile.	8	1354	266	13%	80	10%	1,5
100	34	131/4	580	14	161	Ausý.	.5
75%	10	11%	286	34%	20)	10%	9
796	67	12	72	34%	42	17	10
766	40	1934	760	14%	10	49%	- 3
10	201	12%	642	15	31	1914	1

To secure the optimum value of our lobster fisheries, a close season for a term of not less than five years is necessary, in order that there may be a small measure of recovery from the destructive methods permitted by law during the past forty years. A period less than five years will be of relatively slight value, for the reason that the lobsters lay eggs only once in two years, and require four to seven years to reach sexual maturity. Further, unless the close-season law carried with it the prohibition of the possession of all lobsters, wherever taken, it would be difficult and expensive to enforce the law, even if not entirely impossible, since in some sections the best lobster fishing is beyond the three-mile limit, and fishing in this region would work even greater havoc.

The results of this close season would be quickly dissipated unless a new law is enacted which is based upon correct principles both of law of man and law of nature. Such a law must (1) be capable of ready and economical enforcement; (2) be in the special interest of no class, but give equal opportunities to fishermen, capitalists and the public; (3) it must not bear heavily on vested interests; (4) from the biological point of

view it must guarantee the protection of the adult, in order to prevent undue curtailment of the number of eggs and young produced. We suggest the following as a tentative draft, which appears to embody these features:—

AN ACT REGULATING THE TAKING OF LOBSTERS.

Section 1. It shall be illegal to take or kill any lobster or to have in possession any lobster taken or killed in Massachusetts, otherwise than by a trap or pot the entrance of which does not exceed three and one-quarter inches in any diameter, or in a trap or pot of which the slats are less than one and one-half inches apart, or in a trap or pot which is not plainly marked with a buoy and a number corresponding with the identification number assigned to the owner as hereinafter provided.

Section 2. Before any person shall engage in the taking or killing of lobsters he shall make application to the commissioners on fisheries and game, who shall without cost assign to such applicant an identification number, which shall be placed upon every boat, trap, pot, buov, crate or car used in taking or transporting lobsters. The commissioners on fisheries and game shall so far as practicable protect traps, pots and buoys numbered as aforesaid and the lobsters contained therein. No traps or pots shall be used for the taking of lobsters until they have been inspected and officially marked by an agent of said commissioners duly authorized thereto; and all pots, traps, crates or cars shall be equipped with painted buoys or floats not less than twelve inches long, so attached to said pots or traps as to float at the surface of the water and to mark the location of such pots, traps, crates or cars. The identification number hereinbefore referred to shall be painted in a conspicuous color and in block letters not less than two inches long, with lines not less than one-half inch in width, on both the port and starboard bows of all boats used by any person in the taking and killing of lobsters, and such numbers shall not be covered or removed while such boat or boats are engaged in the taking or transporting of lobsters.

SECTION 3. No trap or pot which does not conform to the above specifications shall be used for the taking or transportation of lobsters, and the possession within the Commonwealth of traps or pots which do not conform to such specifications, or the placing of such pots in or near regions inhabited by lobsters, shall be prima facie evidence of violation of the provisions of this statute.

Section 4. Any pots or traps not conforming to these requirements may be forthwith destroyed by any officer qualified to serve criminal process, and in addition the owner, maker or possessor shall be liable to a fine of five dollars for each trap or pot not conforming to these requirements, and for a second offence a fine of ten dollars and imprisonment for not more than six months.

SECTION 5. It shall be unlawful to take, kill, buy, sell, have in possession or otherwise dispose of lobsters, which are less than nine inches or more than eleven inches long, taken on the shores or in the waters of Massachusetts, or to use lobsters for any other purpose than as food for man.

SECTION 6. Section eighty-eight, chapter ninety-one of the Revised Laws, is hereby repealed.

SECTION 7. This act shall take effect upon the first day of January in the year nineteen hundred and nine.

The following is taken from the report of the Massachusetts Commissioners on Fisheries and Game for 1906 (pp. 103-111):—

It is important, in a case like the present, to give greater attention to the objections to such a law than to the advantages. These objections appear to be at least five.

First of all, it is not uniform legislation throughout the lobster-producing States, and there is a possibility of working hardship to other States. For example, undoubtedly from Maine there would be a continued tendency to divert the 9-inch lobsters to the Boston market; and Maine would be in the same position with reference to Massachusetts and the States south as was Massachusetts in reference to the 9-inch laws in force in New York and Rhode Island. Should Massachusetts pass the suggested law, protecting the adults and permitting the sale only of those lobsters between 9 and 11 inches, the other States and Provinces would probably find it to their advantage to follow with similar laws.

Secondly, the law is on its face more difficult to enforce, because two measurements, the 9-inch as the lower limit and the 11-inch as the upper limit, are necessary. The difficulty of dealing with the upper limit can, however, be remedied by the use of a pot with a legalized ring (of such inside measurements as would prevent the entrance of lobsters above 11 inches), and an inspection and registration of the pot, instead of the inspection of the lobsters. According to our observations, the catches made by pots with various-sized rings indicate that, in a total of 534 eaught in these pots, a smaller number of lobsters above 11 inches are caught by the pots with the smaller rings; and that the average length of all the lobsters entering the pots having a ring 3 inches "inside in the clear" was 9.9 inches, in a 3½-inch ring 10.4 inches.

These figures show merely that the smaller rings permit the catching of the smaller lobsters, and in general prevent the entrance of the larger lobsters which have reached the breeding size. A $3\frac{1}{4}$ -inch ring will permit the entrance of lobsters even as large as 11 or 12 inches, but the average size is $10\frac{1}{2}$ inches; while the average size of all caught

by the 4½-inch ring was 12 inches, including some as large as 15 inches and many above 12 inches in length.

The law should provide for the size of the entrance ring. There should be a space of at least $1\frac{1}{2}$ inches between the slats. The law should provide for the official inspection and sealing of the traps, and all traps not conforming to these specifications should be liable to confiscation wherever found. Any one setting an illegal pot should be liable to a fine. The law should seek to prevent the destruction of lobsters which are so small as to be below the size for most profitable use. Such a law would do away with many of the uncertainties connected with the measurements now necessary, and with abuses and evasions too frequently connected with a standard so arbitrary as a definite measurement of a living animal.

The third objection is the injuries to vested interests,—to capital invested in the lobster business. It is a fact that such a bill, if it became a law, would reduce the average size of marketable lobsters taken in Massachusetts waters six-tenths of one pound, and more lobsters would have to be handled by the lobster dealers for a given amount of money (in exact figures, 155 lobsters to every 100 lobsters under present conditions).

Undoubtedly, too, the price per lobster paid by the dealers to the fishermen would be on the average correspondingly less than at present; but the price received by the fishermen and others now in the "short" business would be greater, and the cost less to the consumer. On the other hand, the public demand and use a lobster as small as 9 inches; and the use of at least three times as many lobsters as under the present law would, in the opinion of the writer, do less damage to the future supply of lobsters than does the present destruction of lobsters above $10\frac{1}{2}$ inches.

A fourth objection is found in the fact that perhaps in at least two places in Massachusetts the large lobsters predominate in the catch, and therefore the present interests of the fishermen at these places might be injured. But it is not entirely certain that this injury would be actual; and from personal observations we are convinced that there are even at Cape Cod at least six lobsters between 9 and $10\frac{1}{2}$ inches to every one over $10\frac{1}{2}$ inches, while off Monomoy the 9 to 11-inch law would permit capture of about half of the lobsters at present taken. But the total weight of the catch would be considerably diminished.

A fifth and most important query is, Will enough lobsters escape the critical period of 9 to 11 inches and pass into the exempt class, where they can be sure of an extended period of egg-producing usefulness? This is entirely problematical, and there is at present absolutely no knowledge bearing upon the case. It is a fair presumption that enough would so escape. In any event, the lobster would have, under the proposed conditions,—exemption from capture after reaching the

point of 11 inches, - far greater opportunity to lay a larger number of eggs than under existing conditions; since under the present laws not only every lobster above 101/2 inches is exposed to capture, but, as a matter of fact, a greater number of those between 9 and 10½ inches or even smaller are captured, in spite of all the machinery of law enforcement which can be brought forward. The fact that lobsters on the average increase 15.6 per cent, at a moult is of importance. Thus, a 9-inch lobster would become 10½ inches in one moult, and a 9½-inch lobster would become 11 inches, and thus exempt. Many individuals would pass within a few days entirely beyond the legal size for capture; and the actual length of time which a lobster requires to pass through the dangerous period of adult life (i.e., from 9 to 11 inches, the only period when exposed to legal capture by man) may be, after all, relatively brief for any one lobster, practically during not more than two moults, probably not more than four years at the maximum. Yet there should be such a number of individuals as to satisfactorily supply the market.

Our experience with the present laws dates from 1873. Since that time, even with the protection of a certain number of adults by purchase of egg-bearing lobsters and the hatching of eggs by the United States Bureau of Fisheries, and in spite of the fact that the 10½-inch limit was fixed at a point where the lobster had an opportunity to produce at least one litter of eggs, there has been a gradual decline in the eatch of lobsters in Massachusetts from 84 per pot in 1891 to 28 per pot in 1904; and from 1 egg-bearing lobster to every 22 lobsters above 10½ inches in 1890 to 1 egg-bearing lobster to every 52 lobsters above 10½ inches in 1906. The present laws are difficult to enforce; first, the public demand for 9 to 11 inch lobsters is strong; second, it is easy to destroy the evidence that a lobster was below the legal limit of size; third, the law is easily evaded, and therefore tempting; fourth, it is not practicable to properly safeguard the law-abiding fishermen. Honorable men throw overboard the short lobsters from their traps. and see these caught the next day by unscrupulous neighbors.

In the opinion of this commission, the lobster is approaching commercial extinction. In the neighborhood of the great markets, i.e., in the waters of Connecticut, Rhode Island and Massachusetts, the decrease is especially evident; yet the biological conditions and the productive capacity of the race still remain essentially the same as they did when these same waters produced at least ten times the number of lobsters that they do to-day. Under wise laws, these waters might again produce as many lobsters as they did twenty or more years ago; but, in order to produce again the requisite number of lobsters to meet the demand, not only must there be protection for all the adults of breeding age, but active measures must be taken for placing the artificial lobster industry upon a commercial basis, when the value of

the number of young lobsters produced will be in dollars and cents greater than the actual cost of production. The trout, shad and oyster industries have reached that stage. The lobster industry at present has not; but the outlook is promising; and appears to lie through the protection of the breeders, supplemented by protection of the just-hatched young up to such a stage as they are able to care for themselves on the bottom of the ocean, either after the methods developed by Bumpus and Mead in Rhode Island, or by the method of specially protected breeding reserves or nurseries for the young; and on this your commission hopes to have something to report next year.

In conclusion, we may say that, for the interests of the Commonwealth and of the lobster, a new law, restricting catching to those lobsters between 9 and 11 inches, and putting a close season upon both males and females above 11 inches, is without doubt a step far in advance. It is not a departure so radical as it appears to the popular mind at first glance. The close-season law has many obvious advantages, and the protection of the adult lobster is already in practical operation to a limited extent. The proposed measure is a combination of "close season" and the "9-inch" laws; and, though essentially a compromise measure, it embodies the advantages of both with the disadvantages of neither.

Finally, such a law as would permit the legal catching and marketing of any lobster between 9 and 11 inches, except those with eggs attached, would readily meet the market conditions in all the States and the Maritime Provinces. It would permit fishing to be carried on at all seasons, for the close season would then be upon only a part of the lobsters all the year, instead of upon all the lobsters for a part of the year.

During the past four years this modification of the law has been carefully considered, and now numbers among its adherents many persons whose intelligence is unswayed by personal considerations, since they are interested in the lobster neither as fishermen nor dealers, and whose opinion is, therefore, of greatest weight.

This proposed measure has the written endorsement of such eminent investigators in marine biology as:—

- Prof. F. H. Herrick, special investigator of the American lobster for the United States Bureau of Fisheries.
- Prof. W. K. Brooks of Johns Hopkins University, director of the Chesapeake Zoölogical Laboratory.
- Prof. C. O. Whitman of Chicago University, director of the Marine Biological Laboratory at Woods Hole.
- Prof. E. L. Mark, director of the Zoölogical Laboratories, Harvard University.
- Prof. J. S. Kingsley of Tufts College, director of the Marine Laboratory at Harpswell, Me.

Prof. Sidney I. Smith of Yale University.

Prof. John M. Tyler of Amherst College.

Prof. E. G. Conklin of University of Pennsylvania.

Prof. Jacob Reighard of University of Michigan.

Prof. William Patten of Dartmouth College.

Prof. J. L. Kellogg of Williams College.

Prof. G. A. Drew of University of Maine.

Prof. H. V. Wilson of University of North Carolina.

Prof. A. L. Treadwell of Vassar College.

Prof. A. W. Weysse of Boston University.

H. E. Baker, Sidney, C. B.

Prof. A. D. Mead, Providence.

Prof. T. H. Morgan, Columbia University.

Prof. Francis H. Herrick of the Western Reserve University recommends a radical change of policy in protecting the voung lobster. "The theory of past legislation has been that the young lobster is in greater need of protection than the old one. Hence it was made unlawful to retain (after catching) lobsters below a given limit in size. Some States fixed the dividing line at $10\frac{1}{2}$ inches and others at 9. These standards have been adopted by most of the Canadian provinces, though one or more place it at 8 inches. This regulation is usually supplemented by a second, which prohibits marketing female lobsters that are spawning." Professor Herrick would reverse the first of these rules, and thus make the second unnecessary. One of his reasons for proposing the change is, that "it would protect the female lobster more effectually than existing laws do, for these can be and are often evaded. It is possible for a dishonest fisherman to remove the evidence that he is violating the statutes. Forbid him to have or sell a lobster which is more than 9 or 10 inches long, whether it is spawning or not, and detection and punishment will be easier than they are now." 1

Professor Herrick is the well-known authority on the lobster. His study of the life history and habits of the American lobster while in the employ of the United States Fish Commission will remain classic, and his opinion carries great weight.

SUMMARY.

The Proposed Law combines Close Season and 9-inch Law. — It would combine the best points of a close season (by putting a close season on all lobsters above 11 inches and below 9 inches) and of a straight 9-inch law (by permitting the legal sale of lobsters between 9 and 11 inches, size-limits which include the largest number of lobsters now caught).

Would be more readily and economically enforced. — By forbidding the use of any pot other than a legal, standard pot, with the seal of the

¹ Cf. Science, n. s., Vol. XXIII., No. 591, pp. 650-655, April 27, 1906.

inspector, having an entrance ring not exceeding 3½ inches, the law could be more readily and economically enforced, since no large lobster could enter the pot, and the further possession of large lobsters would be illegal. The lower limit could be controlled by the prohibition of the use of lobsters as bait, or of their possession for any other purpose whatever, except for use in scientific study. The temptation to keep an 8-inch lobster would be less than that involved in the possession of a large lobster. It would give every man in the lobster fisheries an equal chance. The honest man would no longer throw overboard lobsters for the benefit of his less scrupulous neighbor.

Would increase the Number of Eggs produced. — It would immensely increase the number of eggs produced, and therefore the number of young lobsters which would by growth meet the market demand.

Would improve the Quality of Eggs produced. — By perpetually reserving the best specimens of mature age as a breeding stock, the best quality of young would be produced.

Objections. — The chief objections appear to be the difficulty of enforcement, on account of an upper and a lower limit of size (it should be noted that the upper limit can be cared for by an entrance ring of a specified size upon the pots or traps), and the danger that too many small lobsters would be caught.

But the crux of the whole matter is that the present laws result in a diminished yield of eggs, and to this is to be ascribed the obvious and alarming decline of the lobster in all waters where the effects of these pernicious laws have become evident; and we therefore urge upon you a most careful, judicial and prompt consideration of this important question.

In discussing the question, we strongly urge that the matter be discussed and settled for the benefit of all the people of the State,—consumers, fishermen and dealers alike. It is the person from the interior who, after all, is most interested in the maintenance of the lobster supply,—the fisherman and the dealer are too often interested only to a personal and selfish degree; and this matter should not be left to the consideration only of the representatives of the shore towns, many of whose constituents are actively engaged in the lobster business, and are perhaps too deeply concerned in the pursuit of present gain to give an unbiased opinion upon the methods which the Legislature should carry out in pursuance of the duty and responsibility of the Commonwealth as the trustee and conservator of its natural sources of wealth.

Following are reports of the work done by the U. S. Bureau of Fisheries in Massachusetts for the maintenance of the lobster fishery:—

DEPARTMENT OF COMMERCE AND LABOR, BUREAU OF FISHERIES, WOODS HOLE, MASS., Jan. 13, 1908.

Commissioners on Fisheries and Game, Room 158, State House, Boston, Mass.

GENTLEMEN: — Herewith I submit a brief report of the lobster work done at this station during the fiscal year 1907.

Between October 18 and December 1, 427 egg-bearing lobsters were received and placed in live cars; 314 of these, or 73.3 per cent., survived the extreme cold of our winter and yielded 3,867,000 eggs.

The collections in the early spring were rather discouraging, but showed a marked increase before the close of the season. The eggs received from the spring collections numbered 19,910,000, — an increase of over 50 per cent. during the year. At the close of the year 12,851,000 fry had been planted. During the season eggs were taken from 1,831 lobsters, 677 of which were furnished by the employees of the Massachusetts commission; the remainder, 1,154, were collected by the employees of this station.

Respectfully,

E. F. Locke, Superintendent.

DEPARTMENT OF COMMERCE AND LABOR, GLOUCESTER, MASS., Jan. 17, 1908.

Commissioners on Fisheries and Game, Room 158, State House, Boston,
Mass

GENTLEMEN: — I submit herewith a brief report of the lobster work accomplished at the Gloucester, Mass., station during 1907.

During the spring 1,232 egg-bearing lobsters were received, of which 61 were furnished by the Massachusetts commission and 1,171 collected by the employees of the station. The yield of eggs from these amounted to 17,199,000, from which were obtained 16,165,000 fry, which were distributed along the Massachusetts coast.

Though the egg receipts show a falling off of 5,647,000 from the previous season, the results of the hatching were in some respects more satisfactory, as the fry were much stronger than those produced the past three seasons, and there was less loss in the eggs.

Respectfully,

C. G. Corliss, Superintendent.

Statement of Fish and Eggs distributed from Gloucester, Mass., Station during 1907.

[Species, Lobster; Age, Fry.]

DATE.	To whom delivered.	Address or Point of Deposit.	Waters stocked.	Number
1907. June 22,	Bureau of Fisheries con-	Gloucester, Mass		
22.	_ signment	, ,	Massachusetts Bay,	400,00
•	Bureau of Fisheries con- signment.	Rockport, Mass.,	Ipswich Bay,	400,00
24,	Launch "Egret,"	Nahant, Mass.,	Massachusetts Bay,	300,00
24,	Launch "Egret,"	Boston, Mass.,	Massachusetts Bay,	500,0
27,	Launch "Egret,"	Beverly, Mass., .	Massachusetts Bay,	300,0
27,	Launch "Egret,"	Marblehead, Mass.,	Massachusetts Bay,	400,0
27,	Launch "Egret,"	Nahant, Mass., .	Massachusetts Bay,	300,0
27,	Launch "Egret,"	Cohasset, Mass., .	Massachusetts Bay,	500,0
29,	Launch "Egret,"	Beverly, Mass., .	Massachusetts Bay,	400,0
29,	Launch "Egret,"	Marblehead, Mass.,	Massachusetts Bay,	400,0
29,	Launch "Egret,"	Swampscott, Mass.,	Massachusetts Bay,	400,0
29,	Launch "Egret,"	Nahant, Mass., .	Massachusetts Bay,	400,0
30,	Bureau of Fisheries con-	Rockport, Mass., .	Loblolly Cove, .	1,000,0
uly 2,	signment. Launch "Egret,"	Salem, Mass., .	Massachusetts Bay,	1,500,0
2,	Launch "Egret,"	Swampscott, Mass.,	Massachusetts Bay,	700,0
2,	Launch "Egret,"	Boston, Mass., .	Massachusetts Bay,	800,0
5,	Bureau of Fisheries con-	Rockport, Mass., .	Ipswich Bay,	2,000,0
6,	Bureau of Fisheries con-	Gloucester, Mass.,	Massachusetts Bay,	1,500,0
8,	signment. Launch "Egret,"	Marblehead, Mass.,	Massachusetts Bay.	300,0
8,	Launch "Egret,"	Nahant, Mass., .	Massachusetts Bay.	600,0
8,	Launch "Egret,"	Boston, Mass.,	Massachusetts Bay.	600,0
13.	Launch "Egret,"	Manchester, Mass.,	Massachusetts Bay.	320,0
13,	Launch "Egret,"	Beverly, Mass., .	Massachusetts Bay.	240,0
18.	Launch "Egret,"	Boston, Mass	Massachusetts Bay,	480,0
15,	Bureau of Fisheries con-	Gloucester, Mass.,	Massachusetts Bay,	
17,	signment. Bureau of Fisheries con-	Manchester, Mass.,	Massachusetts Bay,	600,0
-	signment.		• •	600,0
22,	Bureau of Fisheries con-	Manchester, Mass.,	Massachusetts Bay,	150,0
24,	Bureau of Fisheries con- signment.	Gloucester, Mass.,	Massachusetts Bay,	50,0
26,	Bureau of Fisheries consignment. Total,	Gloucester, Mass.,	Massachusetts Bay,	25,0 16,165,0

REPORT ON THE SHELLFISHERIES OF MASSACHUSETTS.

Dr. George W. Field, Chairman, Commission on Fisheries and Game, Boston. Mass.

DEAR SIR: — I beg to report the following outline of the investigations conducted by the commission upon the shellfisheries of Massachusetts.

The three years of scientific investigation upon the edible shellfish of Massachusetts, as defined by the Legislature of 1905, in resolves 49, 73, 78 and 93, have been completed, and the results of this investigation are now on file at the office of the Commissioners on Fisheries and Game. The investigations of the past three years considered as a whole have been successful, in spite of the many failures which must accompany any work of an experimental nature. The entire life history of the scallop has been traced from birth to death, and suitable legal protection, based on that knowledge, has been given the scallop fishery. Practical cultural methods for both the clam and the quahaug have been devised and experimentally demonstrated by numerous test beds planted on barren or non-productive areas.

A report, consisting of the results of the three years' experiments, the methods of investigation, the application of cultural methods and the life histories of the edible shellfish, is now ready for publication. Although it has been impossible to obtain all the desired information in three years, and many important questions have not yet been satisfactorily answered, there is, nevertheless, sufficient material at hand to justify the publication of a report upon these shellfish.

In order to realize the full benefit of the investigations of the past three years it is necessary that the report when published should have a wide distribution, especially among the fishermen, shellfish dealers and all those directly and indirectly interested in the welfare of the shellfisheries, and who may wish to know definitely what results have been obtained through the investigations of the Commission on Fisheries and Game. The only way to satisfactorily meet this demand is to have an edition sufficient to furnish at least every fisherman and many consumers with a published account of the life, habits and methods of culture of these food mollusks. In order to print and distribute the required number of copies, it is earnestly desired that a special appropriation be made.

Although a start has been made in the right way by the investigations of the past three years, there still remains much to be done to complete our biological knowledge concerning these mollusks. The work of the past few years has been essentially preliminary to further work,—the establishment of a basis upon which to carry on work of practical benefit to the shellfisheries. Many people have misunderstood the position taken by the commission, and have expected that a practical work

of restocking the barren areas could at once be carried out. In the first place, the appropriations were of an amount which would have made hardly an impression upon the shellfish production; secondly, it would have been a waste of time and money to go blindly into the work without any knowledge about the subject; and finally, as a definite policy it appears to be a proper function of the State to ascertain and demonstrate what methods are most suited for giving practical results, rather than to directly undertake the actual work of restocking depleted areas at public expense. It would be equally reasonable for the farmers to demand that the State plant corn and potato fields at public expense. But it is eminently proper that the State should ascertain and demonstrate methods, and educate the public in the application of these methods. The chairman of the commission therefore ordered the work of the first three years to be confined to a preliminary investigation of the life and habits of these shellfish. which would furnish sufficient knowledge for the more practical work of later years.

The commission now possesses a scientific knowledge of these shell-fish and their methods of cultivation, which can be put to the practical benefit of these industries. Larger appropriations than those of the past three years are needed to pursue practical as well as experimental work. Appropriations should be made for shellfish in general, and not be confined to any particular mollusk. This would permit the commission to center its efforts where there was the greatest need, and each shellfish could be attended to in its season. Also, investigations could be made on the minor economic mollusks, such as the "winkel," sea clam, mussel, razor clam, etc., which are of value in certain localities, and have been totally disregarded.

The work of 1907 has been carried out on the same lines as the investigations of the previous year, and in part has been a direct continuation of the work of 1906.

The commission furnished me with three assistants for the summer: J. R. Stevenson of Williams College and F. C. Lane of Boston University continued the work at Plymouth and Ipswich, and W. G. Vinal of Harvard University assisted at the commission's laboratory at Monomoy Point, Chatham, Mass. The work of all the assistants was faithful and excellent in every respect.

Three distinct lines of work were carried out during the past year: (1) work on the north shore at Plymouth and Ipswich during the summer, by Stevenson and Lane; (2) a survey of the shellfish-producing area of the State, by Lane and Belding in the autumn; (3) work at the laboratory at Monomoy Point during the summer by Vinal and Belding.

The work on the north shore was confined to the soft clam (Mya arenaria). J. R. Stevenson conducted investigations upon the following points: (a) effect of soils upon clam growth; (b) food of the clam; (c) general observations, which are considered fully in his re-

port. He was assisted during the first half of the summer by F. C. Lane.

The work of the shellfish survey was conducted in a thorough manner by F. C. Lane during the summer and early fall, and completed by D. L. Belding in the late fall. Personal investigation of the shellfish areas, both productive and non-productive, was made, and important facts relative to the quantities produced, methods employed, labor and capital invested, town regulations and general history, etc., of the shell-fisheries, were compiled, and are embodied in the report upon the shell-fisheries of Massachusetts.

Work at Monomoy Point, as conducted by Vinal and Belding, consisted of two main parts: (1) the investigation of the embryology and early life history of the clam, quahaug and scallop, applying methods of spat collecting and artificial rearing of the young. Although abundant in 1906, no set of oysters could be obtained at Monomoy Point the past year, thus rendering impossible any work on the young of this mollusk. Although the young of the other three shellfish were studied, the results on the embryology and early life history of the scallop were most successful. (2) Growth experiments, checking up and continuing the observations of 1906, were conducted with all four shellfish. Various methods of artificial culture were applied to clams and quahaugs, and experimentally tested.

While the experiment station at Monomoy Point has been extremely well adapted to the preliminary work of the past three years, it has now outlived its usefulness. Further work, if extensive and practical, demands a broader field and greater opportunities. Besides its limited opportunities, the location of Monomoy Point (on the end of a peninsula, ten miles from the nearest town, Chatham) has many disadvantages for the situation of a laboratory. The lack of transportation facilities renders travelling expensive and wastes valuable time. Tools, working material, provisions, etc., are hard to procure when desired for immediate use, and manual labor can not be hired.

Respectfully submitted,

DAVID L. BELDING,

Biologist.

INLAND FISHERIES.

Trout. — A distinct advance was made last year in the administration of the wild trout fishery when the open season was made uniform throughout the State. From April 15 to August 1 these fish may be taken in any of the public streams, and it is no longer possible for an undue rush of fishermen to overfish the section which has the longer open season. The monetary value alone of the trout caught in Massachusetts is given by the Massachusetts Department of Statistics of Labor

as not less than \$66,000 per annum, not to mention the value of well-stocked trout streams as a stimulus to honest and healthful recreation, and a local as well as a State asset of direct or indirect value to all citizens. The young trout live chiefly in the weedy shallows and spring holes at the head of the streams, where they feed upon the small crustacea and insect larvæ. An important source of food is the larvæ of Anopheles, the mosquito which is responsible for the spread of malarial fevers. The crustacea and insect larvæ in turn feed chiefly upon microscopic plants, bacteria, diatoms, desmids, etc., which by their growth utilize the waste nitrates and nitrites washed from the soil. Thus the trout in the last analysis, in addition to furnishing recreation and food for man, destroys enormous numbers of the most malignant type of mosquito, and in a state of nature utilizes the waste natural products of the land.

Though for many generations the trout has been familiar as a source of sport and food, much remains to be learned of its natural history, and of the methods by which it may be fostered and maintained unimpaired in quantity and quality. Fortunately, few fishes are by nature so well adapted for artificial propagation, and under favorable conditions so difficult of utter extermination. The requirements are pure, cool, wellaërated water in reasonable supply, gravelly spawning grounds and protection for the breeders of medium size. The large fish more than three or four years old destroy as food too large a number of smaller trout. While on this account they are of undoubted value in checking the undue increase of the species under natural conditions, the large fish should be most sought because man has introduced other checks much more varied and effective. Some of the most important of these new checks introduced by man, and which are conditions directly prejudicial to the well-being of the trout, are (1) overfishing through destruction of the breeding adults, and fishing in nursery streams, with destruction of enormous numbers of undersized fish, — a wasteful practice and therefore properly illegal. A false criterion of successful fishing, i.e., undue emphasis is placed upon numbers rather than upon size and weight of the fish caught. This leads unthinking men to seek the slaughtering type of fishing rather than a real contest of skill with a veteran trout. (3) Pollution of the streams by sawdust, manufactory

wastes, acids, oils, tarry refuse, sewage, etc. (4) The ill-advised introduction of other species into valuable trout streams, or into waters communicating with such streams. In many instances black bass, pickerel, red perch and other enemies of trout have been introduced into waters suitable for trout. This is not only an economic mistake, but in other countries it is punishable by law. Unfortunately, however, we have not yet been driven to a proper consideration of the necessity of conserving carefully our natural resources. We should, however, lose no time in passing a law which should effectually advertise the fact that knowledge and forethought are necessary in maintaining our inland fisheries, and therefore no fish shall be introduced or planted in any public waters, or in any stream or pond communicating with public waters, without the written authority of the Commissioners on Fisheries and Game.

Of more far-reaching effect, however, are the disastrous results of (5) indiscriminate cutting of woodlands, and of (6) forest fires. There is no question that these two factors have enormously increased the range of difference in the volume of all our streams between the highest and lowest marks. With the loss of the spongy humus of the forest floor the run-off is so rapid that the shallow nurseries at the headwaters of the stream are washed out and stripped of their protecting vegetation, but the trout food and the young trout are prematurely carried down stream by the irresistible rush of waters, and become a prey to the larger trout. The gravelly spawning grounds in the upper reaches of the brooks are washed away and replaced by boulders. In the early summer the flood makes way for a drought. The trout nurseries dry up. If not completely, they become restricted to the deeper pools, where the young fry become unduly exposed to the voracity of their older kindred; or with the advent of winter these diminished streams and pools may be frozen solid, thus completing the destruction. Such is the melancholy history of some of the best trout streams of New England and of the middle States. These small streams are of much value to the State and to their locality as a source of water power for factories, farms and dwellings, in addition to the production of trout, and the entire responsibility for their maintenance must not be placed upon the national or State governments, but private owners or associations must develop

wise precautions by suitably protected forest reservations, where scientific methods will save the streams and the trout, and provide asylums for the useful birds.

While recognizing the fact that there is a wide difference of opinion among men competent to judge as to what constitutes the best measures to pursue for maintaining the trout supply, the most equitable laws to enact and the most efficient methods of propagation, stocking and distribution, we sincerely believe that your commissioners conscientiously seek to deal frankly, intelligently, tactfully and fairly, with due consideration of the economic and biological aspects of the problems which come to them for solution. The general basis upon which rests the problem of maintaining the trout supply was outlined in our previous report, as follows:—

Stocking State Waters with Food Fish.—The practice of maintaining and protecting the fisheries of the public waters at public expense is of long standing, and is firmly established in well-nigh all densely populated States and countries as both expedient and profitable. Two definite methods are in vogue:—

I. The regulation of fishing for the purpose of protecting the adults either (1) during the breeding season, or (2) in cases where the demand exceeds the natural increase: (a) by reducing the number of fish taken during the year; (b) by limiting the catch; (c) by limiting the number of days upon which fish may legally be taken, i.e., a close season; or (d) by prescribing how and by what apparatus fish may or may not be taken.

II. The artificial hatching and rearing of young fish, and subsequent stocking of the water by the liberation of fry just hatched, or, preferably, one or two year old fish.

The purpose for which such laws are instituted is absolutely correct. If the adults of both sexes are not protected, the number of fertile eggs laid is immediately reduced. Then necessarily follows a decrease in the number of young hatched, and a proportionally smaller number of immature fish. Observations indicate that in a natural trout brook, undisturbed by man, an optimum population of all classes of life is established; enough insect larvæ, adult insects, worms, crustacea and small fish of various species are present to furnish food for a rather constant number of young trout. Further, practically enough large adult trout are present to eat at least 90 per cent. of the trout fry before these young reach the breeding age, and to furnish a number of offspring practically just sufficient to furnish food for themselves and similar large fish. Thus a surplus of not more than a pair or two come to maturity out of the hundreds of annual progeny of each pair

of breeding fish, to replace the old trout which pass on through accident or senile decline.

When, however, man appears, and a considerable number of the breeding fish are removed by him, the most important consequence is a sudden diminution in the number of eggs laid and a corresponding diminution in the number of fry hatched; consequently, a relatively larger proportion of young fish which are destined to go as food for the "big fellows." A 2-pound trout, for example, requires a certain weight of animal food per day. He will persistently hunt until this amount is secured and his voracious appetite is satisfied. If, then, only a relatively small number of young trout are present. it is possible that every one of these may thus fall victims, and not alone an actually smaller number but even no surplus fry may remain to grow to become breeding adults. When this occurs the trout fishery in that brook declines, and the waters soon become occupied by less valuable fish; or else the stream remains unproductive, yielding either nothing to man, or at least less than its normal productive capacity. Such is the history and condition of most of the unpolluted waters of Massachusetts, chiefly from a failure to maintain unimpaired the number of breeding adults.

The necessity of meeting these conditions has led to biological studies which prove the following facts of economic importance:—

- (1) More trout fry can be secured by artificial impregnation of the egg than are ordinarily hatched under natural conditions.
- (2) The trout fry can be reared artificially in immense numbers, with less mortality than in nature.
- (3) By an increased quantity of food the rapidity of growth may be accelerated, and by substitution of an artificial food in place of young fish a greater weight of trout may be secured at less expense. Whereas nature feeds calves with whole milk and trout with smaller trout, man secures equal results at less cost by substituting foods of other less valuable materials.
- (4) To an age limit not yet very definitely determined, but which is at least at or near the age of sexual maturity (two years in the case of brook trout), more satisfactory economic results may be obtained by continuing the artificial feeding and rearing than by liberating the fry at an earlier stage. The obvious advantage of this method of stocking our waters is found in the fact that the larger the fish are at the time of liberation the smaller is the number that fall a prey to the voracious adults. Hence stocking with fingerlings, i.e., trout one year old, has proved more satisfactory and economical than stocking with fry, i.e., just-hatched fish, or, more exactly, fish which have just begun to feed actively and swim. Similarly, and such is the testimony of the Maine commissioners, it is to be expected that two-year-old fish would yield better results for restocking than would younger fish.

The Number necessary for Stocking.—The question of the proper number to liberate in a stream at the time of stocking demands a con-

sideration of several points: (1) the amount of food, (2) the minimum volume of water in times of drought, and (3) the number of fishermen resorting to those waters. In general, a large number of fish can be reared and transported relatively cheaper than a small number, and the chance of success is manifolded if the number is adequate. In too many cases we are obliged to make plants by liberating the young when the number of fish available is so small that it is probable that all the fry or fingerlings are eaten by larger fish, leaving no surplus to become established as breeders. Often an additional 100, 500 or 1,000 fingerlings in a brook or a pond would satisfy the demands of the larger fish, and leave an adequate surplus. This may cause one to question the practicability of any stocking of the water whatever; but we should note that nature does the work in this very way, producing what appears to be excessive numbers of young, very few of which ever attain ma-The best modern methods are close to nature's own practices. and in general merely seek to hasten and to strengthen her processes

Since our State hatcheries were established, great changes have come in the methods and possibilities of trout propagation. Formerly there were no commercial hatcheries; the State hatcheries were almost the only available source of trout fry. Fingerlings were rarely, if ever, used for stocking purposes. When it had been demonstrated that trout could be artificially propagated on a profitable commercial basis, many commercial plants developed. From the fact that such an establishment can sell its surplus adult fish at rarely less than 50 cents per pound, also a considerable proportion of the surplus eggs, fry and fingerlings, and that usually the proprietor or manager does the most important work himself (working sometimes twelve or more hours per day when necessary), or personally supervises unskilled laborers, the actual net cost per thousand fish is considerably less than when done at a State hatchery, where both skilled and unskilled labor must be paid maximum wages, and for eight hours' work.

In spite of this, we believe that the State should maintain its own hatcheries, (1) not alone for the purpose of maintaining its independence of combinations of commercial hatcheries to secure unduly high prices, but (2) particularly for the purpose of advancing our knowledge of diseases of both young and old fish, (3) of devising improved methods of handling and feeding such fish of all ages and conditions, (4) of determining the effects upon food fish of sewage and other pollutions and upon the possible sanitary problems related thereto, and (5) of making trials of new species and of developing improved breeds.

We are therefore strongly of the opinion that the State's facilities for producing fish for distribution to the public waters is entirely inadequate; that to properly meet this demand not

less than 5,000,000 trout fry and 250,000 fingerlings and larger fish should be produced annually. Only a small fraction of that quantity could be expected from a United States government hatchery located in this State. The private hatcheries are in many cases unable to meet the regular commercial demands, and therefore should not be depended upon for a public supply. We advise the purchase of a site and the development of hatching and rearing facilities which shall become in all its features a model, not alone for the economical propagation and distribution of food fish, but also adapted for accurate and complete studies of all the problems connected therewith. With increasing population and higher prices for essential nitrogenous foods the questions of securing the best possible yields from the water as well as from the land will become of greater importance.

Though we believe firmly that the brook trout is the fish par excellence for our streams, there is much other public water for which this fish is not adapted. To a limited extent we have distributed in certain of our water and have made observations upon the rainbow (Salmo irideus), the European or brown trout (Trutta fario) and the land-locked salmon (Salmo Sebago). When it was learned that trout fingerlings could not be satisfactorily reared at the Hadley hatchery (compare reports for 1903 and 1904), we considered the propagation of black bass or white perch or the large catfishes. With the loss of the surface water, however, this cannot be undertaken with probability of success, though the value of the hatchery building and the supply of ground water for hatching eggs continues thus far apparently unimpaired.

(6) In purely commercial practice it is found to be more profitable to use the eggs from yearling fish for propagation and market the adult fish during the spring succeeding the first spawning. Such a practice long continued must in time lead to a pronounced deterioration in the stock. To prevent our brooks from becoming stocked with inferior fish (the result of breeding from immature parents), the State, acting above and beyond purely commercial practices, must develop and maintain brood fish of such an age and condition as to guarantee the maintenance of the size and stamina of the fry.

Stocking State Ponds. — In stocking State ponds in accordance with section 19, chapter 91, Revised Laws, as amended by chapter 274, Acts of 1903, and further amended by chapter 306,

Acts of 1907, the writer is of the opinion that satisfactory results are frequently not obtainable for the reason that, as the law is mandatory, insufficient discretion is permitted to the commissioners, so that in many instances they are compelled to stock ponds with trout species where the presence of bass or pickerel is almost certain to preclude success. Thousands of trout fingerlings are thus annually sacrificed, to no practical purpose.

The suit which was entered by the Attorney-General against the town of Hadley for damages to the State fish hatchery at Hadley, through diversion of the waters of the brook, has been settled by the advice of the Attorney-General. The sum of \$350 has been received by the Treasurer of the Commonwealth as compensation for these damages.

As the State becomes more thickly settled, there is an annually increasing number of trout brooks leased or purchased by private individuals or associations from which the public are excluded. The question of securing to the public suitable fishing places for recreation must be taken up and settled in the near future.

So much of the report of the superintendent of the Sutton hatchery as pertains to the hatching and rearing of fish follows:—

The eggs collected this season amounted to 548,000, 26,000 of these being brown trout. Of the brook trout eggs, 100,000 were sent to Winchester hatchery, and the remainder, numbering 442,000, were hatched here, resulting in 390,000 fry, enough to fill the applications consigned to this hatchery and stock the ponds moderately.

The brown trout eggs hatched 24,000 fry. All were reserved for the rearing ponds below the dam, where the quality of the water makes it unsafe to place any other fry. The stock of brown trout has been kept so reduced as to yield not more than 30,000 eggs, enough to stock the ponds that seemed best suited to it. It is, however, apparently so well adapted to the water that flows from the breeding pond, the greater part of which goes to waste, that it seems practicable to use this water in keeping a larger brood stock, and secure annually 100,000 or perhaps 200,000 eggs. The hardiness of this species of fish, that makes it possible to rear the fry where others so often fail, is shown both in the brood stock and eggs. The defective and weak breeders so common in the brook trout stock are never found. The conditions most favorable for this trout contrast strongly with the conditions preferred by the brook trout. The spring-fed pools in which the brook trout will grow to the largest size seem so unfavorable for the brown trout that the

best will not equal the smallest brook trout. The brown trout make their best growth in the warm water flowing from the pond, in which it is exceedingly difficult to keep brook trout alive.

Ten thousand landlocked salmon eggs were received from the station of the United States Bureau of Fisheries at Green Lake, Me. They hatched late, nearly a month later than the trout eggs, and as they were doing poorly in the hatchery they were removed to some temporary troughs at the springs. Here they did better, and grew into a good lot of fingerlings, numbering 4,000 at the time of distribution. Fifty thousand rainbow trout eggs were received through the United States Bureau of Fisheries from Manchester, Ia., but having been frozen in transit the loss was heavy, and the vitality of the fry possibly weakened, for they did not thrive in any water. Though suited to widely varying conditions, they failed in the warm pools usually stocked with them, as also in the cooler water usually reserved for brook trout. However, the small number that survived the period of weakness grew into the largest fingerlings ever raised here.

The brook trout fry was of the usual quality, except that it contained more defective and crippled fish, thus requiring much time to remove them. The hatching was late, and some of the fry were hardly old enough to feed when sent out. This condition, however, cannot easily be remedied, as it is caused by the cooling of the water in the too long run through the pipe to the hatchery, though some benefit may be gained by improving the conditions at the springs, where the water is collected in small open ditches of considerable aggregate length. Drain tile is being laid in these ditches, so that the water will be nowhere exposed to frost. This work was undertaken previously, but was given up on account of trouble with quicksand. It is found, however, that by bedding the pipes in coarse gravel, and using this freely to cover them, they can be kept open. If this does not make a change for the better it would be well to set some outside hatching troughs at the springs, on the upper course of the brook, to be used when the weather becomes sufficiently mild, and to hasten the late eggs. deep trough used at so many of the State and national hatcheries would be safe in any weather, and is equally good at hatching fry or rearing fingerlings.

The fingerlings reared did not equal in size the exceptional lot reared the previous year, but were fully up to the average. The most of the ponds showed an increase in numbers, but this was offset by a large decrease in one pond (usually the best), and by discontinuance of the rearing tubs, as the trout in them were so small and feeble as to appear useless if reared.

For several years the average size of the brood stock has been declining, and while excellent in quality, it was thought best to introduce new stock, to secure the advantage of larger size. Two thousand fingerlings were purchased, and they developed into the best yearlings ever

reared here, showing in their spawning a large increase of eggs per fish over the previous year, and undoubtedly as second-year spawners will very largely increase the egg yield.

The extra work during the year was largely directed to providing additional room for rearing birds. The practical limit of the water supply for rearing fish has been reached; therefore no attempt was made to increase the facilities, beyond improving the ponds to give them better protection. More ponds were covered with netting, as it was found that the herons, barred out of the most accessible ponds, turned their attention, somewhat successfully, to the deeper ones. The second pond, usually stocked with yearlings, and the smaller pond above it were walled with stone, and the dam of the yearling pond, with the runway below, for handling spawning fish, were constructed with concrete.

The benefits of this work were quickly shown by the much larger number of yearlings reared and the ease with which they and the larger trout were handled for spawning. The usual general improvements were made, to a less extent, perhaps, as little additional labor was employed for this. Stumps were blown out, brush cut and some grading done; a road was built to the upper tubs, that fish might be more readily shipped from that place. When the pond was drained to complete the spawning the fish were removed, and the mud which had accumulated for eight years was washed out, through a channel built for that purpose, to the flat below the dwelling, where it partially filled the swampy places.

Respectfully submitted,

ARTHUR MERRILL,
Superintendent.

The total number of fish distributed this year to public waters by this department was 855,000 trout fry, 71,000 trout fingerlings, 20 adult pike perch and 3,000,000 landlocked smelts. In addition to this we are informed that several clubs and individuals purchased and distributed through the activity of the Massachusetts Fish and Game Protective Association 54,000 fingerlings.

As we have previously pointed out, these numbers are entirely inadequate to meet the requirements. The legitimate and insistent demand for an increased number of fish makes it imperative that additional facilities for hatching and rearing trout should be provided by the State.

Many of our streams have, as a result of denudation of the watersheds and the pollution by manufactory wastes, become

uninhabitable for the brook trout. In some of these we have introduced the brown trout (*Trutta fario*). The experience and opinion of the New York commission is similar to our own.

There has been considerable discussion of the policy of planting brown trout in State waters. The attitude of the present commissioner on this subject is unfavorable to the introduction of brown trout into waters which the brook trout now inhabits. He does not consider it desirable to liberate brown trout in such waters because it is a much larger fish, growing far more rapidly than the brook trout, and soon driving away or destroying its smaller relative. It appears to be perfectly proper to stock with brown trout such waters as have become unsuitable, and therefore no longer contain brook trout. There is room in State waters for both species, and each has its own advantages. Public sentiment will never abandon the brook trout, which has long held a high place in the affection of the angler and nature lover.

Brown trout (*Trutta fario*) in considerable numbers were taken this year by many fishermen in the Westfield River, as the result of 40,000 brown trout fry introduced there by the commissioners in 1904.

PROTECTION OF USEFUL BIRDS.

Massachusetts for many years has taken an advanced position in its demand for the protection of our useful birds. people we have had costly experience with biologic blunders, notably the massacre of small hawks and owls under the stimulus of a bounty; the introduction of the English sparrow, the gypsy and brown-tail moths et al.; the slaughter of the heath hen, wild pigeon, woodcock, wood duck et al. Shooting has made our shore and marshes in spring no longer a safe haven where, as formerly, the Wilson's snipe, sandpipers and plovers, black duck and Canada geese may nest, undisturbed by the sound of burnt gunpowder. Our territory has been scoured by numbers of quasi-" naturalists " who, during the nesting season, have both killed the breeding birds and taken the nests and eggs. Such birds as only rarely visit or nest within our borders are particularly sought and are pursued with especial keenness, until they are finally bagged and skinned, to be exhibited as proof of the

¹ From the twelfth annual report of New York Forest Fish and Game Commission, transmitted to the Legislature Jan. 2, 1907, p. 120.

collector's knowledge and veracity. Such acts practically nullify the natural conditions which make for extension of the range of various species into regions where the environment may become more favorable. Thus the red-headed woodpecker, the orchard oriole, many warblers and other species which come to us annually in limited numbers might become established if spared by these collectors in their zeal for making "new records" for the State, county or town for dead birds. We might make a more worthy record by pointing to many nests of birds which are now "rare" here, but which, if favorable conditions were provided, might become relatively numerous.

Other of our more valuable birds are either diminishing in numbers or no longer come to us on account of the scarcity of suitable breeding places. Modern methods of building have proved prejudicial to the eave and barn swallows, the chimney swift and the phobe bird. The necessity of destroying old orchards on account of the San José scale and gypsy moth must in time make it much more difficult for the bluebird, greatcrested flycatcher, wrens and screech owl to find suitable nesting sites. Mr. William Brewster, the eminent ornithologist, who has been studying the question, believes that the wood duck has suffered on account of the absence of suitable nesting sites, and has suggested that suitable boxes be provided, especially on islands, where these beautiful ducks may make use of them. therefore behooves all individuals and associations having the welfare of the community at heart to arouse active and intelligent interest in every community to diminish the number of English sparrows, and to increase the number of suitable building sites available to such birds as nest in cavities or in buildings. In many parts of New England bird clubs have been formed for these purposes, usually restricted, however, to school teachers and children. Such activities are exceedingly valuable, both from a practical and an educational point of view, but the question is of such importance as to be well worthy the attention and activity of sportsmen's associations, farmers' organizations and of public officials.

The Least Tern in Massachusetts. — This State is the natural guardian of one of the three last remaining breeding places of

the beautiful little mackerel gull, the least tern. The remote sandy shores of Martha's Vineyard still are the resort of the pitiable remnant of this bird, which fell victim to the fashion in millinery, and was killed by thousands on the north The wings and sometimes the skins, eagerly Atlantic coast. purchased by the wholesalers of New York, London and Paris, are still being placed on the market, and are imported in considerable quantities, though the law in this State very properly places a penalty for the possession of these birds wherever they may have been taken or killed, or whatever their history. So many of these wings and skins have been disguised by dveing, dissection and other "manufacturing" that they may be foisted illegally upon an unsuspecting purchaser. The purchasers of feathers and hats cannot be too guarded in their selections.

It is hoped that the few hundred least terns left after the slaughter may yet increase in numbers. There are indications that the Massachusetts colony has, perhaps, gained 30 or 40 birds over the numbers nesting here in 1906. At our request Mr. William Hazen Gates visited the breeding grounds; his observations are given below:—

June 19, 1907. Trip to Katama Bay.—On this trip 37 nests of the least term were counted, most of which were localized in two colonies. Between these two points the nests were scattered along, nearly in a line, just above the highest tide mark. The two colonies were in open patches of sand, almost entirely free from grass. The nest in no case consisted of anything more than a mere hollow in the sand. The eggs were probably freshly laid, as two weeks previous to this no sign of any nests was found along the beach. The nests contained two eggs each, except in 7 cases, where they contained but one apiece. It is probable that the total number of nests could not have exceeded 50, as none of these terms were found along the east shore up as far as Cape Poge nor to the west as far as Herring Pond.

June 26. Trip to Katama Bay.—On this trip practically the same ground was covered as on the last, made June 19. Only 31 nests were counted, although the ground was gone over quite carefully. With the exception of 3 nests they all contained the normal number of eggs, namely, two; the 3 contained but one egg each.

On this trip 1 nest, containing two eggs, of the common tern, was found in the midst of one of the colonies. Aside from this one instance these two species of terns seem to nest separately; the least

tern preferring the open sand, and the common tern the places somewhat covered with grass, or patches of drifted seaweed.

One nest of the least tern was found at Monomoy Point, near the lighthouse, on June 9, and three other birds were seen. At Wood's Hole, also, on Penzance, 1 nest was found and two other terns seen on July 8. These, combined with the colony of nests on the south beach near Great Pond (in which colony 8 nests were counted on July 5), make the total number of nests actually seen 47. Thus it is probable that the total number of nests on the south shore of Martha's Vineyard did not exceed 60 or 65.

The trip on June 26 was made with special reference to the full-moon tides, which had been running especially high. Although the tide had flowed over the sand bar at the south of Katama Bay at one point, it was not high enough to reach the place where the least terns were nesting, as the lowest nest measured about a foot (perpendicular) above high water.

There was a heavy storm on July 2, accompanied by a southwest wind, and on July 5 a trip was made to the south shore in order to see if it had destroyed any of the tern's nests at Great Pond. It had not, however, done any damage to the nests.

Common Terns. - In the trip made to Katama Bay and Cape Poge on May 29 a colony of common terns was found nesting on the south beach. Eleven nests were counted; of these, 4 contained two eggs each, the rest one. Nine of these nests were well grouped in one place and the other 2 were scattered. By the next trip, June 19, all but 3 of the colony had been destroyed and these 3 were gone by June 26. In both cases the cause was high tide, which overflowed the bank once at least during the full-moon tide, about June 25. It is very likely that this colony of terns was driven to nesting in another place, as on June 19 a colony was found not far distant. In this colony 14 nests were counted; of these, 4 contained three eggs each, 7 two each, and 3 one each. Six of these nests were very well built, consisting of quite a mass of dry beach grass, which had been moulded into a very good nest. This colony remained undisturbed up to June 26, when they were last visited, although some fishermen had camped in a tent only about two hundreds yards distant.

There was no sign whatever of any one molesting the eggs of either these or the least tern. Although the tracks of the fishermen were seen all along the south beach of Katama Bay, yet there was no evidence that any of the terns' eggs had been taken or disturbed.

Food of Gulls. — The herring gulls rendered efficient service during the late autumn in Saugus River by devouring thousands of the dead herring, which threatened to become a public nuisance. Though the bulk of the food of the larger gulls is floating

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organic refuse, observations have been made which indicate that they might become valuable birds on land if they can at length overcome that fear of man, inculcated by generations of remorseless pursuit by gunners for feathers for millinery and the man who shoots not wisely but too well.

Although the usual food of gulls (Laridæ) consists of fishes and insects, they feed also upon rodents. During the vole outbreak in Scotland, in 1892, several species of gulls, notably the great blackbacked gull (Larus marinus), fed upon the field mice; and gulls are usually named among the species that feed upon lemmings during their migrations. It is highly probable that the larger American gulls feed upon field mice whenever they find them.

The Bird Colonies at Muskeget, Penikese and Weepeckets.—Through the devoted efforts of Geo. H. Mackey, Esq., and other bird lovers the colonies of common and roseate terns and laughing gulls on the Island of Muskeget have become restored in a fair measure, and now show some similarity to the condition previous to the "great slaughter" for millinery purposes. In company with Deputy J. E. Howland the writer inspected the colony again this summer. Large numbers of young birds are annually killed by cats, but in spite of this the number of birds breeding here is increasing.

The colonies of common and roseate terns on Penikese and on the Weepeckets also show a gratifying increase. This is not true, unfortunately, with the birds which attempt to breed on Monomoy. Cats practically complete the work which hunters and fishermen begin, and relatively few birds rear their young successfully, even in the more remote sections of the island, which is by nature well adapted to serve as a breeding ground for many species of birds.

Wild Swans in Massachusetts. — All true sportsmen and bird lovers cannot fail to deplore the killing of three wild swans on Nantucket last winter. While doubtless these hunters were within the law and their legal privileges, the fact that these birds, formerly numerous in this State, have been pursued so relentlessly that during the past twenty years but five have been

¹ From Bulletin No. 31, Biological Survey, United States Department of Agriculture, An Economic Study of Field Mice, by David E. Lantz, issued Oct. 28, 1907, p. 53.

taken on this coast, should be sufficient to stay the hand of any reasonable person. An editorial in the Boston "Transcript" well reflects the best type of public sentiment:—

It would seem as if our game laws were comprehensive enough to protect any representative of wild life that it was for the public benefit to have protected; still there are some weak spots in them. To harbor or protect an English sparrow is a misdemeanor but wood ducks, upland plover, all species of herons, mourning doves and wild pigeons are protected by law at all times of the year, and a great many other varieties at stated times. The wild swans do not seem to have been mentioned in the class over which the ægis of the law's protection is placed. and that accounts for the slaughter of three of these birds by some pot hunters in Nantucket the other day. The local newspaper report of this exploit said: "Very few swans have been shot on the New England coast in recent years, good authority stating that but five have been previously taken in the last twenty years." And the hospitality which these beautiful creatures receive when revisiting the homes of their ancestors is to be filled with bird shot. The swan is as much a creature of romance as the deer, and as deserving of protection. Whether the pot hunters in question were violating the law of the State we do not know, but they were disgracing themselves and their community in thus doing their best, or worst, to drive toward extinction one of the most beautiful and noble species of bird life in all the world's history. The south shore and the cape furnish the natural habitat for these graceful creatures of classic fame, and only the stupid craze for slaughter or the man with a gun prevents them from recolonizing their old haunts and coming to their own again.

Birds	kille	d on	the	Isla	nd of	Nan	tucket	fron	n A1	pril	1 t o	Dec.	<i>3</i> 1,	1907.1
Black	duck,	,												571
Brant,							•							263
Wild g	eese,	•												119
Golden	plov	er,		•			•			•				112
Beetle	heads	, rec	l br	easts	and	other	specie	s of	plo	ver,				1,025
														2.094

Bird Sanctuaries. — There has been a healthy growth in the idea of setting apart suitable extensive areas where birds may nest and rear their young in comparative safety. These bird reservations, or "bird sanctuaries," promise to open a most feasible method for increasing bird life, and are being estab-

¹ From reports of Capt. Wm. C. Dunham.

lished in many sections of North America by the co-operation of local and national organizations, notably the National Audubon Society, and State and national governments. This idea is in its inception totally distinct from the ordinary "game preserve," where the owners or lessees exercise complete control over the shooting, and to a greater or less extent thereby acquire special privileges and convert to their own use game which is a public asset. It is a question worthy of consideration whether such special privileges as the private acquisition of public property, viz., the killing and reducing to private possession of game birds or mammals upon land from which the public is excluded, should not be called upon to pay a special tax for this privilege. In the other sort of bird reservation no birds are to be killed, either by the owner or by trespassers. A writer in the Philadelphia "Record" says:—

The statisticians who foot up the loss to the country resulting from the killing of insect-destroying birds, and from our further neglect to intelligently protect and foster these winged scavengers of the air, put the gross sum at \$800,000,000 per year. We do not know upon what facts or what basis of computation this enormous total is reached; but if it is one-tenth part true it is a startling showing. The proposition of the federal government to set aside bird reservations and breeding grounds where our feathered friends might be protected in life, liberty and the pursuit of happiness seems to rest upon sound economical grounds. It is a measure of safety for ourselves as well as for the birds.

A writer in the New York "Sun" says: -

The protection of birds in England has reached such a stage that they have become a nuisance, and now it is not unlikely that a systematic war will be waged upon them. The complaint is not of the game birds, which pay in sport and in the market; it is the little feathered creatures that are bothering the farmers and gardeners.

Of course the [English] sparrows are the worst. They have grown to millions in the southern part of England, and the Kentish farmers have had to organize battues to reduce their numbers, as they were devouring seed and grain and destroying fruit to a ruinous extent. Tens of thousands have been shot or caught with bird lime.

The other birds mentioned as destructive to agriculture are bullfinches, starlings, crows and pigeons. Such statements may tend to a confusion of facts, and tempt the average mind to question the wisdom of protective measures in Massachusetts; but a brief examination of the facts discloses the true situation.

The English sparrow and the starling in the United States have already begun to duplicate the damages above referred to, not alone directly by destroying garden crops, such as early lettuce, radish, beets, etc., and taking tribute of rye, barley and other grains, seeds, etc., but more insidiously by replacing the more valuable native birds, such as the vireo, swallows, martins, cuckoos, orioles and other species which feed exclusively on insects. While it is true that the English sparrow when at its best takes insects to an extent of about 50 per cent. of its food, a very considerable economic loss arises from the fact that the sparrow has replaced species which feed exclusively on insects, and which can by no chance damage property in any degree.

The pigeons referred to are not like our Carolina doves, but are directly comparable to the ownerless pigeons of our city streets, which have descended from escaped tame birds. By some fortunate chance we have thus far escaped the bullfinch, and if Congress properly recognizes the great value and notable efficiency of the work of the United States Biological Survey, the chances of the introduction of injurious birds and mammals in the future will be minimized.

The Use of Birds as Millinery. — It is of interest to note, in connection with the destruction of birds for millinery purposes, that even in darkest Africa steps are being taken to check the killing of birds for the plumage. There has been a gradual development of public sentiment against that feminine fashion of adornment which develops a practice which is ruinous to the country where the birds are killed, and pernicious when the birds are used as ornaments. Of special importance is the fact that the French government is taking measures to preserve the birds which have been an important asset of the western Soudan, on the upper Niger River, south of the Sahara. Dr. G. Decourse, to whom the French government entrusted the investigation of this question in that land "where in days gone by the Mohammedan natives would have killed any white man on sight, though they collected feathers to adorn the costumes of the women of the white race," reports that the hunting of the white

heron (whence come the "aigrettes") should be entirely prohibited for two years, and that to increase the supply, reservations be established, within which natives shall never be permitted to hunt this bird. He further recommends that small French military posts be established throughout the regions to enforce this law.

Happily for the birds, and thus for mankind, most of the feathers now used for millinery purposes are "made," i.e., are natural feathers, chiefly from domesticated and game birds, rearranged and gummed upon forms by hand, one feather at a The gayest colored plumage, the startling and bizarre effects, as well as the extremely artistic creations, are the result of a combination of dyeing and professional feather working. A prominent feather worker in London said: "We have agents all over the world, who buy up poultry and game feathers and send them to the great centers (Paris, Vienna, London and New York), where they are distributed for manufacture." But "while ladies demand exotic plumages the manufacturers must supply it. It is impossible to imitate the natural beauties of the osprey (i.e., aigrette) or the bird of paradise, or of any of the exquisite little birds that come from purely tropical climates. Birds, however, are not fashionable this year, but a stock must always be kept in hand." Many unprincipled dealers are selling heron feathers (not only "aigrettes" or "ospreys" but also other feathers from this family) under the claim that they are "manufactured," thus conveying the impression that they are purely artificial. The process of "manufacture" consists in cutting the skins and the real feathers into possible and profitable lengths, dyeing the soiled feathers, and binding them into various combinations and shapes. The parts of such composite birds are usually not difficult of identification, and milliners and others should be on their guard lest they be imposed upon by specious tradespeople, who, by selling such goods under false pretences, may bring the wearer or possessor into the cognizance of the police court.

Shore Birds. — Many sportsmen have rejoiced in the fact that during the spring and fall migrations of this year shore birds, notably Hudsonian curlew, "beetleheads," "yellow legs" and others have been found in unusual numbers, "more than

for twenty years," etc. The majority of persons, however, fail to take into consideration the fact that such local abundance does not necessarily indicate an increase in the total number of such birds throughout the entire range of the species. much more probable that on account of the unusual meteorological conditions, storms, heat and cold, the migrating birds in greater numbers were compelled to stop within our borders. We are strongly of the opinion that the rapid decrease of the migratory game birds, such as ducks, shore, marsh and beach birds, will continue at even accelerated speed until adequate provision is made for safe and attractive breeding grounds through a much wider range of territory than is at present available for the birds. For example, Canada geese, several species of ducks, plover, rails and shore birds formerly nested on our seacoast and shores of our inland waters, in our marshes, or even in the States farther south. Though summer cottages and agricultural operations have in many places greatly altered the natural conditions. there will long remain many localities in this State favorable for breeding an annual crop of ducks and shore birds. secure such a desirable addition to our bird population, it is first of all necessary that the birds, during the spring migration, should while in our territory be free from the noise of the bombardment which has followed them on their journey southward. With the cessation of this noise comes the feeling of security. and the number of birds remaining to breed within our borders will tend to increase annually. We have long been of the opinion that all shooting, whether on the seashore or inland, should cease not later than December 31 of each year, and begin not earlier than September 1 or October 1 for ducks. In our opinion such cessation of spring shooting is the prime essential for increasing or even maintaining the stock of native birds.

Upland Plover (Bartramian Sandpiper). — The only upland plover we have seen this year were 48 dozen in cold storage. The relentless pursuit of this bird in the neighborhood of its breeding grounds, as well as during its migration, has brought it to the verge of extinction. During several visits on Martha's Vineyard the writer has been unable to see a single individual of this species, and on but one occasion was their call note heard. Deputy I. O. Converse reports that a careful search over their

former breeding grounds in Westminster, Ashburnham and Ashby failed to discover a single plover. The farmers in that section appear to be unanimously of the opinion that they "have not seen a plover for two years," either breeding or migrating. This fact is especially to be deplored, for this bird is an extremely valuable destroyer of insect pests. About 150 "flight birds" were reported from the neighborhood of Newburyport in August. The commissioners would welcome reports as to the presence or absence of this bird in the sections where it formerly was frequently seen.

The Value of Herons. — Of our herons, the American bittern (Botaurus lentiginosus) is probably the best known destroyer of meadow mice. This bird is well known in Massachusetts as the "stake driver," making its home in moist meadows, bogs and swamps. Baird, Brewer and Ridgway say of it: "It does not move about much by day, although it is not strictly nocturnal, but is sometimes seen flying low over the marshes in pursuit of short-tailed or meadow mice, which are frequently taken whole from its stomach." 1 Records of the Biological Survey contain a number of instances in which meadow mice were found in stomachs of this species.

Among other Herodiones that feed upon meadow mice are the least bittern (Ardetta exilis), wood ibis (Tantalus loculator), great blue heron (Ardea herodias), American egret (Herodias egretta), snowy heron (Egretta candidissima), and the black-crowned night heron (Nycticorax nycticorax nœvius). While frogs, fish and fresh-water crustaceans form the major portion of their food, they feed also upon mice, shrews and other small mammals. As a group they undoubtedly effect a reduction in the numbers of meadow mice in America.

Hawks and Owls. — The new law, chapter 250, Acts of 1907, protecting certain hawks and owls, will make for good in at least two ways: (1) the birds which are most distinctly valuable to the agricultural interests of the State will be directly protected, and (2) the fact that these birds have been popularly misjudged will be foreibly advertised.

¹ The Water Birds of North America, vol. I, p., 70, 1884.

² From Bulletin No. 31, Biological Survey, United States Department of Agriculture, An Economic Study of Field Mice, by David E. Lantz, issued Oct. 28, 1907, p. 52.

Few farmers and sportsmen realize that the majority of the hawks and owls are beyond question beneficial to the community, and therefore worthy of the most careful protection rather than such incessant persecution as has been their lot in the past.

The farmer can scarcely have more valuable dumb "help" on his property than one or more pairs of screech owls (Scops asio), popularly known as "small cat owls," either occupying a hollow stub in his orchard or a box placed especially for their occupancy. These birds will destroy an incredible number of insects injurious to garden crops, and wild mice, which girdle the young apple and peach trees. Of the stomachs of this owl examined by Dr. A. K. Fisher 50 grasshoppers were found in one stomach, 18 May beetles ("white grubs," destructive to grass and to strawberry plants) in a second, and 13 cut worms in a third. Of a total of 254 stomachs examined, nearly three-fourths of the food was found to be made up of mice and other injurious mammals and insects, and only about one-seventh of birds (chiefly English sparrows).

Few farmers realize that the damage which is done by the really predatory great horned owl to the poultry keeper who permits his fowls to roost in the trees is vaguely attributed to "an owl," and in the punishment which is consequently meted out, without discrimination, to all owls, the beneficial species have suffered most, for the reason that they are most numerous.

Of the commoner birds of prey which, previous to the enactment of chapter 250, Acts of 1907, were legally subject to destruction, but which are now protected by law, the most important are the two hawks which habitually haunt the fields and meadows, skimming low in search of mice, the marsh hawk and the rough-legged hawk. They are but rarely seen soaring, after the manner of the real "hen hawks." Their habits of flight are sufficiently distinctive to furnish the necessary sign to the hunter that these species are not to be killed. The other species is the osprey, or fish hawk, which from its domestic habits frequently takes up a nesting place in the very dooryard of the friendly farmer, even building its nest upon an old wheel placed for that purpose upon a pole. The large size and white underparts readily distinguish this species, which is of undoubted value to the poultry keeper, since it guards its nest with great vigilance,

and thus drives away the smaller hawks which are liable to acquire an appetite for poultry. The ospreys live entirely on fish, and are by nature so amiable as to permit smaller birds to nest within the interstices of their bulky home. The law, even as amended, permits the shooting of the goshawk, duck hawk, sharp-shinned hawk and Cooper's hawk, all of which are without doubt harmful, in that the larger part of their food is comprised of more valuable birds. The goshawk, the "blue hen hawk," present in Massachusetts only in the winter, is very destructive to hares, rabbits, ruffed grouse, heath hen and quail. From an experimental enclosure at the Sutton hatchery it is believed that at least 12 full-grown "white hares" (the northern varying hare) were taken last winter by presumably the same goshawk before the superintendent succeeded in killing the robber. This hawk was unusually numerous in Massachusetts during the winter of 1906-07. The duck hawk is local in distribution and is comparatively rare in Massachusetts. The Cooper's hawk is the most common of the hawks mentioned and therefore the most destructive, and, together with the smaller, sharp-shinned hawk, is responsible for the bad reputation too generally given to all hawks. These birds are difficult to describe, but are sometimes known as "blue darters," from their long and slim contour and the rapidity of their flight in pursuit of their object. these hawks are of small or of medium size, with a relatively long tail barred transversely.

It is in a measure unfortunate that protection is denied to the red-tailed and red-shouldered hawks, to the barred owl and especially to the snowy owl, so numerous on the seacoast of Massachusetts and Rhode Island in certain winters. As many as 500 have been reported as killed in New England in a single winter. These birds prey almost exclusively upon mice and rats, and in the far north particularly are, therefore, of great value in checking the increase of these animals, which are so destructive on these great northern breeding grounds to the eggs and young of wild birds. Inasmuch as the northland is now the great nursery of our migratory host of insect-eating warblers, thrushes and other song birds, and of our shore birds, ducks and geese, where practically the only danger may be from wild animals, it is probable that the destruction of such large numbers of birds

so useful as the snowy owl may seriously upset the balance of nature in that region. The snowy owl should be protected as an economic measure.

The short-eared owl (Asio accipitrinus) is probably the greatest enemy of field mice. It figures in many historical accounts of vole plagues in England and on the continent. Holinshed's "Chronicle" closes the account of voles in Danesey Hundred, of the county of Essex, in 1581, by saying: "Which vermin by policie of man could not be destroyed, till at the last there flocked together such a number of owles as all the shire was not able to yield, whereby the marsh holders were shortly delivered from the vexation of the said mice." Similar testimony as to the efficiency of owls as destroyers of voles is contained in other chronicles, and in the account of later outbreaks the species is definitely stated to be the short-eared owl.

The chief economic functions of hawks seems to be the destruction of harmful rodents and insects. A majority of the species are decidedly useful, their good qualities far outweighing the bad. A few have no harmful habits, but are wholly beneficial. A smaller number have good and bad traits nearly balanced, or certain species may be beneficial in some localities but harmful in others. Two common species—the Cooper's and sharp-shinned—destroy so many birds and poultry as to far outweigh any good they may do. If legislation against hawks is needed, which is more than doubtful, careful discrimination should be exercised as to the species placed under ban, and corresponding protection should be given those that are of undoubted benefit to the farmer.

Owls.—Owls are pre-eminently enemies of mice. Their eyes are adapted to twilight and nocturnal hunting, and they prey mostly upon animals that are active after sunset. Noiseless of wing and possessed of sharp talons and much strength, they attack small mammals with great success.¹

Forest Fires. — The effect of forest fires upon fish and game are not properly understood by the public at large. Many adult birds are destroyed. Instances are on record where, under exceptional opportunities for observation, birds flying over burning areas have been seen to succumb to the heat and smoke, and to fall into the flames. The damage to nesting sites, the nests and eggs or the newly hatched young is more general, and without doubt may very considerably diminish the avian population which that section under normal conditions should maintain.

¹ From Bulletin 31, Biological Survey, United States Department of Agriculture, An Economic Study of Field Mice, by David E. Lantz, issued Oct. 28, 1907.

The destruction of the spongy, moisture-retaining characteristic of the forest floor increases vastly the rapidity of the "run-off" of water, causing thereby the rushing freshet to destroy the eggs and even the spawning ground of trout. Correspondingly it causes the small streams to dry up early in the summer, and thus destroys the small trout and their nursery.

Under the law passed this year (chapter 299, Acts of 1907), placing upon our deputies certain duties in suppressing forest fires and their causes, our deputies in three instances report work of this character. We believe that our paid deputies will become increasingly efficient in this important duty with the better organization of the forest fire-ward service throughout the State, now being ably undertaken by the State Forester.

We have no classified knowledge of the causes of forest fires in this State, but these would probably differ but slightly from those in New York State.

The causes, as reported by the fire wardens of New York were:—

Railroad locomot	ives.	_										20
Tobacco smokers,	•		·					•			•	14
· · ·	•	•	•	•	•	•	•	•	•	•	•	
Fishermen, .	•	•	•	•	•	•		•		•	•	14
Hunters, .												8
Campers, .												6
Supposed incendia	aries,											11
Clearing land,												9
Children at play,												4
Berry pickers,												2
Bee hunters, .												1
Imbecile, .												1
Burning house,												1
Unknown, .												51
												¹ 142

GAME.

Pheasants. — In 1895 Commissioner Brackett secured from the late Judge Denney of Oregon 12 birds which at that time were called Mongolian pheasants, but which in reality were of the species *Phasianus torquatus*, or ring-necked pheasant, variously called synonymously "Chinese ring-neck" and "Engricustry Chinese ring-necked pheasants, the chinese ring-necked pheasants and "Engricustry Chinese ring-necked pheasants" and "Engricustry Chinese ring-necked pheasants and "Engricustry Chinese ring-necked pheasants" and "Engricustry Chinese ring-necked pheasants and "Engricustry Chinese ring-necked pheasants" and "Engricustry Chinese ring-necked pheasants and "Engricustry Chinese ring-necked pheasants" and "Engricustry Chinese ring-necked pheasants and "Engricustry Chinese ring-necked pheasants" and "Engricustry Chinese ring-necked pheasants and "Engricustry Chinese ring-necked pheasants" and "Engricustry Chinese ring-necked pheasants and "Engricustry Chinese ring-necked pheasants" and "Engricustry Chinese ring-necked pheasants and "Engricustry Chinese ring-necked pheasants" and "Engricustr

¹ From the twelfth annual report of New York Forest, Fish and Game Commission, transmitted to the Legislature Jan. 2, 1907, p. 43.

lish ring-neck." Since then the descendants of these birds, on an average of about 400 pheasants per year, have been distributed to applicants, for liberation in all parts of the State.

This pheasant is now established as a game bird, but is the subject of most diverse opinions. There are many thoughtful men who, as a general proposition, very rightly deplore the introduction of foreign birds or other animals, being mindful of the horrible examples furnished by the English sparrow, and the very grave dangers, well-nigh impossible to predict or avoid, which may closely follow either the extermination of a species or the introduction of almost any species of organism into a new habitat. It should be taken into consideration, however, in the case of the pheasant, that its powers of multiplication are relatively limited; that it is exposed to many enemies on account of the fact that it roosts upon the ground rather than in trees; that from its gaminess to the sportsman and its economic value for meat and feathers it will be hunted assiduously. For these reasons it is not likely to increase so enormously in numbers as to escape control. other most serious question concerns its direct or indirect effect upon our native birds, particularly our ruffed grouse, quail and pinnated grouse. It doubtless may in some degree come in direct competition with all three of these birds, which are, bevond doubt, the three finest terrestrial game birds of America, if not of the world, combining as they do great practical value to agriculture as insect destroyers with habits of life which inspire the sportsman. No effort should be spared to maintain and increase these native species, and their well-being must not be jeopardized by any alien species.

The extent of the keenness of the competition for food and nesting sites, not yet carefully studied in the eastern States, is one of the most important questions awaiting solution at the hands of an accurate and keen observer, who is sufficiently conservative to base his judgment upon a long series of observed facts and experiments.

But of even more importance is the question to what peculiar infectious diseases or injurious parasites is the pheasant subject, and to what extent is there danger of extending such infection to our native birds. This commission has begun to record observations, and is working in connection with the Bureau of Animal Industry at Washington, and with Dr. E. E. Tyzzer of the Pathological Department of the Harvard Medical Simply because some travel-worn quail, brought in mid-winter from a region where these birds were infected with an epidemic, died after having been quarantined in an old pheasant pen, and in post-mortem examinations disclosed certain parasites (Coccidia) which are sometimes found in pheasants, and have been reported as well in upwards of twenty other species of common wild and domesticated birds, and are doubtless present in very many other species which have not yet been examined, it is obviously unfair to the pheasant to regard the case as decided against a bird which has many valuable charac-The case against the domestic hen and turkey are more conclusive, since these disseminate the internal parasite Amaba melæagridis, which is the active agent causing enterohepatitis, which is especially fatal to young quail and ruffed grouse, though both the domestic hen and the pheasant appear to be immune.

There still obtains a wide difference of opinion concerning the extent of the damage to garden crops. We are well within bounds when we say that the total damage done thus far by pheasants is far less than that done by the English sparrow. We find from actual observation that under certain conditions and in the more thickly settled sections pheasants may do considerable damage to early corn, peas, grain and small fruits. offset this, however, they are expert foragers, wandering over a wide range of territory, and thus destroy enormous numbers of army worms, cut worms, cabbage and current worms, moths, bugs and beetles of many species of farm pests. Most prominent of these are the caterpillars of the gypsy moths, and the pheasant is worthy of great consideration from the fact that it greedily eats the larvæ at all sizes. This is a service which few of our native birds can render, and is therefore peculiarly valuable.

The chairman and Commissioner Delano have made careful personal observations of the conditions, and have made inquiries of the game commissioners and many farmers and sportsmen of British Columbia, Washington and Oregon, where ring-neck

pheasants have been long naturalized. The preponderance of testimony was very strongly in favor of the pheasant. The decrease of the ruffed grouse was chiefly attributed not to the competition of the pheasants, but to the destruction of the covers by lumbering operations and forest fires, together with overhunting in certain sections. The pheasants are generally regarded as a good investment in these States, and, in addition, in the States of Illinois, Colorado and Kansas they are now being reared by the thousands for the purpose of stocking the fields and covers.

So much of the report of Arthur Morrill, superintendent, as covers the rearing of pheasants at the Sutton hatchery follows:—

The breeding of pheasants (*Phasianus torquatus*), the so-called "Chinese," or "Ring-neck" or English pheasants, incorrectly called Mongolian, was continued with the same stock, but with improved facilities for rearing the young, and while fully as much trouble was experienced from infertile eggs, weak embryos, weakened and crippled chicks, far better results were obtained in rearing chicks by using brooders and coops that protected them from poultry diseases, and to a large extent from predaceous enemies.

Incubators were used for the first time, and were of great value in finishing the hatch when the hens had brooded the eggs until they were pipped, as all the loss from vicious and careless hens was avoided. Two lots were carried in the incubators through the entire hatching period, with satisfactory results (a little above 50 per cent.). The hatch was as good as the average, and the chicks were equal in vigor to any hatched under hens. This, with the even more satisfactory experience with quail, indicates that incubators can be used much more extensively than has been generally practised by pheasant breeders, but this work will require more careful tests before conclusions can be fixed, for this season's work was based on an assumed difference between the requirements for hatching wild birds' eggs and hatching hens' eggs, the practice being to run the temperature slightly higher. to air and cool the eggs much more, and to provide extra moisture just before the period of hatching. These practices, while seeming to be correct, require to be confirmed by more extensive observations, or possibly varied to secure better results.

Several types of pens were tried; one, very secure and satisfactory, was made 6 by 12 feet, wired all over, with a shed end built of light box boards, that in stormy weather sheltered the birds, together with their dust heap and food. This style was built for either summer or winter use. A larger pen, for summer use only, was made in sections, each side making a section, and when in use was hooked at the corners

and covered with fish netting. This pen was made 12 feet square, and could be moved by two men without taking the birds out. This pen was so satisfactory that if more are to be made they should be of the same style, but larger, as pens 16 feet square would cover nearly twice the ground and could be moved about as easily.

So much ground was reserved on account of possible use by quail and grouse that the area for pheasants was somewhat restricted. and some lots were moved too near ground used the previous year. lot in particular, placed near ground infected with Coccidia suffered much loss from the same parasite which later was found to have infected other lots of older birds, but without causing serious loss. The birds, except the lot mentioned, met with but small loss, and some none at all, while kept in the coops, the age being from three weeks upward. The incidental losses were due to birds escaping, to injuries, mainly feather picking and moulting, to bacterial diseases, chicken cholera, etc. The birds that escaped were mostly taken by hawks, and when all, including the birds raised under hens, were securely penned, the hawks ventured into the open ground around the pens, where two Cooper's hawks and one sharp-shinned hawk were killed. It was estimated that, including the birds they took from hens, the hawks destroyed about 25.

Future work with pheasants to be reasonably successful will require the most vigorous brood stock obtainable and fresh ground each year for rearing the young, with the security that can be obtained only by well-constructed pens. The fixed pen, torn up and rebuilt each year, would probably be less satisfactory here than the one in use, removable as often as desired.

The prospects for another year, based on this year's work, are for a very large increase of birds reared, and it would be advisable to provide ample pen room, more than twice that used this year, for it would be a decided advantage to entirely discontinue the use of hens for rearing, for what is gained through the more vigorous birds they may rear is offset by the greater losses. A small lot of English ringneck pheasants (*Phasianus torquatus*) were reared for comparison with the hatchery stock, which seems to be smaller in size and more variable in markings than formerly, besides giving the trouble, so often mentioned, of low vitality in their eggs and chicks.

Much work was done in providing additional facilities for rearing birds, movable coops for all sizes of birds were built, the old pens for hatching birds were divided up into additional breeding pens, and trees and brush were cut out, as it was found that too much shade was a serious disadvantage. A new insect house was built in the heavy growth on the north side of the lot, where a more uniform temperature could be secured, the most serious trouble in the past being loss from excessive heat, and consequent irregular supply of maggots. North of the barn much brush and some heavier growth were cut out, to give a

suitable location for brooders, the intention being to give each brooder and coop a raised bottom of fresh earth, to keep the chicks from possibly infected grounds. By using extra coops it will be practicable to allow each brood a coop with sprouting grass or grain.

On the south side of the lot a tract of twelve-year hard-wood growth was thinned out to allow room for moving the coops, enough trees being left to develop into a good grove. This land lies high above the rest of the ground, is clean, and roomy enough for an extensive season's work.

The Heath Hen. During the past two years much interest has been shown to save the last remnant of the eastern pinnated grouse or heath hen (Tympanuchus cupido). It was formerly distributed from Cape Ann to Virginia, and was especially abundant in Massachusetts, Rhode Island, Connecticut, Long Island and New Jersey; but immense numbers of adult birds were destroyed by guns and traps, while the young fell victims to the colonial cat and to forest fires. So abundant was this bird in the dark ages of ornithology, when there was a bounty upon the ruffed grouse and when indiscriminate slaughter of all species prevailed, without thought of the bird's economic value or place and function in nature, that the articles of apprentices often specified that they should not be compelled to cat the meat of this grouse (locally called "heath hen") oftener than twice weekly.

Between 1800 and 1840 the bird had been generally exterminated in Massachusetts. In 1844 Giraud believed it to be extinct on Long Island; as late as 1869 it was still found in New Jersey, and to-day the very last stand of the bird is on the island of Martha's Vineyard.

The eastern bird was first distinguished from the western type by William Brewster, and described by him under the name Cupidonia cupido ("Auk," January, 1885, p. 82). In 1890 Mr. Brewster estimated that 120 to 200 birds, inhabiting about 40 square miles, were left over from the previous winter. This number has slowly but surely diminished. Careful daily observations, extending from October, 1906, to May, 1907, showed that the inhabited area has become restricted to about 30 square

¹ A native bird now on the verge of extinction.

miles, and the probable number of individuals to less than 100. By actual count of the flocks very definitely located in various sections of the range, 77 different individuals were accounted for. In May, 1906, a destructive forest fire swept practically the entire breeding grounds, and very few birds were reared that season. The summer of 1907, however, was a favorable one. We know that at least ten broods were successfully reared, and our census this year will probably show that the number of birds has more than doubled.

This grouse (called "hethern" by the natives) has been a well-known and characteristic bird of the island as far back as memory or local tradition extends. Opinions are widely held that from time to time western pinnated grouse or prairie hens have been liberated on the island. Careful inquiries indicate that the facts are as follows: (1) in 1859 Dr. Fisher liberated ruffed grouse and quail on the island, but no western prairie chickens; (2) in 1902 three specimens of the western prairie chicken (Tympanuchus americanus), which had survived the sportsmen's show at Boston, were liberated on Martha's Vineyard, but no subsequent indications of their presence are known.

In 1877 foxes and coons were introduced for sport and later liberated from spite, but it is probable that these have now been exterminated, and at present the chief checks to the increase of the heath hen are (1) the forest fires, which in recent years have swept large areas of the breeding grounds almost annually, usually during the nesting period; (2) cats, whether kept or abandoned by the summer visitors, feed upon the young heath hens, terns and other birds; (3) certain species of hawks, notably the goshawk, are known to kill considerable numbers of adult grouse; (4) with the increase of poultry raising on the islands, particularly of the turkey, there is danger of the introduction of enteric diseases, notably "the black head," caused by the internal parasite Amæba melæagridis, which is equally fatal to turkeys, ruffed grouse and quail, but which is also spread by domestic fowls.

About 1813 the heath hen disappeared from the district around Springfield, Mass. In 1824 it was reported as no longer common around Boston. Cape Cod was the last stand on the

main land. In 1831 the grouse or heath hen had become so reduced in numbers that a law was passed making a close season from March 1 to September 1. In spite of this the decline continued. Chapter 170, Acts of 1837, made a close season of four years upon this bird, which, by chapter 7, Acts of 1841, was extended for five years. These acts, however, permitted any town to suspend this law in that town for such a period as they deemed expedient. Some towns took advantage of this to secure special privileges for the inhabitants of that town; e.g., Tisbury, on May 6, 1842, "Voted that the Law for the Preservation of the Grouse or Heath Hen be so far suspended in the town of Tisbury as to allow the inhabitants of said town to kill, take or sell Grouse or Heath Hens from the first day of December to the tenth day of December inclusive, provided they hunt them without the aid of dogs." The action of a subsequent town meeting indicates that the decline in numbers was rapid. On April 1, 1850, the same town of Tisbury voted to suspend this law so as to permit the hunting (without dogs) of these birds on the "12 and 13 of November next." (Perhaps for the purpose of providing a substitute for the Thanksgiving turkey.) From this period to 1905 there were no systematic attempts to enforce the law. The number of birds killed usually equaled or frequently exceeded the annual increase. The islanders resented the intrusion of non-resident hunters, but many birds were killed by rabbit hunters and by duck hunters crossing the island to the ducking stands on the south shore. Some birds were taken by collectors, and these skins, supplemented by others bearing fraudulent data, were disposed of extensively to museums and natural history stores.

During all this period, however, there was kept alive the feeling of local pride in the heath hen as a peculiar possession of Martha's Vineyard. It has been even stated that sentiments well-nigh voodoo-like in tendency were current on the island, e.g., that a boy must eat heath hen before reaching a certain age. The writer, however, from careful inquiry, is of the opinion that there is no basis for such statements.

Since almost nothing has been recorded of the habits of the heath hen, the following notes, made by the writer on the spot, may be of interest:—

MARTHA'S VINEYARD, May 1, 1906.

At 6 P.M. we arrived at the point where we hoped to find traces of the heath hen. In a cleared field about thirty rods from the road we distinctly saw two large birds. On our nearer approach they squatted close, and their protective coloration was so effective that, although we knew almost exactly the precise location of the birds, we could not distinguish them. We crawled behind the nearest cover, and remained motionless for perhaps ten minutes. At length the long shadows from the descending sun enabled us to distinguish the birds, as they crouched with head close to the ground, among the very scanty vegetation. After another interval of motionless activity on our part, one bird quickly arose and began feeding, apparently without suspicion; soon two more birds arose as if by magic from the ground. Then began a most interesting series of antics. These birds were joined by five others, coming in singly and on foot from the scrub in various directions. birds came frequently within forty paces of our hiding place, and in one instance alighted on a small oak tree twenty-three paces from our camera. While not near enough for successful photographing, we were well situated for using our field glasses. The birds were all actively feeding in the open field, apparently on grasshoppers and other insects, but nipping red clover leaves very freely. They moved leisurely about. Frequently two birds, sometimes as much as one hundred to one hundred and fifty yards apart, ran directly toward each other, dancing and blowing on the way, with the so-called "neck wings" pointed upward in a V form. On facing each other both squatted, and remained motionless from one to five minutes. We could see none of the nodding and pecking motions of the head so commonly indulged in by domestic fowls when fighting; rarely was there sparring with the bill or striking with the feet or wings. In twelve or fifteen encounters, only three or four times did they strike thus, and only once did we see "feathers fly." Most of the energy seems to be spent in posturing and blowing. Generally, one of the combatants backed slowly away, suddenly stopping if the opponent advanced too rapidly. In all these fighting tactics the similarity of habits with those of the domestic fowl were very marked. From all directions came the peculiar "toot," like distant tug-boats in a fog, all having whistles of the same pitch. This call may be well imitated by blowing gently into the neck of a two-drachm homeopathic vial. Each call extends over a period of two seconds, and is repeated at frequent intervals. It is prefaced by a run of about one yard, with very rapid, mincing steps. The strides, however, are so short that the bird does not advance rapidly. The tail is spread and the wings dropped after the manner of the strutting turkey cock. When the tail is spread, the white under-tail coverts are conspicuous, and remind one forcibly of the "white flag" of the deer and antelope or of our gray rabbit. The head is then depressed and the neck outstretched forward, until it is about parallel with the surface of the ground; the neck tufts are elevated to a V shape. The bright, orange-colored air-sacs on each side of the neck, directly behind the tufts of feathers, are slowly inflated, until they reach apparently the size of a tennis ball, when they appear like two small, ripe oranges, one protruding from either side of the neck. The duration of the call appears to closely coincide with the period of inflation, and seems to be emitted as the air enters the sac rather than when the air is expelled. The collapse of the sac is sudden. The sound is ventriloquial, and it is very difficult to locate the direction or distance whence it comes, unless the bird can be seen. A second sort of call is much less frequent, and closely resembles a single syllable of the hoot of the barred owl.

Another characteristic antic was a peculiar combination of a short run, a sudden jump of three to five feet into the air, and a rapid uncoördinated flop and scramble in the air, the bird usually alighting within ten or twenty feet of the starting point, but turning so as to face at least at right angles, or even in the opposite direction, from which it started. When in the air it emits a peculiar cacophonous call or cackle, which, when heard at a distance, gives the impression of a hearty burst of laughter. The purpose of these semi-somersault-like manœuvers appeared to be to attract the attention of other birds, possibly even as a challenge, for frequently they seemed to precede the somewhat pacific duels described above. The effect of these sounds. together with the "tooting" calls, in the mists which so often obtain in their habitat before sunrise is weird in the extreme. At 4.15 A.M. on May 2 these sounds were practically continuous, without appreciable interval, apparently from all directions. At 4.45 a.m. six birds could be counted, all in sight at once. They appeared to resort to a particular clear space, of about two acres in extent, where the antics just described were carried on. All the birds, except one, were observed to have the orange-colored air-sacs. These were probably cocks. saw only one bird which we suspected might be a hen. The other hens were probably nesting, or at least had secured mates, and no longer resorted to the promenading place. As the sun rose high the "tooting" became less frequent; the birds became more restless, often flying to the neighboring low oaks, nesting there until disturbed. reminds one of that characteristic of the carrion crow or black vulture of the south (Catharista urubu), - a succession of four to ten strong. rapid wing-beats, followed by a sail of one hundred to two hundred yards on set wings; this is repeated until the bird again alights or passes beyond the range of vision. The line of flight is usually a straight line, twenty to twenty-five feet above the ground. native birds, the manner of flight most resembles our meadowlark.

The bird gives one the impression of admirable adaptation to the open country,— a large, muscular, hardy, vigorous bird, able to withstand snow and sleet, in size equal or even exceeding the ruffed grouse in weight. Inhabitating open fields and pastures, subsisting on in-

1907.7

sects, leaves, seeds and wild berries, in a country where the absence of foxes and raccoons reduced the numbers of its enemies practically to eats, men, skunks, field mice and rarely some species of hawks, the problem of maintaining and bringing back the bird to its former abundance seems practicable.

Of the total number, twenty-one, which we observed on May 1 and 2, twenty were plainly male; of the sex of one we were uncertain.

The following is a portion of the report of William Hazen Gates of Williamstown, Mass., who worked with the commissioners in studying the habits of the heath hen for the purpose of securing information which might be of service in artificially propagating the species:—

On May 31, while wandering across the plains, three heath hens were started, and each taking wing flew nearly out of sight before alighting. As I watched the birds, a call, resembling to a slight degree that of an ordinary barnyard cock calling to the hens, was heard not far distant. The place was noted as nearly as possible, and then cautiously I made my way there. When the place was reached I looked for birds, but could see none. I then sat down and determined to wait, in order to see if any birds could be heard. The ground was covered with leaves, so the least stir would have been heard. I listened and also looked for signs of anything moving, but none appeared. I sat there for fully twenty minutes, and hearing nothing concluded that either there were no birds or else they had gone as I approached. As I rose a bird flew up within twenty feet of where I had been watching. The bird had been within sight all the while, but probably had crouched in the leaves and remained invisible. It would have been interesting to note how much longer the bird would have stayed in this position without moving. Another bird was started some fifty feet from this one.

On this same day the toots of one or more heath hens were heard between half-past 4 and 5 a.m. The birds are early risers and late bed-goers. Once they were heard to toot at 3.30 a.m., or about an hour before sunrise; and several times their call note was heard as early as this. It is probable, though, that they do not begin to stir quite so early, beginning their breakfasting about sunrise or a little earlier. The middle of the day is generally spent in the shade, or in dusting in the sand in the roads. Late in the afternoon, as the air begins to cool, they take to feeding again, and can be seen in the open fields. They will often feed till nearly an hour after sundown. I do not know whether they roost in the low shrubbery or on the ground at night. Mother birds with young, however, stay on the ground, but it is likely

that this is done only while the young are too small to roost and need the shelter of the mother.

On June 29 a bevy of heath hens was found. The mother bird took flight, cackling, and flew some fifty feet or so. The young scudded in every direction, and were entirely out of sight by the time I reached the spot. I hunted around through the leaves some, but fearing that I might accidentally step on one, did not search very carefully and so did not see any. Two days later what I think must have been the same bevy was again seen, but about half a mile from the place where they were first seen. This time they were in a more or less cleared space, and six of the young were counted. One or two squatted just where they were, and it looked as if one might go right up to them and pick them up. I did not, however, disturb them. These birds were apparently not over a week old.

On July 2 a mother heath hen and four young were seen dusting in a road about 11 a.m. Upon seeing me the mother ran to the bushes and called to the young. As I went by I could hear the mother hen at the side of the road in the bushes. The same day, in the afternoon, a mother hen and one young bird was seen.

On July 7, while walking through the brush near the Cromwell cottage, soon after sundown, I heard some peeping ahead. Getting on my hands and knees I crawled toward the sound. The peeping continued as I approached, so I knew that I had not been perceived. Finally, at a distance of some twenty or twenty-five feet, I saw a mother hen, with wings spread, under the thick foliage of a stunted oak. She was more or less silent, only occasionally uttering a low call, somewhat resembling that of a hen as she calls her chicks at night under her wings. The young, however, peeped quite often as they stole in and out from under the wings of the mother. I think they could not have been much more than a day or two old. Like the chicks of other fowls they could not seem to get settled for the night, but would stray in and out. Then as they sought a place of shelter again they would shove one of their fellows out from under the mother's wing. However, as darkness grew the restlessness ceased, and by the time it was too dark to see the group everything was silent. How many there were in the bevy I could not tell, but it seemed as if there must have been at least six or eight.

According to our observations during the past two years, the birds congregate during the winter in large flocks at points where food is abundant. They readily find grain placed for their benefit, and return to those places with considerable regularity each morning and evening. On two occasions we have been able to count two of the largest flocks in such a way as to be reasonably certain that no bird was counted twice. On

May 2, 1907, we counted a total of 21 birds; on January 11, 1908, an exact count was impossible, but the number was not less than 55 nor more than 60. Since we were reasonably certain that in each case the count was made at the places where the birds resort in greatest numbers, it furnishes some evidence that the birds have increased under the protection which the best public opinion in the island has extended to them. We are of the opinion, however, that the ratio of increase has not been so large as these figures indicate. In common with all the grouse species in the eastern States, the heath hen suffered from inclement weather during the nesting season, so that it is doubtful if the 1907 breeding season resulted in more than doubling the number of birds. Until late in February, the birds remain in large flocks, made up by the congregation of several families, resorting during pleasant weather to the feeding grounds, but during the coldest and stormiest days remaining in sheltered places. With the first appearance of warmer weather, late in February, the booming calls of the mating season begin to be heard, and by the first of March the booming is heard regularly, the flocks break up and the mating season begins. The strutting antics described above begin about April 1 and cease about June 15, being at the height in late April and early May. Egg laying begins soon after May 15, the chicks are hatched in June, and in July, when about the size of quails, are capable of long flights when flushed.

On June 4, a set of nine heath hen's eggs was taken and placed under a bantam hen, selected for this purpose because she appeared to be unusually tractable; but on June 20, when one of the chicks hatched, it was immediately killed by the hen, which attacked it viciously before it was entirely out of the shell. The other heath hen's eggs failed to hatch, and only one contained a well-developed embryo. After destroying the heath hen chick the hen was given some pheasant eggs, hatched them, and reared the chicks with all possible care.

An injured heath hen was received from Martha's Vineyard November 19, but refused to feed, and, though placed in a pen with a tamed ruffed grouse, lived only a week.

The only nest known to the writer was found in oak woods

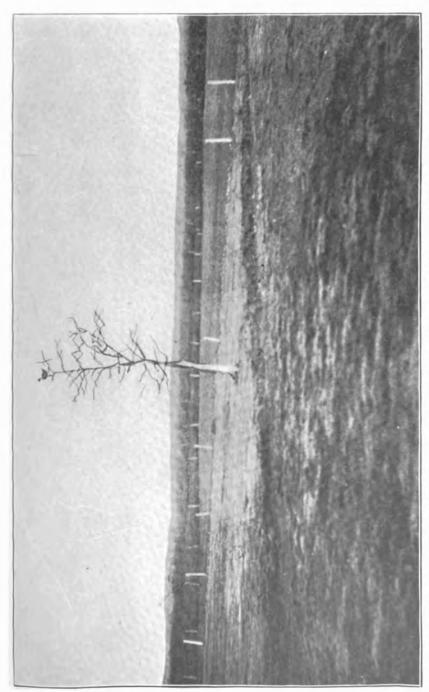
among sprouts at the base of a large stump, and contained either twelve or thirteen eggs about June 10. William Brewster has a set of seven eggs taken July 24, 1885.

In every respect this grouse is adapted for the natural conditions of southern New England. During the summer its food consists largely of insects, clover leaves and blueberries; in the winter acorns, weed seeds and dried fruits. Although inhabiting regions similar to those chosen by the quail, its robustness enables it to withstand the severest weather, and the storms of snow and sleet which decimate the ranks of the quail. The nature and variety of its food is such as to ensure a practically continuous and sufficient forage supply.

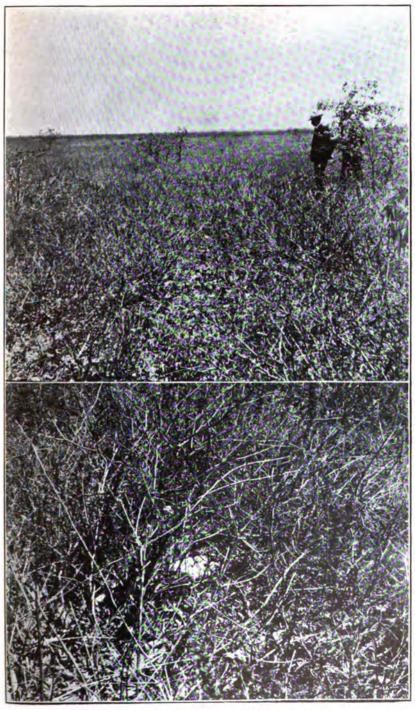
It appears to be most at home in the scrub oak and pitch pine barrens, but if protected from such enemies as the domestic cat, man and forest fires, the bird could be naturalized once more in almost all sections of Massachusetts.

In addition to being a valuable bird upon the farm, it lies well for the dog, has a strong rapid flight and delicious flesh,—qualities which commend themselves to the best type of sportsmen.

The value of the birds as a local asset was early appreciated by many of the best people, but to J. E. Howland is due the credit for initiating the action which promises to prevent for all time the extermination of this bird. Mr. Howland called the attention of the Massachusetts Commissioners on Fisheries and Game to the conditions, and a permanent guardian was located in the midst of the region inhabited by birds, to study their habits and to enforce the law. Amply supported by public opinion, Representative Mayhew introduced a bill, placing under the control and use of the Commissioners on Fisheries and Game such lands as may be donated, leased, purchased or otherwise placed under temporary or permanent control as a refuge and breeding area for the heath hen. Already a considerable amount of money has been pledged by public-spirited individuals and associations for the purpose, and about 1,600 acres placed under special protection. In order that the expense may be minimized, the Legislature authorized the commissioners to take, "for and in the name of the Commonwealth, such unimproved lands upon Martha's Vineyard, not exceeding 1,000 acres, as they may deem



HEATH HEN ON A STUNTED OAK TREE. - This Exposure was made in the Early Morning; the Tree and Bird have been retouched.



COUNTRY INHABITED BY THE HEATH HEN. — In Foreground, Nest of Heath Hen, with Complement of Nine Eggs.





GROUP OF "PRAIRIE CHICKENS." — Illustrating the Courting Habits, which are similar to those observed and described in Case of the Heath Hen on Martha's Vineyard. By Courtesy of the American Museum of Natural History, New York.





PAIR OF HEATH HENS, NEST, EGGS AND YOUNG. - By Courtesy of the American Museum of Natural History, New York.



necessary for the purpose of making fire-stops for the protection from fire of the feeding and breeding grounds of the pinnated grouse, or of otherwise securing the maintenance and increase of such pinnated grouse, or of any other species of wild birds upon said islands." For work "incidental to these purposes, and for an investigation and reports upon the best methods and probable cost of protecting and increasing the colonies of birds on the island," \$2,000 was appropriated by the last Massachusetts Legislature.

We have carefully investigated the problems involved in the permanent maintenance of the heath hen, and have concluded that:—

- 1. One or more extensive areas, as reservations or sanctuaries, should be acquired by the Commonwealth, patrolled and maintained. These sanctuaries should include the principal breeding and feeding grounds of the birds. Some of the land should be annually ploughed and sown to clover, rye, corn, wheat, buckwheat, etc.
- 2. Suitable and sufficient fire-stops should be made and maintained in order to minimize the danger of brush fires, which have in the past proved so disastrous to the birds, vegetation and property.
- 3. All possible precautions should be taken against the introducing of infectious disease, such as, e.g., Entero-hepatitis, Coccidiosis, "white diarrhœa," chicken cholera, etc., which may be transmitted to the grouse through the agency of domestic hens, turkeys, duck, geese, etc.
- 4. As soon as the number of birds has increased sufficiently, systematic artificial incubation, feeding and brooding should be undertaken for the purpose of rearing annually an increased number of young birds. By artificial propagation we may expect to increase the number of eggs laid, to lessen the loss resulting from the destruction of nests and eggs by skunks, mice and other enemies, and to reduce the mortality by guarding the young birds against crows, hawks, jays and other enemies.
- 5. The expense involved would be practically identical with that incidental to ordinary poultry raising, except that on account of the hardiness and vigor of the grouse, the expense of housing the adult birds would be well nigh eliminated.

In addition to practical and most valuable assistance by Wm. Dutcher, Esq., president of the National Audubon Society, John E. Howland, Capt. B. C. Cromwell and many others, contributions for the purchase of land for a reservation and for making fire-stops on Martha's Vineyard have been pledged as follows:—

William Brewster, .										\$100
F. S. Pearson,							•			100
G. B. Clark,										100
John E. Thayer, .						•				100
H. H. Fay,				•						100
S. M. Weld,										100
Frank E. Peabody, .						•				100
L. D. Baker,										100
Arthur F. Whitin and	others,				•					108
Judge F. C. Lowell, .	•									100
Dr. John C. Phillips,							•			100
R. C. Robbins,										100
Gardner M. Lane, .	•			•						100
Dr. B. H. Kidder, .	•			•						100
Hon. Herbert Parker,				•						100
Anawan Club,	•	•								50
R. L. Agassiz,	•			•	•				•	50
Hon. A. P. Gardner,			•	•				•		25
Clinton G. Abbott, .	•									2
Edward L. Parker, .										25
Mrs. Carroll Dunham,	•		•							5
Dr. Gorham Bacon, .	•			•				•		100
Harriet E. Freeman,				•						5
Middlesex Sportman's	Associa	tion	(thr	ough	Dr.	A. H	. Tut	tle),		200
National Audubon So	ciety,									100
W. P. Wharton, .	•									100
Town of Tisbury (at la	ast annu	al to	own i	neeti	ng),					200
Town of West Tisbury	(at la	st aı	nual	town	n me	eting)	, .			50

\$2,420

Inasmuch as under these conditions every dollar contributed for the purchase of land adds at least one acre, it is hoped that sufficient funds may be raised to secure extensive tracts as refuges for the heath hen, quail, least tern, upland plover and other birds which still resort to this island.

Contributions may be forwarded to the Commissioners on Fisheries and Game, State House, Boston. Ruffed Grouse. — In common with all the New England States, New York, Pennsylvania and New Jersey, the ruffed grouse in Massachusetts had a remarkably poor breeding season. There is abundant evidence that the decrease in Massachusetts is no greater than in these other States.

The causes most frequently mentioned are (1) the unusually wet, cold spring and the remarkably dry summer; (2) that the ruffed grouse have been "driven out" or "killed off," either directly by the introduced English or Chinese pheasants, or indirectly by an epidemic due to a parasitic organism with which the pheasant may be infected. While we are confident that no one can be more desirous to know the truth, the whole truth and nothing but the truth concerning the pheasant and its beneficial or baneful influence upon our native birds and agriculture, we are still of an open mind, and would welcome actual evidence of good or bad results attributable directly or indirectly in any degree to the pheasant. That the present scarcity of ruffed grouse is due to the pheasant, as is claimed by many sportsmen and bird lovers, does not appear even plausible on any evidence thus far presented, for the reason that the grouse scarcity is as distinctly pronounced in sections of Maine, New Hampshire, Vermont, Rhode Island, Connecticut, New York and Pennsylvania, where there are few or even no pheasants. A more credible theory would be the possibility that the indiscriminate liberation in this and other States, without quarantine, of quail from points in the southern States which have been found to be foci of the destructive epidemic among the quail, may have introduced epidemic diseases. Of this, however, we have no evidence.

From his own observations in the fields, and from the observations by the deputies, who by special request have endeavored to ascertain facts concerning the breeding and rearing habits of ruffed grouse, and from the evidence obtained by the experiments of Prof. C. F. Hodge at Worcester and of Arthur Merrill at the Sutton hatchery, the writer is inclined to attribute the cause of the scarcity to the fact that from many nests the chicks hatched obviously enfeebled, apparently the result of eggs chilled by the unusually cold weather during the laying period. The majority of these chicks died during the first month, and in many cases within the first week. Of the 25 grouse hatchings reported to or seen by the writer there were many eggs which failed to hatch, in one case 9 out of 13; none exceeded 6 living young one month old; in four instances there was but 1 surviving. Of these nests which came under our observation three sets of eggs and one parent bird were destroyed by animals, probably either skunks or foxes.

We still continue in the opinion that the annual slaughter of game and insectivorous birds by cats far exceeds that from firearms. We need effective legislation which penalizes the wilful abandonment of cats by summer cottagers. We need, further, a campaign of education which will focus observation upon the suburban and the farm cat, in order that intelligent people may learn that in many cases it may be necessary to limit the cat population for the purpose of increasing the more valuable bird population.

From personal observation the writer is convinced that considerable damage to game birds is wrought by dogs running at large during the close season, or taken at this time to the field for training. In some States this practice is prohibited by law.

The remarkable increase in the number of foxes in this and adjacent States may to some extent be a factor in the decrease of partridge and other game birds. The writer suggests, too, that the increased number of deer may possibly be a factor, since he has observed tame deer search out and eat whole clutches of eggs of semi-domesticated ground-nesting birds, such as turkey and guinea fowl.

So much of Superintendent Arthur Merrill's report as concerns the rearing of ruffed grouse at the Sutton hatchery follows:—

Last year our attempts at rearing ruffed grouse in confinement were unsuccessful, chiefly on account of the infection of the young birds by intestinal parasites, chiefly Amæba melæagridis, a protozoan which causes the well-known disease of turkeys known as "black head" (Entero-hepatitis), and which appears to be transmitted through the agency of hens. This year great care was taken to prevent the young partridge and quail from running upon soil contaminated by hens, and not a single case of this amæbic disease was discovered. Nevertheless, all but 4 of the young ruffed grouse were lost. Though there appeared to be as many partridge nests as usual, a goodly number of birds being

left at the end of the shooting season, only five clutches of wild ruffed grouse eggs were taken to the hatchery. These five clutches numbered 56 eggs; from these 50 birds were hatched. That nearly all the chicks, however, obviously lacked vitality was early noticed. In the case of two entire broods the chicks did not have strength enough to escape from the shells. These chicks, together with some that appeared to be stronger, died within four days after hatching. Of a more promising lot some lived for a week or ten days, but only 4 survived. In case of this lot it was suspected that disease might have been introduced by the agency of infected bedding in the brooder, but pathological examination of the dead birds yielded no trace of disease.

Of the two females reared in confinement last year, one made a nest and laid 7 eggs, but abandoned the nest when the eggs were partially incubated. The other hen laid 14 eggs, and incubated faithfully. In order to ascertain whether another clutch might not be laid, the eggs were taken from the nest. She did not lay a second litter. Of this clutch, laid in captivity, 8 were fertile, but the chicks, like those from the wild nests, were too feeble, and lived but a few days. These eggs were laid and remained in the nest under conditions practically identical with those obtaining among wild birds. It was assumed that the deficient vitality of the birds was due directly to the severe weather of the winter and spring. To determine to what extent the birds in the region about the hatchery were affected, a thorough search with a well-trained dog was made. In a search covering more than twentyfive hours, and extending over at least five square miles of partridge cover, but four broods of young were found, though to our knowledge there had been no nests taken in this region, which usually yields not less than ten nor more than twenty flocks. Of these four broods, one comprised 3, another 4, and another but a single survivor. The fourth flock was a numerous one, of small birds, undoubtedly a second nesting.

Prof. C. F. Hodge who has undertaken the rearing of ruffed grouse on a larger scale and with longer experience, encountered the same difficulties. He reared successfully this year 7 birds. It is a significant fact that all of these were from one litter. All the others had equally favorable conditions as to food, shelter, etc.; but this single brood appeared to have superior stamina.

The care of the adult grouse during the year showed only one feature that may be considered a problem in future breeding operations; this was the disposition of the males to fight. During the winter in a pen of three young birds, one male killed another with which it had grown up, and during the mating season great care had to be exercised lest the male kill the females. His savage rushes caused them such alarm that they suffered no small injury in beating about the coop to escape him. It was not safe to put the male in the coop for mating without close watching, and it was necessary to remove him immediately after mating.

The conduct of the birds in the coops, however small, is in marked contrast to that of any other birds bred here. They appear more at home, moving about their pens leisurely, paying no attention to anything outside, and never show the restless, uneasy manner of quail and pheasants. They eat and relish a larger variety of food than other birds ordinarily take, and there is probably no available article of food that they would not eat if trained to it. However, there appears to be no occasion to supply them with any unusual or any great variety of food; the proper proportion of animal cereal and green foods, the latter including fruits and berries, will keep them in the best of condition.

The male grouse died late in the summer from a germ disease supposed to be from infection of the ground by hens, and when examined was extremely emaciated, and showed an unusual development of the disease, indicating that the adult grouse has more vitality for resisting such disease than the young grouse or adult quail.

CLARK UNIVERSITY, WORCESTER, MASS., Nov. 2, 1907.

Dr. George W. Field, Chairman, Commission on Fisheries and Game.

My DEAR DR. FIELD: — I beg herewith to hand you a brief report on the season's work with the ruffed grouse and quail.

My permits for the year allowed me to take 80 eggs of the ruffed grouse and to keep three pairs of bobwhite (quail) for purposes of propagation.

Grouse eg	gs were	obtained	as	fol	lows:	—
-----------	---------	----------	----	-----	-------	---

		Loc	ALIT	T OF	NEST	•		Number of Eggs.	Number hatched
Jefferson,								14	14
Charlton,								12	9
Millbury,								12	7
Brookfield,	des	e rte d	, .					8	8
Canada,								8	-

Total, 54 eggs from Massachusetts, and 38 chicks.

As will be seen, the eggs did not hatch as well as in the previous years of the experiment, possibly due to cold weather in May. The eggs were all hatched under Cochin bantam hens, as usual. The chicks are accounted for as follows:—

Fifteen chicks, June 6, left with hen mother, began dropping off after the first two weeks and were all dead by August 15.

Fifteen chicks, June 6, transferred on morning of hatching to brooder; 2 escaped, 1 died, probably as result of accidental injury, 2 died from swallowing objects too large to pass into gizzard (black cricket and large spider), 10 are healthy, well-grown birds at present.

Eight chicks, June 19, transferred to brooder, and all did well until, on sudden change of weather, temperature ran too high and killed them all.

The experiment was conducted this season on my new place, on uncontaminated ground, and I thought it desirable to try once more the simpler method of rearing with the hen. The result is decisive against this method. The fact that the hen carries parasites which are likely to prove fatal to young grouse probably explains why our native species have not long since been domesticated. All former attempts to domesticate them have been made in the poultry yard, and this environment has been fatal to the grouse. The same is now being proved to explain why the turkey, another native American species, cannot be reared on ground contaminated by domestic fowls. This is the fifth year in which the experiment of rearing ruffed grouse with bantam hens has been tried; and although the second year 6 birds were reared out of a clutch of 12, for all the other years fatalities by this method have amounted to 100 per cent. This season is particularly decisive. because the work was done on new ground, under most favorable conditions, with the benefit of past experience, and in clear competition with the brooder method.

Neither my assistant nor myself had experience in handling a brooder, but results give assurance that, barring accidents, practically every ruffed grouse chick hatched may be reared to maturity by this method. If brooders are at hand, by having connected with them adequate yards in which the chicks may run during the warm days the method is neither expensive nor difficult. Hatching, as they do, about the first of June, the chicks require but little heat; and they develop and feather out so fast that it is not necessary to supply any heat for more than about the first two weeks, except during cold storms. After this time they begin roosting in the brush with which their cages are supplied, or, in case of chilly weather, they may be shut up in a dry, warm box at night.

For use the past season we have devised and built a most convenient rearing cage, made by stretching inch-mesh netting over light ash boughs. The cages are 6 by 12 feet on the ground and about 5 feet high. A strip of rubberoid a yard wide is tacked over one end, and this end is also covered with the same material, and a strip 18 inches wide is placed all around the bottom of the cage inside the wire. This arrangement provides protection and a dry place in which to keep food and dusting boxes in stormy weather, and the bottom strip prevents them from bruising their heads on the wire. The cages are so light that one man can easily move them daily on to fresh ground.

In case it should prove desirable to rear native grouse with hens, these might be hatched in incubators and reared on uncontaminated ground. Probably in this way a strain of fowls might be reared which would be safe mothers and brooders. This experiment may be tried

year after next, if we succeed in rearing the uncontaminated stock next season. For the near future, however, I wish especially to perfect methods of rearing, including incubation, artificially.

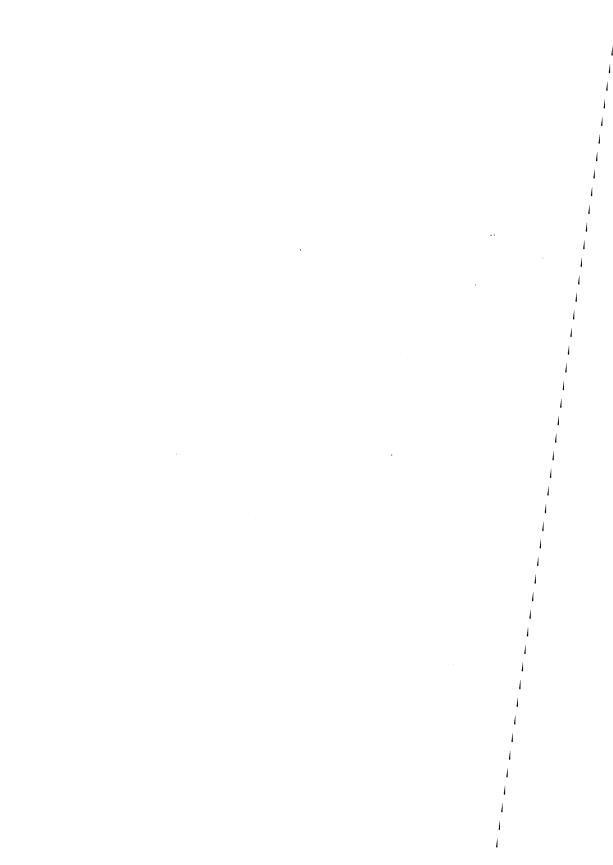
The bobwhite have proved much easier to handle than the grouse. I had a single pair kept as pets in the house to study. Both were birds of the previous season. They were observed to mate often from May until well into August, and the hen laid 18 eggs in a nest made by the pair in a window cage. Since the birds did not seem inclined to incubate, the eggs were placed under a bantam hen. Six out of the first 13 eggs laid hatched, and the chicks, being left with the hen, all died within ten days. The remaining 5, of which 3 hatched, were incubated under a second hen, along with 11 eggs obtained from the State hatchery. Ten chicks were thus obtained from the 16 eggs. One of these died soon after hatching, and the loss was not called to my attention until too late to examine for cause of death. One died, probably, from contusion of the brain, - from having flown against the cage. One died from an unaccountable rupture of the gizzard. Neither of these birds showed the slightest disease of liver or cæca. The remaining 7 are vigorous specimens, and, though hatched September 13, are well feathered and sufficiently grown to shift for themselves and endure frosty nights without brooder heat.

In addition to the above I obtained August 19, from Mr. Merrill, 11 quail chicks just out of the incubator. These were reared in a brooder, and are all alive and well to date. They have attained very nearly adult growth.

A feature of the season's work, upon which, in fact, the measure of success attained has depended, has been extermination of vermin from the premises. Rats are continually invading the place from a public dump along the Beaver Brook close by. Early in the season we found one bantam hen killed by a skunk. A number of traps were kept continuously set in all likely places, are now, and ever shall be. The result was rather surprising for practically a city location. In all 17 skunks were caught and unnumbered rats, every one, practically, that set foot on the premises, and before he had done any damage.

With the breeding stock on hand, prospects are bright for the rearing of considerable numbers of bobwhite and ruffed grouse the coming season. Eight eggs were obtained from Canada, as above stated, but none of them hatched. I desire especially next season to obtain eggs of the ruffed grouse from a very wide range,—if possible, from Canada to Georgia or Florida,—both in order to study regional variations of the species, and to study comparative size, vigor and resistance to disease of different strains, in order to obtain the best possible stock with which to establish a domesticated breed. Any assistance in the way of obtaining unincubated eggs which the Massachusetts commission or the game commissions of other States can render will be very gratefully received and duly acknowledged.

TYPE OF PEN FOUND MOST EFFICIENT FOR WINTERING QUAIL AT SUTTON HATCHERY.



1907.7

A grant of \$500 from the Carnegie Institution has enabled me to carry on the work this season, paying for necessary assistance, brooders, cages, food and all other supplies and equipment. This assistance is most gratefully acknowledged. With the plant in its present form the work of the next few years will be greatly facilitated.

Respectfully submitted,
(Signed) C. F. Hodge.

Quail. — That portion of Superintendent Merrill's report which concerns the rearing of quail in confinement follows: —

Last year's experience with quail showed two principal difficulties to be overcome: maintaining a satisfactory brood stock and hatching the eggs successfully. Rearing the young appeared to be less a problem, assuming that diseases, the one obstacle previously met with, could be avoided.

This season the conditions were somewhat reversed, but a distinct gain was made. Losses in the brood stock were experienced, but more was learned about the diseases, and, further, no part of the loss could be attributed to confinement aside from the part played by dis-The laying, fertilization of the eggs and hatching were very satisfactory, and the way cleared somewhat for the control of egg production and its increase above the normal. The rearing was much less The diseases that were the source of trouble the previous successful. year were avoided wholly, but the chicks showed less vigor, and in the younger stages of their growth, generally under four days, the loss was heavy. No cause could be assigned for the loss other than low vitality, but the case did not parallel that of the grouse, for none showed the excessive feebleness that the grouse did when hatched. The food was the same as that given the year before, with the exception of less insect food, and greater attention to feeding, watering and regulating temperature. After the first week, the growth and health of the birds were satisfactory; no disease appeared, and the loss was very slight, being due largely to panics in the night on three occasions, when several birds beat themselves to death against the wires.

Ten new pens were finished in December, and immediately thereafter were partly stocked with female quail from Alabama. This lot was evidently diseased at time of shipment, for one-fourth arrived dead, but the subsequent loss was not heavy at any time, and was even lighter in the severest winter weather than after the opening of spring. This lot supplied the breeding females mainly, and were good breeders. They laid somewhat later than the old stock and native birds, but laid satisfactorily. Their eggs were fertile and hatched well. It could not be determined whether the chicks from their eggs were any weaker, or in any way different from the other chicks. The unusually severe win-

ter weather was somewhat uncomfortable for them, but did no apparent harm. They avoided the severest cold by going under the snow; not plunging in, like the grouse, but seeking the advantage of a cavity where the snow was held up by brush or a stump and working in two or three feet. The old stock of quail and young reared the previous season passed the coldest weather on the snow; they were never seen burrowing into the snow, and rarely used the shelters provided for them to pass the night.

The December shipment was followed by a shipment in March from the same place, but, although they seemed in excellent condition on arrival, they were infected with a highly contagious disease, that destroyed most of them within a week, and exterminated the lot within three weeks.

At the opening of the breeding season in 1906 the breeding quail numbered 47; at the close of the season a partial count indicated 30. At the beginning of winter, when they could be counted, exactly 21 were found. At the opening of the breeding season of 1907 this number was reduced to 12. In a few cases a flight against the side or top of the pen, as might happen by being unexpectedly startled, was believed to be the cause of death, but this was exceptional, for the quail quickly learn and exercise caution in flight when in pens. Nearly all the quail found dead, when not too far decayed, showed the appearance of intestinal disease, and as all had been exposed to such disease it seems probable that they carried the infection into the pens, where they fell victims, sometimes immediately, sometimes months later, accordingly as they received the infection or had their power of resistance to it weakened. It was noted in several instances that the loss of the first bird was quickly followed by the loss of the rest in the pen.

In 1907 the experiences were somewhat the same, - several lots came through the season without loss, others suffered a total or partial loss. In two lots the birds were in pens adjacent to those in which birds died of the so-called Alabama quail disease, and doubtless received the infection from that source. In both pens only a few days elapsed between the death of the first and the last birds. In between these pens four, occupied by birds from the same lot, went through the breeding season with the loss of only 1 bird out of 12. In the pens occupied the previous year the loss was heavier, but soon after the close of the breeding season a weazel destroyed all the birds but one. This one, a female, was put in a pen with a pair of quail, and was promptly killed by them, being only the second instance here where violence has been shown by one quail to another. Difficulty in finding the dead birds in a condition fresh enough for examination has prevented the determination of the disease, except in a few cases. These proved the agent to be a parasite, Coccidium. The Amaba was reported in only one adult bird.

The birds received in March were destroyed by a bacterial disease. Of the 25 large pens, 6, covering 2,880 square feet, have not been occu-

pied, and may be considered safe for another season's work; 19, covering 11,720 square feet, have been used, and may be considered infected. For how long would be a difficult question to answer, but certainly for another year, probably for two. In a case where pheasants were destroyed by Coccidia last year, the ground where they travelled was infected this year, and loss resulted from placing birds there. pens considered unsafe should be disinfected, if it is possible to do it thoroughly; but a quarter of an acre of rough ground, littered with brush, stones and stumps, and having patches of thick vegetation, presents a difficult problem when it is required to make it safe for such birds as quail, which pick and feed on every inch of the bottom, and scratch deep into the sod. I recommend that a liquid disinfectant be used, first burning the pens over lightly to clean out the dead leaves and vegetation of the previous year's growth, wetting around the boarding of the pens and any vegetation it is desired to save with the disinfectant as the fire progresses.

The breeding lots were substantially the same as the year before, one male to one, two or three females, and the laying was fully as satisfactory, the average being about 13 eggs and percentage fertilized about 90. One lot of birds in a small pen at the barn is considered separately. These were birds reared the season before, two females and two males; the first male died and another one was put in early in the season.

The first egg was taken June 2; the last, after the middle of September. One bird first laid 10 eggs, then ceased; but after a brief time both birds began laying together, and continued until the eggs numbered 76. They laid practically all of their eggs in the same nests, making four, and using these interchangeably when disturbed by having a portion of their eggs taken. The first eggs were well fertilized, 9 out of 10 hatching; succeeding lots showed more sterile eggs, until at the end practically none were good. The number of fertile and unfertile eggs were equally divided, 38 of each; considering only the fertile ones, these birds exceeded the others in prolificness.

The conditions were not especially favorable for this productiveness, and it may be safely taken as an indication of the capacity of the quail under domestication. The pen was small, containing 288 square feet, and had but a slight amount of vegetation. The birds were only slightly stimulated, being fed moderately with maggots when it became evident that they would lay an unusual number of eggs; otherwise their food was the same as that of the other quail, though with much less opportunity to secure insect food.

The laying birds were the only females of the lot reared the previous year, and a comparison can only be made with wild birds captured, which appear in captivity to closely follow their habit and lay only an ordinary nesting. The performance of those two birds seems a hopeful break in this instinct, and if it is continued in the birds for breeding the next season, some of the second generation grown here

will make a most important step in the progress of the work, and a very satisfactory one if the same results can be obtained and the eggs as well fertilized as in the smaller lots. Better fertilization possibly may be secured by having the birds in pairs, by changing the males, or by having lone males in adjoining pens, as a stimulus to the breeding males. This problem should be worked out in succeeding seasons, and in preparation for it the breeding lots should be arranged for the experiments suggested. The two females died two months after the laying season, and on examination were found infected with Coccidia. These parasites were the evident cause of death, but impaired vitality from such heavy laying must have been a contributory cause, for the birds had been in the pen a year, and were exposed to Coccidial infection in the beginning.

The work with incubators was very satisfactory and promises better results than by the use of hens; the loss from dead embryos was less than the usual breakage by hens, and the chicks were strong, except for a few crippled ones, due to variable heat. The incubators were run the same as for pheasants, more airing and cooling and extra moisture being supplied. This and some other parts of the work are proper subjects for careful scientific work, and should be done apart from the regular work, until the proper methods are exactly defined, and can be followed as a matter of routine.

The young quail were fed on dried ant eggs and maggots, live ant eggs and insects being added when obtainable, and fruit, seeds and grain, as the birds grew old enough to take this food. The ant eggs and maggots are a dependable supply of food, and some of the best results were obtained from using these exclusively. The value of insect food is probably higher, but as it could not be used very largely, results cannot be stated. Its use is attended with many difficulties. principally in collecting it, so as to feed the birds regularly, and its value in very extensive feeding operations is problematic, for the collectible supply within reasonable distance of the pens is uncertain, and sometimes wanting. A more varied and regular supply would be of great importance, and should be taken up and studied as something very essential to doing the work on a large scale. There is no question but what insects and the chase for them produce more vigorous birds. but possibly harm is done through depending on an uncertain supply and changing to other food. Fresh ant eggs can be obtained very regularly, but a large stock of birds would soon exhaust the supply within a radius that would be practicable for collecting, and getting these, as well as insects that could be collected only in moderate numbers, would require an amount of time practically prohibitive where it is desired to do considerable work.

The supply of ant eggs might be increased by scattering about flat stones or short lengths of boards or slabs for them to work under; a suitable succession of vegetation might produce a more regular supply of *Aphides* in a season favorable for them. It may be possible to trap

grasshoppers, crickets and such insects, or night flying insects, or to net them on a large scale by sweeping grass or bushes. Maggots can be readily turned into flies, and by breeding the house fly the expense for material would be inconsiderable. Many of these suggestions have been tried with varying success, but no unfavorable conclusion reached until more thorough trials have been made.

The young have been reared in small pens, but the possible advantages of a large pen should be tried, especially one of light construction, that could be moved frequently to fresh ground, where each removal would mean a fresh supply of insects.

The work of cultivating natural plant food was continued, and is of considerable value in supplying a variety of desirable food, and at the present time is of especial value in determining what can be profitably done. The value of domestic berries and their wild varieties is settled, and provision made for an ample supply. As the season for these berries passes, the elderberry has been found most desirable. since it is easily fed, and more eagerly eaten than anything else at that time, and can be given a longer season by planting in warm places for early berries and in half-shady places at the springs for late berries. Probably nothing can be cultivated that will yield such enormous returns for labor expended and ground used, and as it can be easily dried for winter use, it has been planted more extensively than anything else. Weed seeds are so eagerly eaten that it is a question if they should not be collected or cultivated as regular food. A field where ragweed or pigweed would grow up thick, with a small sowing of grain or millet, would, if reaped at the right stage, supply a combined grain and green food of excellent quality.

Respectfully submitted,

ARTHUR MERRILL, Superintendent.

Gray Squirrels. — In certain sections of the State the scarcity of gray squirrels has led to a considerable interest in securing conditions which may make for an increase in numbers. While beyond question the animal is of unusual æsthetic value, and serves as a healthy and pleasant stimulus to those who roam the wild woods or parks, there is another side to the question which must not be overlooked by the enthusiastic champions of this animal. This office has received complaints from sections of Cambridge, Newton Highlands and elsewhere, which all agree in testifying that the squirrels may become too numerous, and thus not only annoying but even very destructive, not alone to the eggs and young of birds, but to trees, fruit and buildings. As in the case of foxes and deer, much depends upon the point of view whether these animals are on the whole so beneficial as

to be worthy of a high degree of protection without guaranteeing adequate protection to property owners. By the extermination of the panther and wildcat, and the slaughter of hawks and owls, man has removed the chief checks to the undue increase of these animals, and is thereby compelled to assume the function of regulating the numbers. Just as a beautiful flower by being in the wrong location may become a noxious weed, so the beautiful gray squirrel may become but a graceful rat, with all its cousin's indiscriminating destructiveness.

We again repeat most emphatically the opinions expressed in our two previous reports, that the greatest hope for the continued maintenance and complete utilization of our useful fish, birds and mammals lies in greater attention to well-considered attempts at artificial propagation, by individual and co-operative methods, and by the institution of permanent sanctuaries or reserves for breeding places, rather than by multiplying complicated and trivial restrictive laws, which are changed each year according as the representatives of any section of the State may become interested in some one phase of a great problem. We need more general laws based upon broad, sound principles, with the elimination of local trivial restrictions.

Side Hunts. — There still persists in certain sections of New England that relic of barbarism the so-called "side hunt," where a "record" of slaughter is sought. It is not a record of difficult shots which have brought success, but rather a noxious attempt to collect the greatest possible number and variety of birds and animals which by any stretch of the law and of so-called sporting "imagination" can be construed as "game."

Such a contest involves too little of the true elevating spirit of outdoor life, and offers little attraction to the true sportsman. "A true sportsman," said Dr. Van Dyke, "is a man who finds his recreation in a fair and exciting effort to get something which is made for human use in a way that involves some hardship, a little risk, a good deal of skill and patience, and plenty of out-of-door life." The "side hunt" provokes reckless and wasteful destruction of life, and tends to promote that deplorable state of mind which manifests itself as fish and game "hoggishness."

These are typical score cards, made in northern Worcester County in the fall of 1907.

The score cards vary in different sections. In many cases beneficial birds which are protected by law are included in these lists.

A sample list of the items and the scores is given below.

List of Game to be counted.

					-	<i>aum</i>					
•										Points.	Number killed
Eagle,										500	_
Hen hawk, .	•									100	1
Owi,		•		•	•		•			200	-
Snipe,			•	•		•				100	_
Partridge,		•		•			•			100	5
Quail,		•		•						100	-
Woodcock, .	•	•	•	•						100	2
row,		•								25	5
Blue jay,						•	•			10	20
Duck,				•		•				150	3
Kingfisher, .	•	•	•			•	•			50	-
Loon,			•		•					300	i -
parrow hawk,	•	•		•	•	•	•		-	50	-
Pigeon, wild,	•	•	•			•		•	-	200	-
furtle dove,	•		٠		•	•	•			200	-
Coon,	•	•	•	•	•	•				800	2
Foodehuck,	•	•	•	•	•	•	•	•		100	-
Fray squirrel,	•		•			•			-	100	40
led squirrel,	•		•		•	•	•			10	60
labbit, .	•	•	•	•		•			-	25	15
lare,		•	•						-	100	-
dink,	•					•			-	150	-
ox, red, .		•							-	800	12
ox, black, .				•	•			٠	-	500	-
'ox, silver,		•		•	•				-	500	-
ledgehog, .		•			•			•		200	-
lying squirrel,		•		•				•	-	25	-
Veasel, .		•		•				•		125	-
fuskrat									٠.	50	-

Total game birds killed,

Non-edible and non-game birds killed, . . .

In another, the total killing included 9 ruffed grouse, 1 fox, 30 red squirrels, 20 gray squirrels, 2 rabbits and 1 coon.

The score card and the results of another two days' batt(ue):—

List and Count of Game.

						- {	Points.	Number killed
Wild goose,						-	500	_
Wild duck, .							500	8
Fox,					٠		500	_
Mink,							500	-
Coon,							400	-
Partridge, .							800	4
Woodcock, .							250	-
Hawk,							400	8
Owl,							200	4
Weasel, .							200	-
Woodchuck,							250	-
Snipe,							150	_
Rabbit, .							150	_
Crow,							150	1501
Blue jay, .						.	100	20
Muskrat, .							50	3
Red squirrel,							50	40
Gray squirrel,							250	25
Flying squirre	ı			_			50	

The food habits of the common crow form the subject of Bulletin No. 6 of the Biological Survey. The results of examinations of 909 stomachs of crows are tabulated in the report. Of this number, 78 contained mice, they being fourth in order of importance on the list of animal food for the year. Professor Barrows says: "There is abundant proof from several sources that crows often capture living mice, particularly the short-tailed field mice, which build their nests usually on the surface of the ground, among the roots of grass. Here the crows discover them, and, tearing the nest to pieces, devour the young and not infrequently catch the adults as well. By far the greater number of the mice found in the stomachs were meadow mice, or voles

¹ In connection with this massacre of crows should be studied the reports of the Biological Survey of the National Department of Agriculture.

² The Common Crow of the United States, Walter B. Barrows and E. A. Schwartz, 1895.

1907.7

(genus Microtus), and most of them were the common species (Microtus pennsylvanicus).

In midwinter, when the ground is covered with snow, crows find but few field mice; but as spring approaches and the snow begins to melt on the meadows the bulky grass nests of the mice are first exposed. The crows may then be seen searching the meadows for them. They alight near the openings in the snow, pounce upon the nests, tear them to pieces, and as the mice scamper out the crows often succeed in capturing them. Later in the spring, when crows feed their nestlings, insects are more abundant and the nests of mice are hidden in the growing grass, so that relatively fewer mice are eaten. Still later, after the young crows have left their nests and mowing machines have once more exposed mouse nests in the meadows, crows again spend much time searching for young meadow mice.

It is of interest to note that complaints of recent depredations of field mice are especially numerous from sections of the United States where for several years past bounties have been paid for killing crows.

Deer. — Deer have continued to increase in spite of considerable illegal shooting and the killing of 25 deer by steam and trolley cars.

Without doubt much damage is done to farmers' crops by deer for which complete and facile remuneration is not obtainable. The writer is, however, warranted in saying that the commissioners and their paid deputies will gladly extend every possible assistance to secure justice for any bona fide claimant. The total disbursements of the Commonwealth during the fiscal year of 1907 were \$2,912.78. The value of the increase in the number of deer cannot be less than \$30,000, figured even at the value of the dressed meat as food.

Enforcement of Law and Suggestions for Legislation.

Classification of Arrests during the Year 1907.

	For	K OI	V 10	LATIC	m.					Counta
Taking shellfish in polluted	water	ъ,				•			-(78
Pishing in closed ponds, .										19
Hunting on Lord's Day, .									.	69
Hunting without license (a)	iens),								.	42
									.	16

¹ From Bulletin No. 31, Biological Survey, United States Department of Agriculture, An Economic Study of Field Mice, by David E. Lantz, issued Oct. 28, 1907, p. 50.

Enforcement of Law and Suggestions for Legislation— Concluded.

Classification of Arrests during the Year 1907 — Concluded.

FORM OF VIOLATION.				Count
Dogs chasing deer,		•		5
Killing song birds,				10
Illegal possession of game,				22
Having short trout,				17
Killing deer,				2
Using more than ten hooks,				29
Setting snares or snaring game,				3
Taking scallops under two inches,				4
Hunting with ferret,				4
Pursuing deer with intent to kill,				4
Having smelts in close season,				8
Using more than one hook on stocked pond,				2
Taking or killing eagle,				2
Dynamiting waters,				6
Seining in Buzzards Bay,				3
Setting nets, chapter 301, Acts of 1897,				1
Spearing fish,				1
Taking short pickerel,				3
Taking short base,				4
Killing wood duck,				8
Snaring trout,				1
Seining in pond,				2
Hunting without license (non-residents), .				4
Having scallops in close season,				5
Having trout in close season,				1
Trespassing on posted land for purpose of hunti	ng,			2
Pursuing wild fowl with power boat,				7
Possession of feathers of birds for millinery,				8
Killing or possession of heron,				9
Shooting gulls,				1
Setting forest fires,				5
Using set lines,				2
Taking clams illegally (Ipswich),				9
Cutting away lobster traps,				9
Total number of counts,				890

Fish and Game Laws and their Enforcement. — Summary of Law-enforcement Work during the Year 1907.

Total fines imposed,			\$3,470 20
Fines from arrests by paid deputies, .			1,921 20
Fines from arrests by unpaid deputies,			1,549 00
Total number of counts taken to court,			. 390
Total number of persons arrested, .			. 358
Convictions,			. 327
Discharged,			. 56
Defaulted,			. 7
Cases filed,	•		. 63

Itemized List of Moneys received by the Commissioners on Fisheries and Game during the Year 1907 and paid to the Treasurer and Receiver-General.

Rac	EIVE	D FOR	-							Amount	·.
ssuance of non-resident hunters'	lice	nses,	unde	r ch	apter	198,	Acts	of 1	907,	\$828	00
sale of egg-bearing lobsters to stations,		Unit				eau (of F	sber •	ies	655	20
Heath-hen fund, chapter 504, Acts	of I	1907,								590	00
forfeitures (deer, moose, etc.),1										386	77
forfeitures (pike perch),										298	70
orfeitures (seines or nets), .										8	50
									-	\$2,767	ž

¹ Deposited with Treasurer of the Commonwealth pending the decision of certain legal questions.

There have been no applications for the inspection of fish under the Acts of 1902, chapter 138, and no fees have been received.

Enforcement of Law. — Our deputies are instructed to extend every possible assistance to the authorities of adjacent States. At many points on the State lines professional violators ply their vocation, since here are offered peculiar opportunities to escape in case of liability of apprehension. It would be of great advantage to the public if some plan could be devised whereby it would be possible for adjoining States to reciprocally deputize the State officers who enforce the fish and game laws. The chief difficulty appears to rest upon the apparent impossibility for one State to commission citizens of a second State as

officers of the first State, though Pennsylvania and New Jersey have devised a plan which promises to meet existing conditions.

Many nests and young birds are destroyed by dogs running at large. Other States have recognized this fact, and have enacted various laws.

Michigan permits the training of dogs fifteen days only before the open season for ruffed grouse, and prohibits the possession of firearms while the person is so engaged. Minnesota does not allow pointers and setters to be used or run in fields or upon lands in which game birds may be found during August, or at any time except in the open season for such birds. Pennsylvania permits dogs to be trained by their masters upon any game, except deer, from August 1 to January 1, but prescribes that no injury shall be inflicted upon such game. South Dakota has gone considerably further, and declares that any person travelling in any manner in any part of the State, outside the immediate bounds of the inhabited parts of any village, town or city, in possession of any kind of shotgun and ammunition, with dogs ordinarily used for hunting game birds, from July 1 to September 1, shall be presumed to have violated the laws respecting game birds.

The special attention of town authorities where bounties are paid upon hawks and owls is directed to the fact that under the present laws bounties may legally be paid only upon the goshawk, red-tailed, red-shouldered, Cooper's, sharp-shinned and duck hawks, and upon the barred and great horned owls. Eagles are especial marks, but are now protected by special law.

The right to search for game illegally held is perhaps one of the most important functions of a warden, and is necessary for efficient protection, for in no other way can illicit traffic in game be eradicated. This authority has led to the discovery of large numbers of birds and quantities of game in some of the cities of the United States, and the suppression of a traffic only suspected before. It has been only by means of this process that illegal interstate commerce in game has been stopped. So hard have the market hunters in the Mississippi valley been pushed that in order to get their illegal shipments to the city markets they have packed the game in butter tubs or egg cases, labelling the shipment "butter" or "eggs." Other devices also for evading the game laws have been adopted; but the climax was reached

¹ From Bulletin No. 28, Biological Survey, United States Department of Agriculture, Game Commissions and Wardens, their Appointment, Powers and Duties, issued Aug. 1, 1907, p. 89.

when certain shippers packed their game in a coffin box and shipped it as a corpse, accompanied by a false death certificate. Somewhat more troublesome, if not so gruesome, was the resort to bales of hay, the game being placed in the center of a car with the bales of hay piled about it.

Search without Warrant.—Seventeen States and the District of Columbia specifically provide that wardens or other officers may search certain designated places without a warrant. While the statutes vary widely in language, the substance is the same, and the officers are clothed with power to accomplish the same results. It is interesting to note that most of the States granting this power are western or central; of the southern States only Louisiana is included, and of the eastern only Maine, Connecticut, New Jersey, New York and Pennsylvania. Arkansas has a provision permitting common carriers to open and examine any package delivered to them for transportation out of the State that they suspect contains game, and the Texas game law of 1907 contains a similar provision, as follows:—

That such express company, or other common carrier, or its agents, servants or employees, shall have the privilege of examining any suspected package for the purpose of determining whether such package contains any of the articles mentioned herein [all game]. — House Bill No. 345, section 10.

Ohio does not vest her officers with power to search without warrant, but provides that in case of refusal of the owner or person in charge of any package, box, coat, clothing or other receptacle to permit a warden or officer to inspect them, such officer may procure a search warrant to do so from any competent court. Penalizing the refusal of any person to permit an inspection of his place or receptacles, the interposition of or hindrance or interference with such search accomplishes much the same result as direct authorization of search with or without warrant. Such provisions are as follows:—

Kansas. — Persons engaged in trade of meat, fish and game are required, under penalty of \$10 to \$50, to permit an inspection of their places of business by a warden.

Minnesota. — Any person in possession or control, or in charge of any hotel, restaurant, storage plant or house commonly used in storing meat, game or fish for private parties, refusing or failing to permit any member of the game commission or its wardens to enter such place or receptacle therein for the purpose of making an inspection thereof, is punishable by a fine of \$50 to \$100, or imprisonment for thirty to ninety days.

West Virginia. — Any person who hinders, obstructs or interferes with a game warden in the discharge of any of his duties (among which is the duty to search for evidence of the violation of law) is punishable by a fine of \$10 to \$50, and in default of payment shall be imprisoned until it is paid, but not exceeding thirty days.

Michigan, Oregon and West Virginia render evasions of their laws still more difficult or more certain of detection by making hindrance or obstruction of officers in their search for evidence or fruits of violations prima facie evidence of violation of law. The Michigan provision is as follows:—

Any hindrance or interference, or attempt at hindrance, with any search and examination shall be *prima facie* evidence of a violation of the law by the party or parties who hinder or interfere with such search and examination.

One phase of the subject, however, deserves fuller and more extended presentation. A number of cases involving the game laws have gone to the courts of last resort upon the ground that the fine authorized to be inflicted was excessive, and that the statute was therefore in contravention of that clause of the State Constitution prohibiting the imposition of excessive fines. The courts without exception in these cases have sustained the law, and have held the following fines not to be excessive; \$1 for each lobster in Maine (State v. Craig, 13 Atl. 129); \$5 for each lobster in Maine (State v. Lubec, 45 Atl, 520); \$5 for each prairie chicken in Nebraska (McMahon v. State, 97 N. W. 1035); \$10 for each duck in Minnesota (State v. Poole, 100 N. W. 647); \$20 for each bird in Rhode Island (In re Stone, 41 Atl. 658; 21 R. I. 14); \$50 to \$75 for a wild duck in Wisconsin (State v. DeLano, 49 N. W. 808); and \$100 for each deer in Minnesota (State v. Rodman, 59 N. W. 1098; 58 Minn. 393). One of the clearest and most satisfactory expositions of this question is found in the case of State v. Rodman (Minn., 1894), 59 N. W. 1098. In this case, which involved the unlawful possession of 58 deer, the maximum punishment provided by the statute was a fine of \$5,800, or imprisonment in the county jail for about sixteen years. In the course of its decision the court said: -

While the fines imposed are certainly large, yet we cannot say that they are excessive, in a constitutional sense. A large discretion is necessarily vested in the Legislature to impose penalties sufficient to prevent the commission of an offence, and it would have to be an extreme case to warrant the courts in holding that the constitutional limit had been transcended.

Ten years later the same court (the Supreme Court of Minnesota), as already explained, sustained the lower court in the imposition of a much larger fine — \$20,000 — for having in possession 2,000 wild ducks with intent to sell them.

One of the greatest obstacles to effective game-law enforcement is the modern cold-storage plant and the facility it offers for concealment of game. The ease and certainty with which dead game may be preserved even in hot weather removes all limitation formerly imposed by that condition, and stimulates the killing of vastly larger quantities than in days before this invention. It is therefore a direct incentive to the unlimited destruction of game. It has furnished a defence often invoked in prosecutions for possession of game in close season, when the defendant has asserted that the game was lawfully taken in the open season and held in cold storage. It is often difficult, if not impossible, for the State to controvert this defence. Hotels, restaurants and clubs are therefore able to serve game to their guests throughout the close season, and many other avenues of illicit commerce in game are thereby opened. It has proved such a menace to the preservation of game in Minnesota that in 1905 the Legislature prohibited, in the following terms, the placing of game in any cold-storage plant:—

The placing or receiving within, or storage of any game bird or game animal, or any part thereof, in any cold-storage plant, is hereby prohibited and made unlawful.

Other States have placed restrictions on the storing of game. As an example. Nebraska has made it unlawful to store game, except during the open season and five days thereafter, when stored for the person lawfully in possession thereof, and at any time when it has been lawfully imported into the State. This limitation is followed by a positive prohibition of the possession or serving of game by hotels, restaurants, cafes and boarding houses to their patrons in close season. In Colorado a permit from the game commissioner is required to store game. In several States the owners, proprietors or managers of cold-storage plants are required to permit the game wardens to inspect all places where meat, fish and game are kept for sale or shipment, or stored for pay, and those storing such articles are required to permit inspection. New York defines the limitations on the privilege of storing game in no uncertain terms: dealers in game may store their stock on hand at the commencement of the close season upon giving bond in such amount and under such restrictions as the forest, fish and game commissioner may prescribe, and with the further restrictions that they will not sell, give away or otherwise dispose of the game in close season, and that they will not violate the law in any way. The prostitution of the cold-storage plant to purposes of illicit traffic in game is fortunately disappearing under recent legislation, and through the vigilance of the officers charged with the enforcement of the game laws.

The case of Haggerty v. St. Louis Ice Manufacturing and Storage Company (44 S. W. 1114), decided by the Supreme Court of Missouri in 1898, involved an interesting question of contract connected with the storage of game. Haggerty, game dealer in St. Louis, had stored in 1892 with the defendant company a large quantity of game, to be withdrawn during the next open season. In 1893, when the game was

removed, the owner found it worthless from decay. A suit was instituted for the recovery of \$7,000 damages from the storage company. The company demurred to the complaint upon the ground that the contract of storage was in violation of the game law, which prohibited possession of game in close season. The demurrer was sustained and on appeal to the Supreme Court the judgment was affirmed.

Large numbers of ruffed grouse and other game are disposed of in various ways distinctly contrary to the spirit of the non-sale law, but in such a manner as to successfully be within the strict letter. Public opinion should take up this type of violation.

Forest Fires. — These do enormous damage to bird life by the destruction of nesting sites, young birds, eggs and probably not a few adults. Many incipient forest fires have been extinguished by our deputies in various parts of the State.

Deputy James E. Bemis says in his annual report: "Have watched for forest fires and put out one or more every day for some weeks in the dry season. Have twice called out the fire department for assistance."

Our deputies have secured five convictions of persons illegally setting fires in the woods.

The deputy service is rapidly becoming that of a trained and active rural police, whose duty is to protect the forests and their inhabitants. The majority are adept hunters, whose interest in the wellbeing of the property under their charge is greater than the mere "job."

Recommendations for Legislation. — We especially respectfully recommend the passage of laws designed to accomplish the following purposes:—

- 1. To protect the lobster from excessive and destructive fishing.
- 2. To prevent the sale of lobster meat prepared or placed on the market under unsanitary conditions.
- 3. More adequate and economical facilities for propagating and distributing food fish and useful birds.
- 4. Development of the shellfisheries below high-water mark in such a manner as to increase the economic yield of food

¹ From Bulletin No. 28, Biological Survey, United States Department of Agriculture, Game Commissions and Wardens, their Appointment, Powers and Duties, issued Aug. 1, 1907.

material; to furnish wider opportunities for remunerative employment of skilled and unskilled labor; to increase the taxable property of the shore towns and cities; and to bring revenue to the Commonwealth.

- 5. Giving to the fish and game commission and their salaried deputies the same powers for the enforcement of the fish and game laws as is now given to the district police for the enforcement of the general laws, including the right to carry weapons, etc., to serve warrants, and to summon assistance.
- 6. Suitable protection for deer, and for property liable to injury by deer.
- 7. Definition as to what constitutes hunting on the Lord's Day.
- 8. A perfecting clause to the law licensing unnaturalized, foreign-born persons to hunt within the Commonwealth.
 - 9. Suitable protection for pheasants.

1907.7

- 10. Prohibition of all hunting from January 1 until the beginning of the next open season on game in order that better protection may be given to the useful birds, and that an increasing number of woodcock, ducks and other species of birds may breed within this State.
- 11. It should be lawful at any time for any person, firm or corporation, dealing in game or engaged in the cold-storage business, to buy or sell hares or rabbits which have not been taken or killed contrary to the laws of this or any other State.
- 12. Such an extension of the right of search law as our State Constitution may permit, thus making possible a more satisfactory enforcement of the laws relating to the preservation of birds and other useful animals.
- 13. Amendment of section 132, chapter 91 of the Revised Laws, relative to fishing with seines, dip-nets, etc., in fresh water.
- 14. Perfecting clause to chapter 296 of the Acts of 1907, relative to the sale of artificially reared trout.

COURTESIES.

It is a pleasure again to acknowledge the assistance so courteously rendered to the commission by Mr. Arthur L. Millett, local agent of the United States Bureau of Fisheries at Glouces-

ter, and by Mr. F. F. Dimick, the efficient secretary of the Boston Fish Bureau.

Permits to hold in confinement egg-bearing lobsters for collection by the agents of this commission, according to chapter 408, Acts of 1904, were issued to 480 fishermen and dealers.

Permits for taking birds and eggs under section 9, chapter 92 of the Revised Laws, as amended by chapter 287, Acts of 1903, were issued to the following-named persons:—

Frank S. Aiken, Fall River.

Chester A. Reed, Worcester.

A. H. Tuttle, Cambridge.

William Dearden, Springfield.

George M. Gray, Woods Hole.

William Brewster, Concord.

Frederick E. Waterman, Fall River.

John H. Hardy, Jr , Boston.

W. H. Forbush, Wareham.

F. H. Carpenter, Seekonk.

Owen Durfee, Fall River.

F. B. McKechnie, Boston.

F. H. Kennard, Boston.

A. C. Bent, Taunton.

F. H. Scott, Westfield.

Nathan F. Stone, Worcester.

A. E. Preble, Portsmouth, N. H.

B. G. Willard, Millis.

J. A. Sinclair, Wilmington.

Haynes H. Chilson, Northampton.

J. A. Barton, Fitchburg.

Chester S. Day, Boston.

Clarence Birdseye, Amherst.

Permits to have in possession for propagation purposes ducks of any species were issued to: —

A. V. Freeman, South Duxbury.

Guilford C. Hathaway and Benj. W. Brown, Fall River.

Permit to have in possession for purposes of propagation wild ducks was issued to:—

William French, Fall River.

Permit to have in possession black bass, trout and pickerel at any season, of any size, also to use minnow traps and casting net, was issued to:—

W. Endicott Dexter, Boston.

Permit to have in possession native birds for purposes of observation and breeding was issued to:—

Dr. J. C. Shaw, New Bedford.

Permit to take eggs, young and adults of the laughing gull, Wilson's tern and Roseate tern was issued to:—

Clarence E. Birdseye, Woods Hole.

Permit to take and have in possession eggs of the ruffed grouse and the birds which hatch therefrom, also quail for purposes of propagation and study, was issued to:—

C. F. Hodge, Worcester.

Permission to have live Alabama quail in possession was issued to:—

Louis C. Tilton, Boston.

Permission to have in possession for purposes of propagation live quail was given to:—

William Albrecht, Sharon.

Permit to have in possession gray squirrels, to be liberated on reaching a proper age, was given to:—

M. J. Whitall, Worcester.

Permit to trap quail for purposes of propagation was issued to:—

C. F. Hodge, Worcester.

Permit to have in possession and to transport from Worcester to New York ruffed grouse and quail was issued to:—

C. F. Hodge, Worcester.

Permit to have in possession lobsters of any size for use in connection with scientific work was issued to:—

Marine Biological Laboratory, Woods Hole.

Permits to take sand eels for bait, under chapter 164, Acts of 1902, were issued to the following persons:—

A. P. Hilton, Newburyport.

Henry L. Godfrey, Newburyport.

R. L. Gove & Son, Ipswich.

Charles R. Coullard, Newburyport.

James Crooks, Newburyport.

Permit to collect scallops of any size, and to use a sweep seine and nets for catching fish, to be used solely for scientific purposes, was issued to:—

Marine Biological Laboratory, Woods Hole.

Permit to take lamprey eels for scientific purposes was issued to: —

George M. Gray, Curator, Marine Biological Laboratory, Woods Hole.

Permission was given to take white perch by seines or nets for the purpose of transferring them from the waters in which they were taken to other waters in the town of Plymouth to:—

W. C. Hathaway, Plymouth.

Permit to take large-mouthed black bass from Housatonic River in Sheffield for scientific or exhibition purposes was issued to:—

Richard E. Follett, Boston.

Permit to take from Housatonic River in Sheffield large and small-mouthed bass, sunfish, pickerel, yellow perch, rock bass and dace, to be used for scientific or exhibition purposes, was issued to:—

Richard E. Follett, Boston.

Respectfully submitted,

GEORGE W. FIELD. EDWARD A. BRACKETT. JOHN W. DELANO.

APPENDICES.

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[A.]

LIST OF COMMISSIONERS.

United States Bureau of Fisheries, Washington, D. C.

George M. Bowers, Commissioner.

Hugh M. Smith, Deputy Commissioner.

Irving H. Dunlap, Chief Clerk.

John W. Titcomb, Assistant in charge of Division of Fish Culture.

Barton W. Everman, Assistant in charge of Division of Inquiry Respecting Food Fishes.

A. B. Alexander, Assistant in charge of Division of Statistics and Methods.

Hector Von Bayer, Architect and Engineer.

Superintendents of United States Fisheries Stations.

E. E. Race, Green Lake, Me.

Charles G. Atkins, Craig Brook, East Orland, Me.

E. E. Hahn, Boothbay Harbor, Me.

W. F. Hubbard, Nashua, N. H.

E. N. Carter, St. Johnsbury, Vt.

C. G. Corliss, Gloucester, Mass.

E. F. Locke, Woods Hole, Mass.

Chester K. Green, Cape Vincent, N. Y.

L. G. Harron, Washington, D. C.

George A. Seagle, Wytheville, Va.

R. K. Robinson, White Sulphur Springs, W. Va.

H. D. Allen, Beaufort, N. C.

J. J. Stranahan, Cold Springs, Bullochville, Ga.

C. W. Burnham, Tupelo, Miss.

S. G. Worth, Edenton, N. C.

A. G. Keesecker, Fishery, Tenn.

S. W. Downing, Put-in-Bay, O.

Frank N. Clark, Northville, Mich.

S. P. Wires, Duluth, Minn.

S. P. Bartlett, Quincy, Ill.

R. S. Johnson, Manchester, Ia.

H. D. Dean, Neosho, Mo.

J. L. Leary, San Marcos, Tex.

W. T. Thompson, Leadville, Col.

D. C. Booth, Spearfish, S. D.

James A. Henshall, Bozeman, Mont.

G. H. Lambson, Baird, C. Henry O'Malley, Clackam A. H. Dinsmore, Baker L. W. K. Hancock, Yes Lake M. F. Stapleton, Mammo Claudius Wallich, Afogna	as, O ake, ' e, Ala th Sp	Wash, ska. oring,								
		Alab.	AMA.							
Fish	and (Game	Com	missi	one	r.				
John H. Wallace, Jr, .	•	•	•	•	•	Montgomery.				
		Arizo	ONA.							
		h and	l Gas	ne.						
T. S. Bunch,		•				Safford.				
T. S. Bunch, W. L. Pinney, Secretary,						Phœnix.				
E. A. Sliker,	•		•	•	•	Flagstaff.				
California,										
	Fish	Comn	nissio	ners.						
George Stone, President,						San Francisco.				
George Stone, President, F. W. VanSicklen, .						Alameda.				
John Birmingham, Jr.,						Pinole.				
Charles A. Vogelsang, Chi	ef D	eputy	, .	•	•	San Francisco.				
		Coloi	RADO.							
David E. Farr, Commission	ner.					Denver.				
R. L. Spargur, Chief Cler						Denver.				
W. S. Kincaide, Superinte										
C. W. Lake, Deputy Comr	nissio	ner,	•	•	•	Denver.				
	Co	ONNEC	encii	т.						
George T. Mathewson, Pr			_			Thompsonville				
E. Hart Geer, Secretary,	- Casacc	,	•	•	•	Thompsonville. Hadlyme.				
John M. Crampton, .		•				New Haven.				
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John Y. Detwiler, .	•	•	•	•	•	New Smyrna.				

GE	ORGIA.	
Fish Co	mmissioner.	
A. T. Dallis,	•	. LaGrange.
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Fish and (
William N. Stephens,		. Boise.
D. I. Mingston, Chief Dopatty, 1	•	. 2020.
ILI	INOIS.	
State Game	Commissio	ner.
John A. Wheeler,		. Springfield.
Board of Fish	h Commissi	oners.
Nat H. Cohen, President,		
S. P. Bartlett, Superintendent and	Secretary,	. Quincy.
Henry Kleine,		. Chicago.
	DIANA.	
Z. T. Sweeney, Commissioner, . E. E. Earle, Chief Deputy,		. Columbus.
E. E. Earle, Chief Deputy,		. Indianapolis.
I	OWA.	
Fish and G	ame Ward	ρ n
George A. Lincoln,		
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D. W. Travis,		. Pratt.
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Inland Fishe	· ·	
L. T. Carleton, Chairman,		. Winthrop.
J. W. Brackett,		. Phillips.
Edgar E. Ring,		. Orono.
Sea and SI	ore Fisher	ier.
James Donahue, Commissioner, .		
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MAR	YLAND.	
Fisheries C		
James D. Anderson,		. Somerset County.
Charles F. Brooke,		. Montgomery County

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Oregon Milton Denni	is,			•			Baltimore.				
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Massachusetts.											
							Jame.				
George W. Field, Cha											
John W. Delano, .	•				•	•	Marion.				
George H. Garfield,	•	•	•	•	•	•	Brockton.				
Michigan.											
	1	Fish	Com	missi	oners.						
George M. Brown,							Saginaw.				
George M. Brown, Charles D. Joselyn,							Detroit.				
Delbert H. Power,											
Game, Fish and Forestry Warden.											
Charles S. Pierce,					•		Lansing.				
			MINE	ESOT.	A.						
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O. J. Johnson, Presid John H. Grill, First	dent,						Glenwood.				
John H. Grill, First	Vice-	Pres	ident	·, ·	•		Sherburn.				
C. W. Stanton, Seco	nd V	ice-F	Presi	dent,			International Falls				
Robert Hannah, Secr	etary	, .				•	Fergus Falls.				
Carlos Avery, Execu	tive A	lgen	t, .				Hutchinson.				
S. F. Fullerton, Sup-	erinte	ender	it of	Hate	heries	3, .	St. Paul.				
			M.a	SOURI.							
J. C. Bassford, .							Mexico.				
J. O. Dassiolu, .	•	•	•	•	•	•	BICAICO,				
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William F. Scott,											
wimam r. Beott,	•	•	•	•	•	•	Helena.				
			NEBI	RASKA							
Gov. George L. Shel	don.	Com				icio.	Lincoln				
George L. Carter, Ch											
W. J. O'Brien, Supe	rinter	ıdeni	of	Hatch	eries.		Gretna.				
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Nathaniel Wentwortl	h, Ch	airm	an,				Hudson Centre.				
Charles B. Clarke, F	inanc	ial A	gent	·, ·			Concord.				
Merrill Shurtleff, Se							Concord.				

		N	w Ji	ERSEY	•					
Benjamin P. Morris, David P. McClellan, William A. Logue,	•	•	•	•	•		Long Branch. Morristown. Bridgeton.			
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W. E. Griffin, .	•		•	•			Santa Fé.			
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Forest, Fish and Game Commission.										
James S. Whipple, C										
J. Duncan Lawrence,										
John D. Whish, Secr										
D W		ellfish					Y			
B. Frank Wood, .	•	•	•	•	•	•	New York.			
NORTH DAKOTA.										
District Game Warden.										
W. N. Smith, District	No.	1,					Grafton.			
Olaf Bjorke, District	No.	2,			•		Abercrombie.			
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Paul North, Presiden	ıt,	•	•		•		Cleveland.			
Thomas B. Paxton,	•	•	•	•	•	•	Cincinnati.			
J. F. Rankin, D. W. Greene, George W. McCook, George C. Blanckner,	•	•	•	•	•	•	South Charleston.			
D. W. Greene, .	•	•	•	•	•	٠	Steubenville.			
Commo C. Dlonollan		•	•	•	•	•	Columbus.			
J. A. Charles Chief	7139G L777	etary,	•	•	•	•	Columbus,			
J. A. Speaks, Chief	w ard	en,	•	•	•	•	Columbus.			
		0	KLAH	EOMA.						
	Gas	me ar	id Fi	ish W	arde	n.				
Eugene Watrous,	•	•	•		•		Enid.			
			Opto	N.V.						
Oregon. Master Fish Warden.										
H. G. VanDusen,	Д						Astoria.			
II. G. YEIIDUSCII,	•	•	•	•	•	•	ASUFIA.			
		Gas	ne N	Varde	11 .					
R. O. Stevenson, .							Forest Grove.			

PENNSYLVANIA.

Game Commissioners.

James H. Worden, I	Pres	ident,				Harrisburg.
C. K. Sober, .					•	Lewisburg.
William H. Myers,						Williamsport.
Charles B. Penrose,						Philadelphia.
Frank G. Harris,						Clearfield.
John M. Phillips,				•		Pittsburg.
Dr. Joseph B. Kalbf	18, E	Secreta	ry,			Harrisburg.

Department of Fisheries Commissioner.

W.	E.	Meehan,								Harrisburg
			•	•	•	•	•	•	•	ATOM TANDOUT

Board of Fishery Commission.

John Hamberger,				Erie.
Henry C. Cox, .				Wellsboro.
Andrew R. Whitaker,				Phœnixville.
W. A. Leisenring,				Mauch Chunk.

RHODE ISLAND.

Commissioners of Inland Fisheries.

Henry T. Root, President, .			Providence.
William P. Morton, Secretary,			Providence.
J. M. K. Southwick,			Newport.
Charles W. Willard,			Westerly.
Adelbert D. Roberts,			Woonsocket.
Albert Davis Mead,			Providence.
			Central Falls.

Commissioners of Shell Fisheries.

James M. Wright, .	•		•	South Scituate.
Herbert M. Gardiner, .				Barrington.
Phillip H. Wilbour, .				Little Compton.
George W. Hoxie, .				Charlestown.
James H. Northup, .				Warwick.
James C. Collins, Clerk,				North Providence.

Commissioners of Birds.

C. H. Remington, Chairma	an,			Providence.
W. Gordon Reed, 2d, .				Cowesset.
E. R. Lewis,				Westerly.
William H. Thayer, .				Bristol.
A. O'D. Taylor,				Newport.

Tennessee.												
		Stat	e W	arde	n.							
Joseph H. Acklen,	•	•		•	•	•	Nashville.					
			Texa	. a								
Game, Fish and Oyster Commission.												
	-		-									
R. H. Wood, .	•	•	•	•	•	•	Rockport.					
			UTA	ਸ .								
H. B. Cromar, .							Salt Lake City.					
· · · ,												
VERMONT.												
H. G. Thomas, .	•		•	• '	•	•	Stowe.					
		•	7									
VIRGINIA. Board of Fisheries.												
			•	rishe	ries.							
W. McDonald Lee, Cl					•	•	Irvington.					
S. Wilkins Matthews,				•	•		Oak Hall.					
George B. Keezell,	•				•		Keezletown.					
Bland Massie, . Rorer A. James, .	•	•	•	•	•	٠	Tryo.					
Rorer A. James, .	•	•	•	•	•	•	Danville.					
		WA	SHIN	GTON	·		•					
Fish Comm	ission	er an	d Ga	ıme .	Ward	en	Ex Officio.					
John L. Riseland,							Bellingham.					
70 m 2. 1110 min,	•	•	•	•	•	•	2011mg attant					
		Wes	r Vn	RGINI	IA.							
	Gan	ie an	d Fis	h W	arder	3.						
James H. Marcum,							Huntington.					
•												
			ial D									
F. H. Merrick, .	•	•	•	•	•	•	Huntington.					
		w	ISCON	70737								
T WY Ctome			e W				Darmon					
J. W. Stone, .	•	•	•	•	•	•	Darron.					
	Comn	issio	ners	of F	isheri	ies.						
The Governor, ex offic				, -								
							Mineral Point					
Calvert Spensley, Pre James J. Hogan, Vic	e-Pres	ident	_				Mineral Point. LaCrosse.					
E. A. Birge, Secretar	▼.		,	•	:		Madison.					
2. 2. Direc, Delicial	,	•	•	•	•	•	1-ALEGENOUS					

William J. Starr	•,						Eau Claire.
Henry D. Smith,							Appleton.
Jabe Alford,							Madison.
A. A. Dye, .							Madison.
James Nevin, Su	perir	tende	ent,	•	•	•	Madison.
			V	√чом	ING.		

FISH AND GAME.

[Dec.

State Game Warden.
D. C. Nowlin, Lauder.

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[B.] DISTRIBUTION OF FOOD FISH.

TROUT FRY.

Distribution of Fry from the Adams Hatchery during April and May, 1907.

APPLICANT.	Town.	Name of Brook.	Number.
George F. Sayles, .	Adams	Patten,	10,000
Harry J. Sheldon,	Adams.	Bassett,	10.000
William P. Martin,	Cheshire,	Chapman,	10,000
William F. Card	Cheshire.	False	,
William F. Card	Cheshire,	Lincoln,	15,000
William F. Card	Cheshire,		
Walter Barber	Savoy,	Card,	10.000
F. N. Haskins,	Savoy.	Haskins	10.000
Sanborn G. Tenney	Williamstown.	Sweet and Idlewild,	10,000
Daniel V. Hanson	Erving,	Jack'e.	10,000
James H. O'Hara.	Greenfield	Sheldon,	,
James H. O'Hara.	Greenfield	Potter,	
James H. O'Hara	Greenfield	Phillips,	30,000
James H. O'Hara.	Leyden,	Barton,	,
James H. O'Hara	Levden.	Glen, east,	l
James H. O'Hara,	Leyden,	Glen, west,	1
Charles C. Stearns	Northfield	Miller and Warwick's.	10.000
H. H. Ramsey,	New Salem	Swift River	10,000
James H. Krum	North Adams.	Tunnel,	,
James H. Krum,	North Adams, .	Hudson,	20.000
James H. Krum	North Adams	North Branch,	,
James M. Burns	Lanesborough, .	Holly,	10.000
James M. Burns,	Lanesborough, .	Wells,	10,000
Sigmund Klaiber.	Gill.	Clark.	
Sigmund Klaiber.	Bernardston.	Fall River,	20,000
Sigmund Klaiber.	Gill	Dry,	
H. A. Barton.		1 2 3 7 7	10,000
H. A. Barton.			23,000
W. H. Sherrill,	Richmond,	Furnace,	5,000
			200,000

Fry distributed from the Hadley Hatchery during April and May, 1907.

	<u> </u>								
W. S. Gabb,			Cummington,		Nipping and Mit	chell,			20,000
W. A. Smith,			Goshen, .	•	Highland, .			. [5,000
F. E. Hawks.			Goshen, .		Packard, .			. 1	5,000
M. W. Smith.			Goshen.		Rogers.				5,000
John Doherty,			Goshen.		Hampshire,		-		5.000
C. F. Bates.	-	. 1	Worthington,		Stevens		-	: I	5,000
Frank Burr.	•		Worthington,	•	Ringville, .		•	٠,	5,000
Charles Brooks.	•	-	Worthington,	•	Center, .		•	٠,	5,000
Charles A. Kilbou		•	Worthington,	•	Corner, .	•	•	٠,١	5,000
Clarence K. Bates		•	Worthington,	•	Sampson,	•	•	٠ ١	5,000
	,	•	Worthington,	•		•	•	• 1	
Horace S. Cole,	•.	• 1	Worthington,	•	Hegen Stream,		•	.	5,000
William H. Rober	t.		Chicopee Falls,		Poor,				10,000
Francis H. Graves	s		Chicopee, .		Willimansett,			. 1	10,000
J. R. Beaudoin,			Chicopee Falls		Cooley, .			!	10.000
Walter A. Sheldor			Westhampton.		Roberts Meadow		- 1		5,000
Charles H. Sawye		•	Sunderland	•	Welsh.	,	-	- 1	5,000
	-•	- '	1	•	,	•	-	- 1	5,000

Fry distributed from the Hadley Hatchery, etc. — Concluded.

Applicant.	Town.	Name of Broo	k.		Number
Peter McHugh, Thomas F. Ahearn, Frank Shaughnessy, Edward Miller, George L. Harris, Henry L. Pierce, Joseph F. Barrett, A. P. Morin,	 Sunderland,	Running Gutter, Ahern, Parsons, Roberts Meadow, Welsh, Prince River, Burnshirt River, Webb, Snow, Mad, Bigelow, Town Farm,		}	5,000 5,000 5,000 5,000 10,000 10,000 20,000

Fry distributed from the Sutton Hatchery during April and May, 1907.

Edward G. Clark, Alfred Read, F. F. Shepard, John M. Sauter, R. K. Andrews, Leon H. Bowers, W. G. Bailey, R. L. Soper, Ward Rees, C. L. Haughton,	Weetfield, . {	Powder Mill, . Munn's,	: }	60,000
Charles F. Bowers, C. L. Allen, John L. Houde, John S. Hubbard, W. E. Johnson, H. W. Barnes, W. L. Taft, George L. Gill, Elmer A. Macker, W. F. Durgin, Fred S. Casavant, D. H. Gates, F. A. Gravlin, C. F. Morse, J. G. Britton, L. F. Earle, J. G. Britton, L. F. Earle, Henry E. Dean, H. G. Howard, Charles B. Adams, Leominster Sports- men's Association, Arthur G. Chickering, Charles S. Dodge, Harry C. Dodge, Harry Wardle, J. F. Merrill, J. S. Harwood, T. B. Stevenson,	Worcester, Sturbridge, Sturbridge, Northbridge, Northbridge, Northbridge, Northbridge, Northbridge, North Grafton, Mendon, Gardner, Gardner, Gardner, Gardner, Gardner, Gardner, Cardner, Templeton, Gardner, Lencaster, Lencaster, Templeton, Southbridge,	Clay. Streeter, Prentice, Burt, Brigham, Poor Farm, Carrol and Bummit, Poor Farm, Poor Farm,	- '	10,000 10,000 10,000 10,000 10,000 10,000 5,000
C. E. Bill,	West Brookfield,	White,	: :	275,000

Fry distributed from the Winchester Hatchery during April and May, 1907.

Fry distributed from the Winchester Hatchery, etc. - Concluded.

Ernest L. White, Mansfield, Lowland, 5.000 Wayne M. Freeman, Lakeville, Hathaway, 5.000 Eugene E. Wood, Woburn, Beaver, 5.000 Charlie A. Jones, Woburn, Carter's, 5.000 Charlie A. Jones, Woburn, Buckminster, 5.000 C. E. Taylor, William J. Hammond, Woburn, Cutler's, 5.000 Carles W. Ames, Woburn, Cutler's, 5.000 Charles W. Ames, Woburn, Keyes, 5.000 Charles W. Ames, Woburn, McManus, 5.000 John H. Sweetser, Woburn, McManus, 5.000 John H. Sweetser, Falmouth, Childe River, 5.000 Jere J. Donovan, Randolph, Blue Hill River, 5.000 S. J. Bigelow, North Chelmsford, Swain's, 5.000 S. J. Anthony, Carlisle, Carlisle, Saac A. Ferin, Peabody, Allen's, 5.000 Lasse A. Ferin, Peabody, Allen's, 5.000 Page 8, 5.000 Blue Hill River, 5.000 Black, 5.000 Black, 5.000 Page 8, 5.000	APPLICANT.	Town.	Name of 1	Name of Brook.		
Waldo Spaulding, John A. Roberts, L. F. Cowdry, Townsend, Trout, 5,000 T. H. Varnum, Tryngsborough, Flints, 5,000 Edward N. Eames, John S. Cooney, Rockport, Wine, 5,000 Edward N. Eames, John S. Cooney, Rockport, Wine, 5,000 Edward N. Eames, Medway, Hodges, 5,000 Edward R. Ereeman, Medway, Sawmill, 5,000 A. D. Wheeler, Milton, Pine Tree, 5,000 Edward, Stoughton, Dead Meadow, 5,000 Edward, Berkley, Wild, 5,000 Edward, Berkley, Wild, 5,000 Ereet L. White, Mansfield, Lowland, 5,000 Ereet L. White, Mansfield, Willow, 5,000 Edward, Reewille, Hathaway, 5,000 Edward, Reewille, Hathaway, 5,000 Edward, Noburn, Reaver, 5,000 Edward, Reewille, Hathaway, 5,000 Edward, A. Jones, Woburn, Beaver, 5,000 Edward, Reewille, Burlington, Buckminster, 5,000 Edward, Reewille, Burlington, Buckminster, 5,000 Edward, Reewille, Burlington, Buckminster, 5,000 Edward, Reewille, Reaver, 5,000 Edward, Reewille, Reaver, 5,000 Edward, Reewille, Reaver, 5,000 Edward, Reewille, Reewill, Reewille, South Reaver, 5,000 Edward, Reewill, Reewille, Reewill, Reewille, South Reaver, 5,000 Edward, Reewill, Reewi	Southwell Ferrington	Lowell	Mandow		5,000	
John A. Roberts, Reading, Mink, 5,000 C. F. Cowdry, Townsend, Trout, 5,000 Henri E. Richardson, Ectward N. Eames, 5,000 John S. Cooney, Rockport, Stoney, 5,000 John S. Cooney, Rockport, Stoney, 5,000 Lyde C. Hunt, Medway, Hodges, 5,000 Edgar L. Freeman, Medway, Hodges, 5,000 Tobias H. Burke, Quincy, Blue Hill River, 5,000 G. Fred Howard, Berkley, Wild, 5,000 Ernest L. White, Mansfield, Willow, 5,000 Wayne M. Freeman, Lakeville, Hathaway, 5,000 Lewis A. White, Woburn, Beaver, 5,000 Lewis A. White, Woburn, Beaver, 5,000 Carries A. Jones, Lown, Woburn, Carter's, 5,000 Carles W. Ames, Woburn, Cutler's, 5,000 Woburn, Beaver, 5,000 Woburn, Bouckminster, 5,000 Carles W. Ames, Woburn, Cutler's, 5,000 Frank W. Ames, Woburn, Boutwall Place, 5,000 Frank W. Ames, Woburn, Boutwall Place, 5,000 Frank W. Ames, Woburn, Boutwall Place, 5,000 Frank W. Ames, Woburn, Blackminster, 5,000 Frank W. Ames, Freeman, Randolph, B. J. Bigelow, North Chelmsford, Black, 5,000 George W. Alcott, Chelmsford, Black, 5,000 George W. Alcott, Chelmsford, Black, 5,000 George Manning, Peabody, Allen's, 5,000 George Manning, Peabody, Black, 5,000 George H. White, South Braintree, Cold Spring, 5,000 George H. White, South Braintree, Cold Spring, 5,000 George H. White, South Braintree, Cold Spring, 5,000	Waldo Spaulding	Pennarall	Snoker	2 3	5.000	
C. F. Cowdry, Townsend, Trout, 5,000 T. H. Varnum, Tyngsborough, Flints, 5,000 Edward N. Eames, Vestford, Snake Meadow, 5,000 Lohn S. Cooney, Rockport, Wine, 5,000 Lohn J. Kennedy, Stoughton, Pine Tree, 5,000 Lohn J. Kennedy, Stoughton, Dead Meadow, 5,000 Lowis A. White, Mansfield, Willow, 5,000 Lowis A. White, Woburn, Beaver, 5,000 Lowis A. White, Woburn, Shaker Glen, 5,000 Lohn J. Kennedy, Woburn, Burkminster, 5,000 Lohn J. Kennedy, Woburn, Boutwell Place, 5,000 Lohn J. Kennedy, Noburn, Boutwell Place, 5,000 Lohn H. Sweetser, Woburn, Hall's, 5,000 Lohn H. Sweetser, Woburn, Boutwell Place, 5,000 Lohn H. Sweetser, Woburn, Boutwell Place, 5,000 Lohn H. Sweetser, Lohn, Randolph, Black, 5,000 Lones M. Lotting, Braintree, Arnold, 5,000 Lones M. Cutting, Braintree, Cold Spring, 5,000	Iohn A Roberts	Panding	Mink.		5,000	
T. H. Varnum, I. Westford, Snake Meadow, 5.000 Snake H. Burke, 5.000 Snake Meadow, 5.000 Snake H. Burke, 5.000 Snake Meadow, 5.000 Snake M. Snake Sn	C F Conde	Townsond	Trout		5,000	
Henri E. Richardson, Vestford, Snake Meadow, 5.000 Edward N. Earnes, 5.000 Mr. Sconey, Rockport, Stoney, 5.000 Mr. Sconey, Rockport, Wine, 5.000 Mr. Sconey, Rockport, Wine, 5.000 Mr. Sconey, Rockport, Wine, 5.000 Mr. Sconey, Sawmill, 5.000 Mr. Sawmill, 6.000 M		Turnehamush	Flints .	2 3	5,000	
Schward N. Eames, Sohn S. Coney, Rockport, Stoney, 5,000 R. George H. Westlod, Shakes seadow, 5,000 Rockward, Rockport, Wine, 5,000 Rockport, Wine, 5,000 Rockport, Milton, Pine Tree, 5,000 Rockport, Milton, Rockport, Milton, 5,000 Rockport, Rockport, Milton, 5,000 Rockport, R	I. n. varnum,	Tyngsborough, .	Orela Mandam		5,000	
Gorge V. Lewia, Woburn, Carter's, 5.00 Carles W. Ames, Woburn, Woburn, Woburn, Carter's, 5.00 Carles W. Ames, Woburn, Coarles W. Ames, Woburn, Coarles W. Ames, Woburn, Coarles W. Ames, Woburn, Coarles W. Ames, Woburn, Cartisle, Mediand, S. J. Bigelow, North Chelmsford, Cartisle, Back, S. J. Milen's, 5.00 Carles W. Alcott, Chelmsford, Cartisle, Back, S. J. Sougelow, Cartisle, Back, S. J. Milen's, 5.00 Carles W. Alcott, Chelmsford, Cartisle, Back, S. J. Sougelow, Cartisle, Back, S. J. Milen's, 5.00 Carles S. J. Anthony, Cartisle, Black, S. J. O. George W. Alcott, Chelmsford, Cartisle, Sancter, S. J. O. George W. Alcott, Chelmsford, Cartisle, Sancter, S. J. O. George W. Alcott, Chelmsford, Cartisle, S. J. Bigelow, Cartisle, Sancter, S. J. O. George W. Alcott, Chelmsford, Cartisle, S. J. Bigelow, Cartisle, Black, S. J. O. George W. Alcott, Chelmsford, Cartisle, Sancter, S. J. O. George W. Alcott, Chelmsford, Cartisle, Back, S. J. O. George W. Alcott, Chelmsford, Cartisle, Braintree, Cold Spring, 5.00 George Manning, Peabody, Allen's, South Braintree, Cold Spring, 5.00 George H. White, South Braint	Henn E. Ruchardson, .	westford,	Shake Meadow,		5,000	
Stoney Rockport Stoney Stoney Stoney Stoney Rockport Wine Stoney	Edward N. Eames, .	B.J	84	-	5,000	
H. Gee. Clyde C. Hunt, Medway, Hodges, 5,000 Edgar L. Freeman, Medway, Hodges, 5,000 Tobias H. Burke, Quincy, Blue Hill River, 5,000 Gorge Manning, Peabody, Burther, South Braintree, South Brai	Joan S. Cooney,	Rockport,	Stoney,	* *	5,000	
Clyde C. Hunt, Medway, Hodges, 5,000 A. D. Wheeler, Milton, Pine Tree. Tobias H. Burke, Quincy, Blue Hill River, 5,000 John J. Kennedy, Stoughton. Dead Meadow, 5,000 G. Fred Howard, Berkley, Wild, 5,000 G. Fred Chadderton. Mansfield, Lowland, 5,000 Wayne M. Freeman, Lakeville, Hathaway, 5,000 Eugene E. Wood, Woburn, Beaver, 5,000 Lewis A. White, Woburn, Carter's, 5,000 Lewis A. White, Burlington, Carter's, 5,000 L. D. McDermott, Burlington, Buckminster, 5,000 William J. Hammond, Woburn, George V. Lewis, Woburn, Boutwell Place, 5,000 William J. Hammond, Woburn, Boutwell Place, 5,000 Keyes, S. South	H. Gee,	Rockport,	Wine,	X 6	5,000	
Edgar L. Freeman, Medway, Sawmill, 5,000 A. D. Wheeler, Milton, Pine Tree, 5,000 Tobias H. Burke, Quincy, Blue Hill River, 5,000 G. Fred Howard, Berkley, Wild, 5,000 Ernest L. White, Mansfield, Lowland, 5,000 Wayne M. Freeman, Lakeville, Hathaway, 5,000 Lewis A. White, Woburn, Beaver, 5,000 Carles A. Jones, Woburn, Carter's, 5,000 Carles A. Jones, Woburn, Blue Minster, 5,000 Carles W. Ames, Woburn, Cutler's, 5,000 George V. Lewis, Woburn, Boutwell Place, 5,000 Charles W. Ames, Woburn, MeManus, 5,000 Frank W. Ames, Woburn, MeManus, 5,000 Charles Baker, Falmouth, Childs River, 5,000 George W. Alcott, Chelmsford, Black, 5,000 George W. Alcott, Chelmsford, Black, 5,000 S. J. Bigelow, North Chelmsford, Black, 5,000 George Manning, Peabody, Allen's, 5,000 George Manning, Peabody, Bouth Braintree, Cold Spring, 5,000 George H. White, South Braintree, Cold Spring, 5,000 George H. White, South Braintree, Cold Spring, 5,000	Clyde C. Hunt,	Medway,	Hodges, .		5,000	
A D. Wheeler, Milton, Pine Tree, 5,000 Tobias H. Burke, Quincy, Blue Hill River, 5,000 G. Fred Howard, Berkley, Wild, 5,000 Ernest L. White, Mansfield, Lowland, 5,000 Wayns M. Freeman, Lakeville, Hathaway, 5,000 Lewis A. White, Woburn, Beaver, 5,000 Lewis A. White, Woburn, Carter's, 5,000 Lordie A. Jones, Woburn, Burlington, Buckminster, 5,000 L. D. McDermott, Burlington, Buckminster, 5,000 William J. Hammond, Woburn, Cutler's, 5,000 George V. Lewis, Woburn, Boutwell Place, 5,000 Charles W. Ames, Woburn, Boutwell Place, 5,000 Frank W. Ames, Woburn, Hall's, 5,000 George W. Aleott, Chelmsford, Childs' River, 5,000 George W. Aleott, Chelmsford, Blue Hill River, 5,000 George W. Aleott, Chelmsford, Black, 5,000 George Manning, Peabody, Allen's, 5,000 George Manning, Braintree, Cold Spring, 5,000 George H. White, South Braintree, Cold Spring, 5,000 George H. White, South Braintree, Cold Spring, 5,000 George H. White, South Braintree, Cold Spring, 5,000	Edgar I. Freeman	Medway,	Sawmill, .		5,000	
Tobias H. Burke, Quincy, Blue Hill River, 5,000	A. D. Wheeler,	Milton,	Pine Tree.	F 100	5,000	
John J. Kennedy, G. Fred Howard, Berkley, Wild. 5,000 Ernest L. White, Mansfield, Lowland, 5,000 Wild. 5,000 Wayns M. Freeman, Lakeville, Hathaway, 5,000 Eugene E. Wood, Woburn, Beaver, 5,000 Lewis A. White, Woburn, Shaker Glen, 5,000 Lowland, Woburn, Shaker Glen, 5,000 Lowland, C. E. Taylor, Woburn, Shaker Glen, 5,000 William J. Hammond, Woburn, Cutler's, 5,000 William J. Hammond, Woburn, Cutler's, 5,000 George V. Lewis, Woburn, Boutwell Place, 5,000 Lake S. Manes, Woburn, Boutwell Place, 5,000 Charles M. Ames, Woburn, Boutwell Place, 5,000 Charles S. Baker, Falmouth, G. Childe' River, 5,000 George W. Alcott, Chelmsford, George W. Alcott, Chelmsford, George W. Alcott, Chelmsford, Black, 5,000 Lake A. Ferrin, Peabody, Allen's, 5,000 George Manning, Peabody, Bodge's, 5,000 George H. White, South Braintree, Cold Spring, 5,000 George H. White, South Statute, Sou	Tobias H. Burke,	Quincy.	Blue Hill River,	2 2	5,000	
G. Fred Howard, Ercest L. White, Mansfield, Lowland, 5.000 Fred Chadderton. Mansfield, Willow. 5.000 Wayne M. Freeman, Lakeville, Hathaway, 5.000 Lawis A. White, Woburn, Beaver, 5.000 Lowis A. White, Woburn, Shaker Glen, 5.000 L. D. McDermott, Burlington, Buckminster, 5.000 L. D. McDermott, Burlington, Carter's, 5.000 C. E. Taylor, Shaker Glen, 5.000 Woburn, Woburn, Cutler's, 5.000 George V. Lewis, Woburn, Keyes, 5.000 Charles W. Ames, Woburn, Boutwell Place, 5.000 John H. Sweetser, Woburn, McManus, 5.000 John H. Sweetser, Woburn, Hall's, 5.000 John H. Sweetser, Falmouth, Childe River, 5.000 Jers J. Donovan, Randolph, S. J. Bigelow, North Chelmsford, George W. Aleott, Chelmsford, Blue Hill River, 5.000 George W. Anthony, Carlisle, Page's, 5.000 George Manning, Peabody, Allen's, 5.000 George Manning, Braintree, Cold Spring, 5.000 George H. White, South Braintree, Cold Spring, 5.000	John J. Kennedy.	Stoughton	Dead Meadow.		5,000	
Ernest L. White. Pred Chadderton. Mansfield. Wayne M. Freeman. Lakeville. Woburn. Lakeville. Woburn. Charlie A. Jones. L. D. McDermott. D. Mc	G. Fred Howard,	Berkley	Wild		5,000	
Fred Chadderton, Mansfield, Willow 5.000 Wayne M. Freeman, Lakeville, Hathnway, 5.000 Legene E. Wood, Woburn, Beaver, 5.000 Lewis A. White, Woburn, Carter's, 5.000 Londrie A. Jones, Woburn, Shaker Glen, 5.000 L. D. McDermott, Burlington, Buckminster, 5.00 C. E. Taylor, 5.000 Keyes, 5.00 William J. Hammond, Woburn, Cutler's, 5.00 Carles W. Ames, Woburn, Keyes, 5.00 Charles W. Ames, Woburn, Boutwell Place, 5.00 John H. Sweetser, Woburn, McManus, 5.00 John H. Sweetser, Falmouth, Childe River, 5.00 Jers J. Donovan, Randolph, Blue Hill River, 5.00 George W. Alcott, Chelmsford, Black, 5.00 Jasse A. Ferrin, Peabody, Allen's, 5.00 James M. Cutting, Braintree, Arnold, <td< td=""><td>Ernest L. White.</td><td>Mansfield.</td><td>Lowland.</td><td></td><td>5.000</td></td<>	Ernest L. White.	Mansfield.	Lowland.		5.000	
Wayne M. Freeman, Eukeville, Woburn. Lakeville, Beaver. 5.000 Eugene E. Wood, Lewis A. White. Woburn. Beaver. 5.000 Charlie A. Jones. Woburn. Shaker Glen. 5.000 C. E. Taylor. Woburn. Buckminster. 5.000 William J. Hammond. Woburn. Cutler's. 5.000 George V. Lewis. Woburn. Keyes. 5.000 Charles W. Ames. Woburn. Modanus. 5.000 Frank W. Ames. Woburn. Modanus. 5.000 John H. Sweetser. Woburn. Hall's. 5.00 John H. Sweetser. Falmouth. Childs River. 5.00 Jeer J. Donovan. Randolph. Blue Hill River. 5.00 S. J. Bigelow. North Chelmsford. Swain's. 5.00 George W. Alcott. Chelmsford. Black. 5.00 George Manning. Peabody. Allen's. 5.00 James M. Cutting. Braintree. Arnold. 5.00 George H. White. South Braintree.		Manafield.	Willow.	G 25 A	5,000	
Eugene E. Wood, Woburn, Beaver, 5,000 Lewis A. Wbite, Woburn, Carter's, 5,000 Lo. A Jones, Woburn, Shaker Glen, 5,000 L. D. McDermott, Burlington, Buckminster, 5,000 C. E. Taylor, Woburn, Cutler's, 5,000 William J. Hammond, Woburn, Keyes, 5,000 Charles W. Ames, Woburn, Boutwell Place, 5,000 Frank W. Ames, Woburn, McManus, 5,000 Charles B. Baker, Falmouth, Hall's, 5,00 Charles B. Baker, Falmouth, Childs' River, 5,00 George W. Alcott, Chelmsford, Blue Hill River, 5,00 S. J. Anthony, Carlisle, Page's, 5,00 Sase A. Ferrin, Peabody, Allen's, 5,00 George Manning, Peabody, Bodge's, 5,00 James M. Cutting, Braintree, Cold Spring, 5,00		Lakeville.	Hathaway.		5.000	
Lewis A. White. Woburn. Carter's. 5.00 Charlie A. Jones. Woburn. Shaker Glen. 5.00 L. D. McDermott. Burlington. Buckminster. 5.00 C. E. Taylor. Woburn. Cutler's. 5.00 George V. Lewis. Woburn. Boutwell Place. 5.00 Frank W. Ames. Woburn. Boutwell Place. 5.00 John H. Sweetser. Woburn. Hall's. 5.00 John H. Sweetser. Falmouth. Childs River. 5.00 Jere J. Donovan. Randolph. Bukhil River. 5.00 S. J. Bigelow. North Chelmsford. Blue Hill River. 5.00 George W. Alcott. Chelmsford. Black. 5.00 S. J. Anthony. Carlisle. Page 8. 5.00 S. J. Anthony. Carlisle. Page 8. 5.00 George Manning. Peabody. Allen's. 5.00 George Manning. Peabody. Bodge's. 5.00 George H. White. South Braintree. Cold Spring. 5.00 George H. White. South Braintree. Cold Spring. 5.00	Rusens E. Wood	Wohum	Reaver	2 30 4	5.000	
Charlie A. Jones, Woburn, Shaker Glen, 5.00 L. D. McDermott, Burlington, Buckminster, 5.00 CE. Taylor, William J. Hammond, Woburn, Cutler's, 5.00 George V. Lewis, Woburn, Boutwell Place, 5.00 Charles W. Ames, Woburn, Boutwell Place, 5.00 Charles M. Ames, Woburn, McManus, 5.00 Charles S. Baker, Falmouth, Blue Hill River, 5.00 George W. Alcott, Chelmsford, Blue Hill River, 5.00 George W. Alcott, Chelmsford, Black, 5.00 Lisace A. Ferrin, Peabody, Allen's, 5.00 George Manning, Peabody, Allen's, 5.00 George M. Wite, South Braintree, Cold Spring, 5.00 George H. White, South Braintree, Cold Spring, 5.00 George H. White, South Braintree, Cold Spring, 5.00 George H. White, South Braintree, Cold Spring, 5.00	Lewis A White	Wohurn	Carter's		5,000	
L. D. McDermott, L. D. McDermott, C. E. Taylor, C. E. Taylor, Woburn, Woburn, Woburn, Frank W. Ames, Woburn, Woburn, Woburn, Woburn, Hall's, Woburn, Woburn, Hall's, Woburn, Hall's, Woburn, W	Charlie A Tones	Wohum	Shaker Clan		5,000	
Burney Bu		Puslinaton	Buskminster		5,000	
Woburn. Cutler's, 5.00 George V. Lewis. Woburn. Keyes, 5.00 Charles W. Ames. Woburn. Boutwell Place. 5.00 Frank W. Ames. Woburn. Boutwell Place. 5.00 John H. Sweetser, Woburn. Hall's, 5.00 Charles S. Baker. Falmouth, Childs River, 5.00 Jere J. Donovan. Randolph, Blue Hill River, 5.00 George W. Alcott, Chelmsford, Black, 5.00 George W. Alcott, Carlisle, Page's, 5.00 Jasac A. Ferrin, Peabody, Allen's, 5.00 George Manning, Peabody. Bodge's, 5.00 Jemes M. Cutting, Braintree, Arnold, 5.00 George H. White, South Braintree, Cold Spring, 5.00	C F Tanks	Duraugion,	Duckiminater,		5,000	
Woburn. Keyes. 5.00 Charles W. Ames. Woburn. Boutwell Place. 5.00 Charles W. Ames. Woburn. Boutwell Place. 5.00 Icharles W. Ames. Woburn. Hall's. 5.00 Icharles S. Baker. Falmouth. Childs' River. 5.00 Ere J. Donovan. Randolph. Blue Hill River. 5.00 S. J. Bigelow. North Chelmsford. Swain's. 5.00 George W. Alcott. Chelmsford. Black. 5.00 S. J. Anthony. Carlisle. Page's. 5.00 Isase A. Ferrin. Pesbody. Allen's. 5.00 James M. Cutting. Braintree. Arnold. 5.00 Jenses M. Cutting. Braintree. Cold Spring. 5.00 George H. White. South Braintree. Cold Spring. 5.00	William T Hamman	Wahmer	Custowia	0.71	6,000	
George V. Lewis, Charles W. Ames, Woburn, Boutwell Place, 5,00 Frank W. Ames, Woburn, Boutwell Place, 5,00 Hall's, 5,00 Ha	william J. Hammond, .	Woburn,	Cutier s,		5,000	
Charles W. Ames. Woburn. Boutwell Place. 5,000 John H. Sweetser. Woburn. Hall's. 5,000 Loarles S. Baker. Falmouth. Child's River. 5,000 Lers J. Donovan. Randolph. Blue Hill River. 5,000 Lers J. Donovan. Randolph. Sure Hill River. 5,000 Lers J. Antony. Carlisle. Page's. 5,000 Lessa A. Ferrin. Peabody. Allen's. 5,000 Lessa A. Ferrin. Peabody. Bodge's. 5,000 Lessa M. Cutting. Braintree. Arnold. 5,000 Lessa M. Cutting. Braintree. Cold Spring. 5,000 Lessa M. Cutting. Braintree. Cold Spring. 5,000 Lessa M. Cutting. Braintree. South Braintree. Cold Spring. 5,000	George V. Lewis,	Woburn, .	Leyes,	(Y)	. 5,000	
Frank W. Ames. John H. Sweetser, Woburn, Hall's, 5,000 Charles S. Baker, Falmouth, Childe' River, 5,000 Jere J. Donovan, Randolph, Blue Hill River, 5,000 S. J. Bigelow, North Chelmsford, Black, 5,000 George W. Alcott, Chelmsford, Black, 5,000 Lisac A. Ferrin, Peabody, Allen's, 5,000 George Manning, Peabody, Allen's, 5,000 George M. White, South Braintree, Cold Spring, 5,000 George H. White, South Braintree, Cold Spring, 5,000	Charles W. Ames,	Woburn, .	Boutwell Place.	9 5	5,000	
John H. Sweetser, Woburn, Charles S. Bakker, Falmouth, Childs' River, 5,000 Lere J. Donovan, Randolph, Blue Hill River, 5,000 Swain's, 5,000 George W. Alcott, Chelmsford, Carlisle, Page's, 5,000 Carlisle, Page's, 5,000 Carlisle, Page's, 5,000 George Manning, Peabody, Allen's, 5,000 George Manning, Braintree, Arnold, 5,000 George H. White, South Braintree, Cold Spring, 5,000		Woburn,	McManus, .	7 77	5,000	
Charles S. Baker. Jers J. Donovan, Randolph, S. J. Bigelow, North Chelmsford, George W. Alcott, Chelmsford, Chelm		Woburn, .	Hall's,	6 6	5,000	
lere J. Donovan, Randolph, St. J. Bigelow, North Chelmsford, Swain's, 5,00 George W. Alcott, Chelmsford, Black, 5,00 Lisae A. Ferrin, Pesbody, Allen's, 5,00 George Manning, Pesbody, Allen's, 5,00 George Manning, Braintree, Arnold, 5,00 George H. White, South Braintree, Cold Spring, 5,00	Charles S. Baker, .	Falmouth,	Childs River,		5,000	
S. J. Bigelow, North Chelmsford, Black, 5,000 S. J. Anthony, Carlisle, Page's, 5,000 Issae A. Ferrin, Peabody, Allen's, 5,000 James M. Cutting, Braintree, Arnold, 5,000 George H. White, South Braintree, Cold Spring, 5,000	Jere J. Donovan.	Randolph	Blue Hill River,		. 5,000	
George W. Alcott, Chelmsford, Black, 5,000 Issae A. Ferrin, Pesbody, Allen's, 5,000 George Manning, Pesbody, Bodge's, 5,000 George H. White, South Braintree, Cold Spring, 5,000		North Chelmsford,	Swain's.	V 4	5,000	
S. J. Anthony. Isaac A. Ferrin, Pesbody. George Manning, Pesbody. Braintree, Arnold, 5,00 George H. White, South Braintree, Cold Spring, 5,00	George W. Alcott.	Chelmsford	Black.		5.000	
Lasac A. Ferrin, Peabody, Allen's, 5.00 George Manning, Peabody, Bodge's, 5.00 Allen's, 5.00 Source M. Cutting, Braintree, Arnold, 5.00 George H. White, South Braintree, Cold Spring, 5.00	S. J. Anthony.	Carlisle.	Page's.	1 5	5,000	
George Manning, Peabody Bodge's, 5,00 James M. Cutting Braintree, Arnold, 5,00 George H. White, South Braintree, Cold Spring, 5,00		Pesbody.	Allen's.	12 12	5,000	
James M. Cutting, Braintree, Arnold, 5.00 George H. White, South Braintree, Cold Spring, 5.00	George Manning.	Peabody.	Bodge's	A 10	5,000	
George H. White, South Braintree, Cold Spring, 5.00	James M. Cutting	Braintree	Arnold.	200	5.000	
Stories II. Il tale	George H. White	South Braintree	Cold Spring	3	5.000	
	nenge II. muse,	Court Diameter, .	Cord opting.		0,000	

Fingerling Trout Plants during Fall of 1907.

Henry B. Burdick, William F. Card, .	Adams.		Tophet, Fales, Card,			:	500 500
H. O. Hicks,	Admini.		Dean,			001	500
Thomas H. Hughes.	Adams.		Hall,			3.1	500
Frank W. Rice.	Laneaborough	4	Town,			3.1	1.000
William H. Newton.	Lanesbornigh		Wells.		7		500
James M. Burns	Pittatield.		Sackett, Yokum.		1.5	201	500
			Seckett, 10kum,			*	
William T. Crittenden, .			Dame Dalles	-	_		250
H. A. Barton,	Dalton,		Brown, Dalton,			100	500
A. Silvernail,	State Line,		Baldwin, .	*	7 -	00	250
W. H. Sherrill,		-		-	-	1	250
G. W. Tucker.	2000		and the second				000
Benry S. Manley,	South Egrem	ont, .	South Egremont			2001	750
G. D. Gregory, .						400	
James H. O'Hara.	Leyden.		Glen, east and w	est.	100	1	1,000
James H. O'Hara.	Greenfield.	2 12	Stickney	7.75		- (1,000
Sumond Klaiber.	Gitl.		Dry, Fall River,	4		11	750
Sigmond Klaiber.	Bernardston,		Fall River.	0		1	
F. E. Brigge.	Montague,		Sawmill,	10.0			250
C. L. Crafts.	Whately,	3	Roaring,			12.1	250
A. S. Hunt.	1 marchy,		recurring,			1	200
C. A. Hinds,	New Salam.		Swift River.			1-1	1,000
H. H. Ramsey.	Men Carem.		DWALL TOTTEL			151	1,000
Albert F. Tolman,	Northfield.		Miller.				250
H. H. Charles							250
H. H. Chamberlain,			Warwick,			15	
John W. Haigis, .	Montague,		Pond, .	*		18	250
Fred E. Field, .	Montague,		Cold,		100	4900	250
P. B. Hasbrouck,	Prescott,		Swift River, wes	t,		Ca.	250

Fingerling Trout Plants during Fall of 1907 — Continued.

Applicant.	Town.	Name of Brook. Number
A. T. Mitten,	Prescott, .	. Swift River, east, 250
John Doherty,	Goshen, .	. Hampshire
W. A. Smith,	Goshen, .	. Highland,
r.E. HBWKS, M. W. Smith	Goshen, . Goshen, .	Packard, 250 Rogers, 250
George L. Harris,	Gomen,	. Rogers,
E C Rice	Northampton,	. Walsh,
W. A. Sheldon,	Westhampton,	. Westhampton.
G. J. Thayer,	Northampton,	. Parsons,
W. A. Sheldon, G. J. Thayer, Charles H. Sawyer, Thomas F. Ahern,	Hatfield, .	Running Gutter, .
Inomas F. Anern, Edward Miller	Sunderland, .	Ahern
Caorra Hoffman	Northampton,	. Roberts Meadow, . J
George Hoffman, Fred Wester, F. M. Smith,		
F. M. Smith, .	South Hadley,	. Buttery, 1.000
George M. Selfridge,		•
W.C.Cowan, . [ŀ	
Frank Roberts, .)	Walanda	773
Ira J. Humes. Justin W. Keith, .	Holyoke, . Prescott, .	. Broad,
John L. Brewer,	Prescott,	. Swift River, east,
Wells G. Bisbee,	Williamsburg,	. Ashfield Stream, 500
C. M. Pattingill)	***************************************	
L. W. Pettingill		
Jesse M. Howes, .		
Jesse M. Howes, . Henry H. Hitchcock, Milton S. Howes,	Cummington,	Nipping, : : : } 1,000
Milton S. Howes,	000000000000000000000000000000000000000	Willcutt,
H. E. Drake, .	4	
T P Tower		
W. S. Gabb, I. P. Tower, William H. Robert, I. R. Beaudoin,		250
I. R. Beaudoin.	Chicopee Falls,	. Cooley,
rrancis H. Graves,	Chicopee, .	. Willimansett, 250
Iohn M. Sauter)		
Edward G. Clark,		
Ward Rees, R. L. Soper, C. L. Haughton,		
C. I. Haughton		
R.K.Andrews	Westfield	. Munn, 1,000
Leon H. Bowers, .		1,000
Alfred Kead, .		
Charles F. Bowers,	1	<u> </u>
W. G. Bailey,		1
F. F. Shepard, . J. A. D. Norcross,	1	oro
Iohn F Havden	Palmer, .	Swift River,
John F. Hayden, George W. Bautell, J. S. Harwood,	Athol,	
. S. Harwood,	Athol, .	} Riceville,
Myron R. Goddard,		
avi G. McKnight		i i
F. A. Gravlin, . D. H. Gates, B. A. Waite,		
J. H. Gates,		
J. Pierce,		
i.S. Ames >	Gardner, .	. Hubbardston, 1,000
Edric H. Coleman.		. 1,000
Lewis A. Hartwell,		
Edric H. Coleman, Lewis A. Hartwell, Charles N. Dyer,		
Herbert L. (317116		
A. W. Pratt, B. H. Webster, E. A. Woodward,		
C A Woodmand	Hubbardston.	. Tan Yard,
G. Frank Balcom	Baldwinsville,	. Tan Yard,
I. E. Stuart.	Data willowine,	. 0.00 11,
I. E. Stuart, I. W. Hunting,	Westminster,	. Bigelow and Tophet, 750
1. I. 118 W IPV.		
F. L. Hager, .		
F. L. Hager, F. J. Day, Charles N. Merriam,	W	n
Charles N. Merriam, J. D. Mason,	Winchendon,	. Beaman, 1,000
· L/, MAROII, ,		
Valson H Rianchard	t	1
Nelson H. Blanchard,	Grafton.	. Cold Spring.
Nelson H. Blanchard, J. A. Anderson,	Grafton, North Grafton,	Cold Spring, 250
Nelson H. Blanchard,	Grafton, . North Grafton, Leominster, .	Cold Spring,

Fingerling Trout Plants during Fall of 1907 - Continued.

APPLICANT.	Town.	Name of Brook.	Number
H F Room	Prescott,	Brown,	250
H. E. Brown, H. G. Howard, A. G. Chickering, Andrew F. Hall, P. S. Callaban,	Ashburnham, .	Cooper,	250
A. G. Chickering.	Lancaster.	Cemetery,	250
Andrew F. Hall.	Lancaster,	McKinstry,	250
P. S. Callshan,	Sturbridge,	Hinman and Bemis.	250
COATIES D. ACIALDIS, .	Webster	Potash and Freeman,	250
T. B. Stevenson,		772	250
G. A. Keith, George E. Whitehead, Rufus B. Dodge, Hiram J. Parent,			250
George E. Whitehead, .	8 8 8		250
Rufus B. Dodge,	W.5.	40.500.500.500.500	250
Hiram J. Parent,	Holden,	Fessenden,	250
William Wadamarth	Holden, Holden,	Parsons.	250 250
Hiram J. Parent, Thomas H. Davis, William Wadsworth, Charles S. Dodge, Henry E. Dean, C. L. Allen, W. E. Johnson, C. V. Dudley, Seorge L. Gill, W. L. Taft, C. E. Bill, Tharles H. Clark,	Holgen,	Holden,	250
Henry E. Dean	2 2 2	1 2 2 2 2	250
C. L. Allen	Worcester.	Barber,	250
W. E. Johnson	" STEEDEGLY ! .	Danton	
C. V. Dudley.			500
George L. Gill.	57	W-03-11	
W. L. Taft.	Northbridge, .	Northbridge,	500
C. E. Bill.	West Brookfield, .	Taney,	1 2 90
	West Brookfield	Allen.	1.000
. S. Donovan,	West Brookfield, .	Barrett,	1 1
D Useline	West Brookfield, .	White,	3973
Frank Stone,	West Brookfield, West Brookfield, East Brookfield,	Great,	250
A. P. Morin,	North Brookheld.	Mad, Poor Farm, Bigelow,	500
P. Morin,	North Brookfield, .	Bigelow,	
A. P. Morin, A. P. Morin, M. C. Capen,	Spencer,	Meadow,	250
E. Comins, ames B. Hodder, rank Stockwell.	Di-To-	F	250
ames B. Hodder, .	Blackstone,	Fox.	250
rank Stockwell.	Walledow	0.140	250
lichard L. Event, .	Wellesley,	Cold Spring, Muddy, Upton,	250
F. Durgin,	Mendon,	Taft,	500
Jenry F. Dean	Barre Plains.	Pratt,	250
W. F. Durgin, W. F. Durgin, Ienry E. Dean, Ameron E. Wood,	Barre,	Pratt.	250
mith Finney.	Daile,	A latte	500
farry L. Shedd.	Tewksbury,	Felker	250
outhwell Farrington.	Lowell,	Felker, Long Meadow,	250
eRoy J. Parkhurst.	Chelmsford, .	Stevens and Blind,	250
Indrew Garbutt.	Holliston.	Jar,	250
biver K. Pierce	Aver.	Beaver,	250
ohn F. Tune	Ayer. East Pepperell,	Blood,	250
iarry L. Shedd, outhwell Farrington, eRoy J. Parkhurst, indrew Garbutt, liver K. Pierce, ohn F. Tune, f. E. S. Clemons, harles N. Hargraves, ames A. Jones, L. E. Cowdry,	Wilmington,	Lubber,	250
harles N. Hargraves, .	Framingham, .	Edgell and Rattlesnake, .	250
ames A. Jones,	Stoneham	Sweetwater, Pearl Hill,	250
I. E. Cowdry, Villiam P. Wharton,	Townsend,	Pearl Hill,	500
villiam P. Wharton, .	Groton,	Baddacook,	500
I. P. Andrews, rank B. Twitchell, villiam F. Walsh, harles W. Curtis,	Hudson,	Hog	250
rank B. Iwitchell,	no de la company	D. C. Cont.	
illiam F. Walsh,	Framingham, .	Brackett,	750
naries w. Curus,		Park Was James	
W. Eager.	Madhanash	Fort Mendow,	2 000
Valter P. Frye, Irving Muse, John M. Carpenter, Frank Smith,	Marlborough,	Flagg, Junction,	1,000
ohn M Camenter		Junction,	
Frank Smith	Andover, .	Baker, Rogers,	250
H. Bartlett,	Boxford.	Trout,	250
tenhen H Sinclair	Middleton,	Poor's,	250
sac A. Ferren, eorge Manning, avid G. Webster, dgar L. Freeman, lyde C. Hunt,	Middleton,	Beach,	250
eorge Manning.	Middleton,	Beach,	250
avid G. Webster.	Peabody.	Norris.	250
dgar L. Freeman.	Medway, Rockville,	Gurney's.	250
yde C. Hunt,	Rockville,	Hogg. Railroad.	250
hn Clancy. D. Wheeler.	Medway,	Railroad.	250
. D. Wheeler			250
harles C. Peck,	Wrentham,	Rabbit Hill,	250
harles C. Peck, . red H. Miller, . obias H. Burke,	Hingham,	Plymouth and Beechwood	1.000
obias H. Burke,	Waymouth,	Monatiquot,	1.000
th Damon,	Waymouth,	Old Swamp,	1,000
sorge H. White,	South Braintree	Cold Spring.	500
th Damon, corge H. White, rank A. Chamberlain, hn J. Kennedy,	Builth Braintree.	Monatiquot,	500
nn J. Kennedy.	Stoughton, .	Dead Meadow, Devil's,	1,000
. M. Plummer. Herbert Tower.	Sharon	Devil's,	1,000
LICITETI LOWET.	Beeklaml, .	Plyer and Molly,	1,000

Fingerling Trout Plants during Fall of 1907 - Concluded.

APPLICANT.	Town.	Name of	Brook.	Number
T. E. Reilly, M. E. Leshy, W. J. Cahill, W. F. Barrett, Charles S. Baker,	Randolph,	Long, . Meadow, . Childs' River,	: : :	1,500 500 1,000
Allen P. Hoard,	Lakeville, i.skeville, Taunton, Mansfield, Mensfield, New Bedford, East Bridgewater, Rochuster,	Holloway, Poquoy, Woodward, Town Farm, Hersey, Pashamansett, Katy's Spring, Doggett's,		1,000
				58,000

Ponds stocked and closed in accordance with Chapter 91, Section 19, Revised Laws, as amended by Chapter 274, Acts of 1903, and further amended by Chapter 306, Acts of 1907.

NAME OF POR	rD.		Town.	Rain- bow.	Brown Trout.	Land- locked Salmon.	Pike Perch.
Baddacook, .			Groton, .	 _	1,000	_	_
Stiles,			Boxford,	 _	1,000		_
Little Chauncy,			Northborough	_	1,000	- 1	_
Pleasant Lake, .			Harwich,	 500	_	500	_
Queen Lake, .			Phillipston,	 500	_	500	_
Massapoag Lake,			Sharon, .	 500		500	20
Monponsett Lake,			Halifax,	 _	-	1,000	_
Quannapowitt Lake,			Wakefield,	 _	1,000	_	_
Goose,			Chatham,	 _	500	-	_
Scargo Lake, .			Dennis, .	 _	500	-	_
Prospect,			Taunton,	 _	1,000	- :	_
Long,			Royalston,	 _	1,000	_ :	_
Horse,			Yarmouth,	 500	-	_	_
Greenough, .		.	Yarmouth,	 _	_	500	_
Great Herring, .			Plymouth,	 _	500	_	_
Little Herring,			Plymouth,	 _	500	_	_
				2,000	8,000	3,000	20

Ponds restocked during the Year 1907.

NAME OF POND.		Town.		Pike Perch Eggs.
Quinsigamond Lake,		Worcester, .		2,000,000
Chaubunagungamaug Lake, .		Webster, .	.	1,000,000
				3,000,000

[C.]
Distribution of Pheasants.

APPLICANT.	Town.	Number.
Edney A. Lapham,	New Bedford,	7
	Fairhaven,	7
John I. Bryant,	Fall River.	7
	1 m · '	7
William D. Mandell, Edgar W. Lovell,	Cohasset,	7
Edgar W. Lovell,	Santuit,	7
Thomas F Horrigan	Framingham,	7
Thomas F. Horrigan,	Sherborn,	7
Everett Morey,	Ashland	7
Adelbert D. Thayer,	Ashland,	7
	Franklin,	7
W. F. Durgin,	Hopedale,	4
Unaries A. Kimball,	Littleton,	
Henry M. Green,	North Wilbraham,.	<u> </u>
John W. Tyler,	Warren,	7 7 7
A. P. Morin,	North Brookfield,	
Dana Malone,	Greenfield,	7
James H. O'Hara,	Greenfield,	7
Sanborn G. Tenney,	Williamstown,	7
William J. Potter,	Northborough,	8 8 8 8 8 8 8 7
T. B. Stevenson,	Manchaug,	8
Henrie C. Fay,	Royalston,	8
H. Courtemanche,	Southbridge,	8
Frank Stockwell,	Auburn	8
Charles B. Adams,	webster,	8
I D D	West Upton,	8
Charles H. Goodell,	Worcester,	8
Elmer A. Macker,	Month Cuestion	7
James M. Cutting,	South Braintree,	7
W. H. Reynolds,	Braintree,	7
G. M. Shaw.	South Weymouth,	7 7 7
Sidney T. Nelson,	Lakavilla	7
Henry O. Whiting,	Lakeville,	' 7
Herbert E. Guy,	Production	7
Charles U. Shriver	Druckton,	7
Charles H. Shriver,	Dedham,	4
nenry M. Knowles,	Dartmouth,	7
Albert W. Lewis,	Westport Factory,	7
Thomas Rice,	Fall River,	7
M. P. Clough,	Saugus,	7
Frank A. Patch,	Littleton, South Acton,	14
Frank A. Patch,	South Acton,	14
Total,		302

[D.] DISTRIBUTION OF BELGIAN HARES.

Applica	Town.	Number.				
Charles B. Adams,			Webster, .			6
W. F. Durgin, .			Hopedale, .			6
Merrill A. Stebbins,			Palmer, .	•		6
Henry G. Trimble,			Monson, .			6
Arthur Hardy, .			Lowell, .			6
George A. Dudley,			South Methuen,			6
Dominic McGovern,			Lawrence, .			6
Thomas Croswell,			North Reading,			6
Charles A. Loring,			Reading, .			6
Total, .					•	54

The rearing and distribution of Belgian hares has been discontinued.

[E.]
ARRESTS AND CONVICTIONS.

Report upon Convictions, Fines, etc., for Violations of the Fish and Game Laws.

Fine.	Offence.	TOWN OR CITY.	STATE V.
- Fi	Taking shellfish in violation of § 114, c. 91, R. L., also c. 285, Acts of 1907,	Boston, New Bedford, Ouincy, Quincy, Quincy, Quincy, Quincy, Quincy, Quincy, Quincy, Quincy, Quincy, Ouincy, Ouin	Galvatoro Parasi, Gascomo Lucicilo, Naola Parasi, Ilicolanti Lovunco, Ilicolanti Landry, Ilicolanti
		Taking shellfish in violation of § 114, c.	Boston,

Somerville, Quincy, New Bedford, Fairhaven, New Bedford,	Taking shellfish in violation of § 114, c. 91, R. L., also c. 285, Acts of 1907,	Convicted 10 00	Defaulted; warrant out. Defaulted; warrant out. Second offence. Second offence. On probation. Defaulted.
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Report upon Convictions, Fines, etc., for Violations of the Fish and Game Laws - Continued.

STATE V. —	TOWN OR CITY.	Offence.	Court Decision.	Fine.	Remarks.
James Nofe, John Mederious, John Mederious, John Mederious, John Mederious, John Mederious, John Mederious, Lotis Townsend, Joseph LaPoint, Thomas C. Starkey, Larries S. Dumkley, Jr., Perry H. Hoyle, Henry Cassidy, Chiton L. Westherbee, John Pyne Wingvit Xavier, Alexander McKensie, Albert E. M. Hallon, Russell Monn, Andrew Dray, Chas, S. Woolcott, William H. Eceleston, John Day, Leslie Stevens, Larries N. Mellen, Henry Beauregant, Augustus Goodness, Charles Thelannil, Larries Thelannil,	New Bedford, New Bedford, New Bedford, New Bedford, Fairhaven, New Bedford, Fairhaven, New Bedford, New Bedford, New Bedford, Freetown, Holyoke, Southwick, Southwick	Taking shellfish in violation of § 114, c. 91, R. L., also c. 285, Acts of 1907,	Convicted,	\$15 00 15 00 15 00 15 00 10 00 10 00 20 00 20 00 20 00 20 00 3 00 5 00 5 00 5 00 5 00 5 00 5 00	Nol prossed. Second offence. Filed on payment of costs. Filed.
Edward White, Ernest Lenburg, Orlow Barnes, Harry Becker, C. H. Richardson, Jr., Lawrence Noyes, Sidney Drowne, Joseph Rastra, John Albran, Bonnilo Albran, Hamnel Comman, Absander Lewell, Stember Thompson.	East Longmeadow, Maynard, Great Berrington, Alford, Newburyport, Newburyport, Newburyport, Ashland, Ashland, Mansfield, Lowell, Lowell,	Hunting on Lord's Day in violation of \$1, c. 92, R. L., as amended by c. 176, Acts of 1904,	Convicted, Discharged, Convicted,	10 00 10 00 10 00 10 00 10 00 10 00 10 00 10 00	Filed; paid costs, \$3. Filed; paid costs, \$3. Filed.

erongo Molla, affanda Antonnoccia	New York, Braintree, Norwood,		Convicted, 2 Convicted, 10 Convicted, 10	00
bonne Nutley, ortimati Macroello, Suseppe Passalacqua, Sicholas Boggani, barles Stone,	Roston, Great Barrington, Boston, Boston, Ashland, Hopkinton,		Convicted, 10 Convicted, 5 Convicted, 5 Convicted, 5 Convicted, 10	OO Also alien without license.
lvester Smith, erry Smith, lmund Pruex, edric Trembly,	Plainville, Plainville, Beverly, Salem,		Discharged,	00
uis Letarte, ward J. Cummings, on H. Fallon,	Salem, Salem, Salem,		Convicted, . 15 Convicted, . 15 Convicted, . 15	00 00 00
nes Archibald, C. Goff, lliam Barry,	Campello,		Convicted, . 15 Convicted, . 10 Convicted, . 10	00
d Hathaway, Howard Dean, ford P. Fowles,	Rehoboth, Holyoke, Holyoke, Holyoke,	Hunting on Lord's Day in violation of § 1, c. 92, R. L., as amended by c. 176, Acts of 1904.	Convicted, . 10 Discharged, . — Discharged, . — Discharged, . —	
nry Davis, liam Davis, n Steele, ro Zimmer,	Holyoke, Hatfield, Holyoke,	Acts of 1904,	Discharged,	00
eph Shimaski, orge A. Blashfield, in Bromley,	Granby, Warren, Belehertown,		Convicted, . 12 Convicted, . 10 Convicted, . 10	00 00 00
	Ashby, Weymouth, Weymouth,		Convicted, 10	00
n A. Breding,	Greenfield, Lanesborough,		Discharged, . 10 Convicted, . 10	00
uis J. Marcel, eph P. Crook,	Pittsfield, Pittsfield, Rockland, Marshfield,		Convicted, . 10 Convicted . 10 C	00
ward Arnold, lliam Damon, lliam D. Ewell, codore H. Forgeon,	Marshfield, Marshfield, Plymouth,		Discharged,	Out of jurisdiction. Out of jurisdiction.

Report upon Convictions, Fines, etc., for Violations of the Fish and Game Laws — Continued.

STATE V	Town or City.	Town or City. Offence.		Fine.	Remarks.	
Jeo White, Liery Raymond, Wisnia Sealey, Darles Barber, Jester Andrews, seob Faustini, Jeonge Miami, Joarles Logero, Nathan W. Smith, Juffeld Porter, Livin Newberry, Harles Brennan, Jornan Baratow, cha O'Noil, Jaarles E, Schrader, ohn Martinnais,	Plymouth. Plymouth. Williamstown. Erving. Erving. North Adams. Sudbury. Boston. Millers Falls. Grockton. Brockton. Brockton. Swansea. New Boulford. New Beilford. Sandwich. Northampton. Northampton.	Hunting on Lord's Day in violation of § 1. c. 92, R. L., as amended by c. 176, Acts of 1904,	Discharged, Discharged, Convicted,	\$10 00 10 00 10 00 10 00 10 00 10 00 10 00 10 00 10 00 10 00 15 00	Filed.	
Villiam Yownjens, Villiam Mattes, Villiams Mattes, Sunseppe Pontrini, samuel Chapman, Jeorge Melle, Jenny Hattman, Jeorge Melle, Jenny Hattman, Jeorge Melle, Jenny Hattman, Jeorge Melle, Jenny Hattman, Jenny Malvol, Jenny Hattman, Jenny	Northampton, Westfield, Framingham, Manefield, Norton, New York, Taunton, Taunton, Braintree, Norwood, New Bedford, Wilbraham, Wilbraham, Wilbraham, Wilbraham, Great Barrington, Great Barrington, Great Barrington, Framingham, Boston, Bridgewater, Springfield, New Bedford,	Hunting without license in violation of c. 317, Acts of 1905,	Convicted, Discharged, Convicted,	10 00 3 20 10 00 10 00	See shooting song birds. Filed; Sunday hunting. See Sunday hunting. Filed. Filed.	

Liuvanus Dundi. Raptiete G. Belei. Tonio Lemelli,	 	Framingham Framingham Framingham Framingham Leominater Leominater Mosson Framingham Chicopee Falls North Adams Broekton Lincoln Boston Maynard Maynard Maynard Scontient New Bedford	Hunting without license in violation of c. 317, Acts of 1905,	Convicted, Discharged, Discharged, Discharged, Discharged, Discharged, Discharged, Discharged, Discharged, Discharged,	10 00 10 00 25 00 25 00 25 00 25 00 10 00 10 00 10 00 10 00 10 00 10 00 10 00	Also Sunday hunting. Failed to pay; jail. Defaulted. Nol proseed to avoid a criminal record.
Fred Pease, Walter E. Bownian, Fred C. Maunch, Joseph Lafrance, Manuel Frates, Clarence W. Chase, Honry Lord, John Fold, Jr., James Tempkius, Thomas E. Ross, Thomas D. Alier, Jaseph Coffin, Albert Cann.	 ***********	Sentiout, Mattapoisett, Hull, Nabant, New Bedford, New Bedford, Fall River, Brockion, Boston, Boston, Boston, Boston, Boston, Boston, Boston,	Having short lobsters in violation of § 88, c. 91, R. L., as amended by c. 303, Acts of 1907,	Discharged, Convicted,	20 00 6 00 5 00 15 00 5 00 5 00 5 00 5 00 5 00	
George R. Lane. George Normandie. Leopoldo Castiglioni, Kyeled Johnson, Frank Lassone. James A. Murchie, Pontrini Giusenne.	 	Warren. Warren. Milford, Menson, Warren. Harvard, Framingham.	Dogs chasing deer in violation of § 18, c. 92, R. L., as amended by c. 245, Acts of 1905,	Convicted, Convicted, Convicted, Convicted, Discharged, Convicted.	15 00	Filed; killed dogs. Filed; by order of court.
Ernatus J. Morton. Harold Hamilton, John Schwietk, John Annatasi, Gaetanio Medablia, Antheny Conti, Gaetanio Pino, Joseph Simi, Laus Heen,	 *******	Saugus. Saugus. Taunton. Boston. Boston. Boston. Boston. Boston. Boston. Boston. Boston.	Killing song birds in violation of § 7, c. 92, R. L., as amended by c. 250, Acts of 1907,	Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted,	10 00 10 00 20 00 10 00	Placed on probation. Placed on probation. Filed; alien without license. Filed.

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Report upon Convictions, Fines, etc., for Violations of the Fish and Game Laws — Continued.

STATE V. —	Town on City.	Offence.	Court Decision.	Fine.	Remarks.
Joseph Vigent, 1 H. Hiehnrdson, Jr., Jamuel Chapman, Thomas Nutley, Edmund Pruex, Madric Trembly, Louis Letarte, Edward J. Cummings, John H. Fallon, James Archibald, ra C. Goff, William Barry, Fred Hathaway, Theodorn H. Fergeon, Flacentino Dominico, Louis Scanelli, Jeorge Lavigne, Niere Marchand, Jhurles Tripp, Joseph McCarthy, Jiovanni Fusco,	Hardwick, Newburyport, Mannfeld, Boston, Baverly, Salem, Salem, Salem, Salem, Campello, Campello, Campello, Tenningham, Framingham, Fall River, Fall River, Westport, Agawam, Lincoln,	Illegal possession of game under laws relative to close seasons.	Convicted,	\$10 00 10 00 	Filed: Filed: see Sunday bunting. Filed: see Sunday hunting. Filed: see alien without license
Asarles Kimball, Walter Jarvia, cosph Torr, ouis Dimond, Sernard Caniwell ouis J. Marcal, harles H. Tifft, Villam W. Granger, ames A. Brunnan, ewis Pomeroy, aleb J. Hawisworth, J. Hays, Arthur Hays, hadres J. Pollock, "Jomas Planagan, red L. Harvey, villam W. Newman, J. Y. Southard, larvin E. Dodge, Janford W. Stees,	Ashby, Northampton, Northampton, Northampton, Northampton, Fittsfield, Springfield, Worthington, Worcester, Hubbardston, Hubbardston, Westfield, Fittsfield, Easthampton, Springfield, Williamsburg, Groton, North Pressott, Ludlow,	Having short trout in possession in violation of § 64, c. 91, R. L., as amended by c. 190, Acts of 1905, Killing deer in violation of § 17, c. 92, R. L., as amended by c. 307, Acts of 1907,	Convicted,	10 00 10 00	Filed. Filed in Superior Court.

Edward Sheehan Eara Strike,	Aler. Webster, Webster, Webster, Webster, Webster, Webster, Webster, Abington, Brighbon, Newton.		Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Discharged, Discharged,	20 00	Filed. Filed. Filed. Filed. Filed. Filed.
Frank Badger, Waldo Drake, Meriton Drake, Antonius D. Zingel, Antonius Yestminas, Jonas Berrys,	Ayon, Hanson, Pembroke, Brockton, Brockton, Brockton,	Fishing in great ponds in violation of \$26, c. 91, R. L., as amended by c. 308, Acts of 1904,	Convicted, Convicted, Convicted, Convicted, Convicted, Convicted,	25 00 - 20 00	Paid costs of court, \$10. Filed.
Martin Antonyte, William Ludwinavile, John Keith, Simeon Chase, John Doe, Mike	Brockton, Brockton, Brockton, Brockton, Brockton, Brockton,		Convicted, Convicted, Convicted, Convicted,	20 00 20 00 30 00	Paid coats of \$5. Defaulted. Defaulted.
Fred N. Staples, Ephraim Mann, W. E. Danforth,	Taunton, Taunton, Taunton, Taunton, Taunton, Everett, Boston,	Fishing in great ponds in violation of § 26, c. 91, R. L., as amended by c. 308, Acts of 1904,	Convicted, Convicted, Convicted, Convicted, Convicted, Convicted,	20 00 20 00 20 00 20 00 20 00 20 00	
	Natick, Norton, North Adams, Dennis, Dennis,	Violation of §11, c. 92, R. L., as amended by c. 241, Acts of 1906, Scallops less than two inches in diameter	Convicted, Convicted, Convicted, Convicted, Convicted,	20 00 20 00 20 00 20 00 20 00	
Edward G. Cahoon, Wendell Eldredge, Morris J. Halpin, Alvin Moore, Patrick Bresnahan, Michael Fox,	Dennis, Harwich, Worcaster, Bellingham, Holyoke, Holyoke,	Amended by c. 288, Acts of 1906, Hunting with ferret in violation of \$11, c. 92, R. L., as amended by c. 241, Acts of 1906.	Convicted, Convicted, Convicted, Convicted, Convicted, Convicted,	20 00 20 00 20 00 15 00 20 00 20 00	
Oswald Klugel, George Nelson, Preston Armitage, W. H. Pike, John Britsniere,	Easthampton, Huntington, Shirley, Shirley, Weymouth,	Pursuing deer with intent to kill in violation of § 17, c. 92, R. L., as amended by c. 307, Acts of 1907,	Convicted, Discharged, Discharged, Convicted, Convicted, Convicted,	10 00	Filed.
Oscar Rogers, Charles E. Adams,	Newbury, Newbury,	of \$ 71 c 01 R I	Convicted, Convicted,	25 00 25 00	

Report upon Convictions, Fines, etc., for Violations of the Fish and Game Laws - Concluded.

STATE v	Town or City.	Offence.	Court Decision.	Fine.	Remarks.
Frank King, Howard E. Tingley, Irving Durkee, Herbert R. Cahoon,	Attleborough, North Attleborough, Danvers, Harwich,	Using more than one hook on stocked pond, Killing eagle in violation of c. 118, Acts of 1907,	Convicted, Convicted, Convicted,	\$20 00 20 00	Filed. Filed.
Frederick S. Cook,	Newark, N. J.,	Killing loon on fresh water in violation of c. 118. Acts of 1907.	Convicted, .	-	Filed.
William Conten, Daniel Phelpe, Robert Steele, Ephraim Musson, William V. Leonard, Rockwell D. Bisbee, John Dafgood, Albert D. Petres, Ularies W. Coox, Herbert Crosby,	State Line, N. Y., South Williamstown, South Williamstown, Chesterfield, Chesterfield, Chesterfield, Mattapoisett, Mattapoisett, East Fairhaven, Osterville,	Dynamiting waters in violation of § 133, c. 91, R. L., as amended by c. 246, Acts of 1903, Seining in Buzzards Bay in violation of § 122, c. 91, R. L., Violation of c. 301, Acts of 1907,	Convicted, Discharged, Discharged, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Discharged,	30 00 	
Alfred Lewis,	Cheshire,	Spearing fish in violation of § 132, c. 91,	Convicted, .	10 00	
Paul Kronsk, Pater Syak, Iolan Schweider, Peter Syak, John Sefmelder, John Saunders, John Saunders, John Summers, John Summers, John Sefmenson, John Sefmenson, John Sefmenson, John Sefmenson, John Sefmenson, John Sefmenson, Walter Moran,	Holyoke, Holyoke, Holyoke, Holyoke, Southwick, Westledd, Quincy, Middleborough, Southwick,	Having short pickerel in violation of § 67, c. 91, R. L., as amended by c. 329, Acts of 1904, Having short bass in violation of § 70, c. 91, R. L., Killing wood duck in violation of c. 274, Acts of 1906, Snaring trout,	Convicted, Convicted, Convicted, Convicted, Convicted, Discharged, Convicted, Discharged, Convicted, Discharged, Convicted,	9 00 12 00 12 00 - - - 5 00 30 00	Filed; see short pickerel. Filed; see short pickerel. Filed. Failed to pay; jail three months
Fred Abbott,	Ware,	Seining in pond in violation of \$26, c. 91, R. L., as smended by c. 308, Acts of 1904.	Discharged, Discharged,	-	a man for their out on account of
Luce Boccone, Frederick S. Cook, Herbert Cooper, Fred E. Mann,	New York, Newark, N. J., Broomfield, Vt., Weymouth,	Non-residents hunting without license in violation of c. 198, Acts of 1907,	Convicted, . Convicted, . Convicted, . Discharged, .	10 00 5 00	Filed.
Wallace J. Cook, Normand S. Cook,	Provincetown, Provincetown,	Maintaining fish trap without permit in violation of § 118, c. 91, R. L.,	Convicted	210 00	Filed.

Otte II. Ked w. John Freih. George II. U. athurher. Charles C. R.nor. Charles Hartin. Minhael P. Melle. John Leavy. David C. Law. August Lavois, Henry Reardon. G. F. Linehan. David Lavois. Edward Arnold. William Damon. William D. Ewell. George C. Packbam. Joseph Fox. Charles Billideau. Amans Foutnier.	Dennia Port. New Bedford, Boston. Boston. Boston. New Bedford, Pittsfield, Arlington. Lynn, Lynn, Lynn, Lynn, Marshfield, Marshfield, Marshfield, Fall River,	Possession of feathers of certain birds for millinery purposes in violation of c. Convicted, 10 00	jurisdiction. jurisdiction. jurisdiction. jurisdiction. osts, \$2.60.
Simeon Atwood, Daniel O'Comnell, Ezals Lucien, Lloyd Denn, Fred Coota, Albert Pike, Harmitton Gordan Antonic Pino, Isaac Harvey, Estward Fenbody, Antone Bruggell, Paolo Merilino,	 Boston,	Shooting gulls in violation of § 5, c. 92, R. L., as amended by c. 99, Acts of 1907. Setting forest fires in violation of c. 299, Setting forest fires in violation of c. 299, All mi	nors; were severely reprided by the judge.

[F.]
RETURNS FROM THE SHORE POUND AND NET FISHERIES FOR THE YEAR 1907.

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Ap	paratus	emplor	yed.

PROPRIETOR.		Town,				Number of Men.	Boats.	Value.	Pounds.	Value.	Nets.	Value.	
Edward Holway. J. Eldredge & Son. Gilbert E. Ellis.	: :		Bournedale,		*		2	3	\$175 00	1	\$1,200 00	141	
A. S. Hall, James F. Higgins, E. C. Jerauld, David A. Newcomb,			Brewster, .	•		•	22	14	1,295 00	22	8,710 00	4	\$55 00
Fred Young, Fred W. Baker, Consolidated Weir Company, George W. Crowell, Geo. F. Nickerson, R. A. Nickerson, Albert W. Smith,		*******	Chatham, .		•	3.	16	12	4,170 00	8	6,100 00	56	575 00
C. C. Flanders & Co.,	:	:	Chilmark, .				16	14	1,300 00	10	6,500 00	-	-
O. W. West, Frank B. Veeder & Co.,		3	Cuttyhunk,				4	5	1,270 00	1	1,200 00	1	50 00
rowell Cold Storage Company, enns H. Baker,		:	Dennis, .				13	10	1,127 00	5	4,000 00	-	+
has. Gardner. S. D. Perry. Albertis F. Simmons.			Dighton, .	*			18	9	435 00	-	-	10	660 00

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David B. Pesso and Allen Maybow, E. R. Durkres and W. F. Vincent, D. D. Distrood & Co.,	Edgartown.			-1	4	6	225 00	2	900 00	-	-
Linus S. Jeffers & Co., A. H. Vanderhoop & Co., L. L. Vanderhoop & Co.,	Gay Head,		14	*	17	17	2,175 00	13	7,900 00	2	70 00
Fuller A. Andrews, George W. Douglass, Joseph Douglass, Thomas Douglass, Henry W. Nelson, Alexander Sargent,	Gloucester,	÷			10	17	5,934 00	1	1,200 00	15	2,750 00
Alexander Bargent, Frank A. Tarr, Walter F. Kelley,	Hull,		4.0		-	-	-		- 1	2	16 00
Orin S. Crosby,	Hyannis,				5	4	1,050 00	-	-	64	715 00
Faylor Brothers, Alfred W. Rilay, Edw. Heath & Co., A. L. Holmes,	Lanesville, Manchester, Manomet,		:	*	3	5	600_00	ī	1,500_00	10	50 00 14 00
H. D. Powell. F. H. Johnson and others). Avard L. Smith. R. A. Atwood and others). Arthur J. Barrett & Co.,	Nahant,		•	4	12	9	1,150 00	4	6,000 00	2	4 -2
Edward I. Fisher. C. S. Glidden & Co., George H. Hamblin, Arthur McCleare, W. F. Ramsdell, Alexander C. Swain, John S. Watkins,	Nantucket,		123		21	22	7,063 00	7	3,500 00	148	2,270 00
George M. Winslow, C. A. Caswell & Co., George G. Short,	Newburyport,	,			10	12	4,850 00	1	200 00	92	1,050 00
Atkins, Hughes & Co., Allen R. Norton, Agent,	North Truro, Oak Bluffs,			3	24	16	3,320 00	10	22,000 00		10 00
Caleb Hayden, L. W. Raymond, Warren Cove Weir Company,	Orleans,		2		3	3	520 00	-		1	700 00

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J. H. Mitter,			Somerset,	 - 11	13	3	130 00	-	-	2	300 00
16. W. Dagmett. Obed S. Dagmett. George H. Luce, H. Nelson Luce, George W. Manter, J. A. Mayhew & Co., W. L. and G. F. Tilton, John R. Walker,	 ******	 	Tisbury, .		20	35	2,595 00	18	8,125 00	3	35 00
George Cleveland, Eben Lace, Otis B. Luce, B. S. Paine, John J. Veeder, Hiram E. Baker,	 	 	Vineyard Haven, Wellfleet, Woods Hole, Yarmouth,		4 2 3 4	12 - 4 4	1,452 00 4,125 00 40 00	9 	3,650 00 700 00	1 2 - 2	15 00 30 00 60 00
Totals for State,					363	325	\$65,537 00	126	\$96,385 00	1,212	\$17,209 00

Returns from the Lobster Fisheries.

PROPRIETOR.	Town.	Number of Men.	Number of Boats.	Value.	Number of Pots.	Value.	Number of Lobsters.	Value.	Number of Egg- bearing Lobsters
W. N. Springer, John Pinto, Jonquis Ferrari, Joseph Serrilla,	Allerton, .	. 1	1	\$30 00	18	\$30 00	587	\$135 00	2
L. Sidney, Cony Silver, Cony Silver, Cony Silver, Frank Brengola, Coseph Cabral, Asia Corry, Intona Ferreira, Lindrew Fe	Boston,	. 19	38	4,292 00	2,310	2,210 00	55,638	9,992 40	30
ile Rose, anuel Serrilla, D. Colb, C. Leonard, Ibert Nightingale, L. Nightingale,	Bournedale,	. 5	7	280 00	250	270 00	7,561	1,066 55	90
L. Nightingale. H. Hewins, corree Pardy, red S. Pratt. W. Tolman, illus E. White, corge W. Bloomer, unuel Dill.	Brant Rock,	. 5	7	320 00	168	317 00	8,349	788 78	72
amuel Dili. yivester Eldredge, ' W. Eldredge, rancia A. Ellis, base G. Hamilton, b. A. Nickerson & Co., thert W. Smith, red W. Baker, Bert W. Carpenter,	Chatham,	. 12	18	2,236 00	625	802 00	10,716	3,436 58	524

rnest J. Dean and J. J. I Illiam S. Mayhew, verent A. Poole, Bart E. Reed,		Chilmark,			17	20	4,326 00	640	1,125 00	28,422	3,651 25	304
arry G. Beed, ustin E. Smith, nslow Stewart, P. and J. G. Tilton, seerge Atwell, seeph Boutin,												
mest Johns, enry A. Jordan, hitman Nickerson, parles H. Pierce, harles Rogers, S. Sampson,		Chiltonville,			19	26	976 00	617	1,160 00	54,134	7,177 02	542
S. Sampson, S. Sampson, F. Swift, S. Thurston, obert Ainsley,		}										
scar Anderson, evi Cadose, S. Figueiredo, atons Grasse, strick Grasse,												
on W. Hunt, nailel Oliver, drew Peterson, ne Peterson, troine Silva,	: :	Cohasset,		*	17	25	4,315 00	1,751	2,451 18	78,317	15,831 04	1,002
hn J. Silvia, studi Trombus, arry H. White. arles Williams, as C. Church.												
F. Cornell, atthew R. Goulet, sac Gregory, vin Hall & Co., unuel Jackson,	: :	Control			20	00	8 200 00		1.054.50	100 506	10 201 14	1.048
ank Peters, ossell Rotch, car H. Stetaan, H. Tilton,		Cuttyhunk,	A.1		20	26	8,320 00	1,114	1,356 50	100,528	12,801 16	1,048

Returns from the Lobster Fisheries - Continued.

Proprietor.	Town.	Number of Men.	Number of Boats.	Value.	Number of Pots.	Value.	Number of Lobsters.	Value.	Number of Egg- bearing Lobsters
aniel S. Crowell, need P. Howes, enjamin Walker, amusi P. Burgess,	11	. 3	3	\$85 00	52	\$50 25	1,420	\$253 75	108
imitel P. Burgess, filliam E. Freeman, aac Symmes, rank E. Wadsworth,	Duxbury	. 4	7	380 00	175	270 00	14.050	1,953 63	95
anuel Delours,	Edgartown, .	. 2	2	70 00	84	84 00	3,175	388 20	1
evi Ripley, lvin F. Bourne, oses P. Cooper,	Falmouth, .	1	2	115 00	30	45 00	311	124 20	17
nne S, Hatch, seeph A, Lang, II. Ryan, naries W. Ryan, dward L, Ashley, ntone Burnham, anuel Cardozo, seeph Douglass,	Gay Head, .	. 6	10	803 00	187	183 00	7,592	837 30	129
rank A. Gove (R. L. Gove & Son), elson F. King, terr Knutson, E. Mehlmann, elvin Parsons, rry Philips, L. Small, amiel S. Webber, B. Brewer, illiam Galbacher, alser W. Marchant,	Gloucester,	. 20	. 24	1,807 00	759	824 25	24,537	4,327 25	239

V. M. Emricatend, Villest Keette. harles Peterson. has. E. Peterson. Symm Seara.		Green Harbo	r		11	22	4,315	00	1,280	2,455	00	51,787	9,917	08	723
I. Staw. P. Tolman. J. H. Tolman. M. Cheurly. Valter F. Kelley.												2			
red C. Maunch, mbrose Mitchell, aniel Souther,	: :	Hull,			7	8	929	00	444	770	00	24,065	5,628	30	87
om Crosby, -	9 4	· Hyannis,			4	4	1,115	00	30	13	00	532	85	83	2
den R. Gorham,		Kingston,			1	1	450		45		200		(1)		
lired W. Riley.				-	•		450	00	45	45	00	2,612	485	28	11
ddison Woodbury. M. Poland,	: 5	Lanesville,	*	:	4	4	65	00	155	145	00	7.611	1,295	60	83
C. Jones, O. Sargent,	1 1	Manchester,			2	2	60	00	95	130	00	2,752	426	55	63
nes Anderson, sd W. Archibald, D. Bacon, L. Bartlett, muel H. Benson, L. Binney, ban R. Briggs,															
H. Divon. L. Holmes, lph B. Holmes,	: :	1									58.	irran		. 1	18
J. Nightingale,		Manomet,			22	35	2,597	00	1,292	1,946	00	106,204	14,832	64	98
R. Petersun.		3			- 1			- 1							
hile Plouffe.				- 1	- 1			- 11			- 1			- 1	
E. Raymond.		*			- 1			- 1			3				
bert Richardson.		:						1							
C. Sampson,	(I) H	0.1						1							
en R Swift.								1							
A. Wakefield.		3.11						1	7						

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Returns from the Lobster Fisheries - Continued.

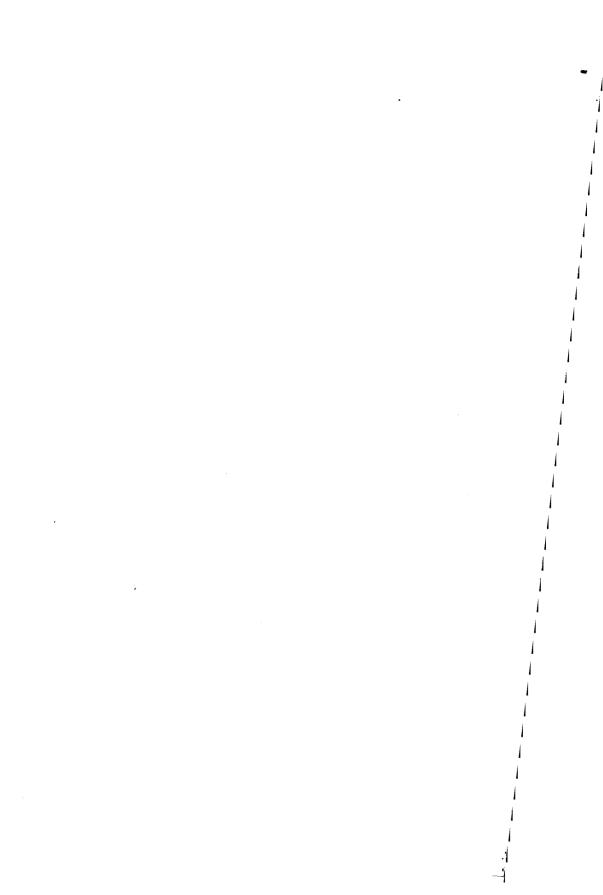
PROPRIETOR.	Town.	Number of Men.	Number of Boats.	Value.	Number of Pots.	Value.	Number of Lobsters.	Value.	Number of Egg- bearing Lobsters
Clinton F. Adams, W. F. Allen, J. E. Brown, W. F. Dennis, William Divay, Arthur D. Frost, Wm. T. Gardner, Everett S. Hamson, R. C. Hiller, George K. Hamson, Jr. David P. Howe, P. H. Keenan, Fhomas P. Lyons, John W. Mace, James H. Magee, William F. Merritt, Richard T. Millett, Harry A. Oliver, Everett P. Peach, Joseph S. Phillips, Harris E. Rhoades, Augustus K. Roindy, Jr., Richard F. Russell, S. Q. Smith, William T. Smith, C. H. Smith, C. M. Smith, C. H. Smith, C. H. Smith, C. H. Smith, C. H. Smith, C. M. S	Marblehead,	38	39	\$3,428 00	1,542	\$1,938 00	116,195	\$24,213 56	655
2. H. Smithurst, Stenever E. Snow, Samuel A. Stone. Benjamin H. Swett, John F. Trefry, William H. Tutt, Walter E. Bowman, J. K. Gamnett, Jr., E. H. Prast,]	1 4	2	210 00 160 00	125 195	135 00 320 00	3,796 8,796	559 28 581 04	155

H. Crowell. R. Cumingham, such Lafence. A such, self-Taylor. D. Lamphier, station Atwood.	Nahant.			10	10	880	00	1,300	1.400	00	14,234	3,178	08	73
s. A. Inidaham, one I. Hatch, urr E. Hatch, nucl McDomild, iraim Onderkirk, son Rogers, and S. Topham, C. and J. E. Chapel,	Nantasket,			8	9	305	00	335	505	00	24,065	4,822	60	104
I. Dennis, rry E. Dunham, S. K. Dunham, s. C. Eldredge, a. H. Hambilu, H. Noccross, oph H. Ray, une) Thomas,	Nantucket,			13	17	1,857	00	435	581	00	11,373	2,437	16	314
m S. Watkins, os. B. Dowling, rtholomew Silva,	New Bedford,			4	5	1,365	00	200	250	00	15,441	1,861	08	180
orge B. Taber, nuel DeCosto, cob Allen,	North Scituate North Tisbury	,	:	1	1 1	20 20	00	30 12	40 12		3.595 200		50	25
C. Goodspeed, erge H. Hallett,	Onset,			2	6	1.540		110	110	- 11	2,464	515		56
niel II. Gould. eli Hayden. M. Pierce. H. Bagnall.	Orleans, .		•	5	5	790	00	105	190	00	1,589	664	78	25
J. Caswell, J. Graffam, R. Harlow, sert F. Pierce, W. Raymond, and Simmons,	Plymouth,	•		9	15	1,343	00	462	744	00	32,700	4,661	99	84
P. Thurston artin Nelson, seph S. Perry, hn W. Savage, C. Snow.	Provincetown			4	5	525	00	280	265	00	2,123	754	55	109

Returns from the Lobster Fisheries - Concluded.

Proprietor.	Town.	Number of Men.	Number of Boats.	Value.	Number of Pots.	Value.	Number of Lobsters.	Value.	Number of Egg- bearing Lobsters.
Manuel Marshall, Antone Vera, George E. Wendell and W. E. Nor- wood.	Robinson Hole,	2	`2	\$800 00	136	\$130 00	4,884	\$701 17	93
Peter Dixon. secret Dixon. secret Dobwen. s. Litch. s. D. Thurston. Jr., William Bennett. ohn Bowman. Jartin Bowman. sespih Dobson. rank Gaspec. ohn F. Lawson. sarid B. Newcomb. Jr.,	Rockport,	15	21	2,613 00	1,395	1.840 00	55,480	8,988 24	219
mest M. Rich, J. Chandler, thur Gibbs, H. Marsh, illiam Norris.	Sagamore,	4	7	130 00	95	89 00	2,441	326 42	81
arles S. Brown, dn A. Dunn, mrtes L. Wales,	Salem,	3	4	670 00	245	265 00	16,033	3,206 60	287
hn Elvander, W. Haines, hn F. Malioney, . H. Veeder, Frank Cushman, paries DeCoste, doinns Dwyer, dward E. Edson,	Sandwicz,	4	5	517 00	129	172 50	3,671	561 50	63
eorge F. Edson. has, Alfred Foster, ichard Graham, Ijjah P. Pratt. sha Stonefield,	Scituate.	12	17	2,685 00	680	1,110 00	45,497	6,202 72	364

Totals for State,			-		4	,	379	523	\$65,162	00	21,342	\$28,668	68	1,039,886	\$174,36	17	10,340
ince M. Stuart. H. Vedeler, irley D. Lovell,	:		*	Yarmouth,	1.		1	2	210	00	40	40	00	1,198	335	00	36
ine, R. Grinnell, car R. Hibron, comms Hibckley, m. H. McLlowell, fred Nickerson, alter E. Nickerson,				Woods Hole,		4	11	15	2,200	00	295	410	25	20,743	2,640	19	343
rainis J. Cain, rancis J. Cain, lartley L. Wells, L. Adams, ames F. Cook,				Weymouth, Winthrop,	:		2	1	300 50	00	180 60	270 75	00	12,410 3,416	3,079 683		101
eorge A. Gifford, Villiam A. Hammond Villiam S. Head, Earry G. Sowle,	•			Westport Poin	nt,		8	9	2,275	00	271	295	25	16,858	2,667	06	315
ester D. Mayhew, indley W. Mayhew, corge A. Rogers,	*			West Tisbury			5	9	1,893	00	290	457	50	16,102	2,087	82	215
ames R. Tilton. J. Densmore, Layhew C. Stuart, David T. Butler,	•	ė.		West Falmout	th,		2	3	50	00	25	25	00	485	101	15	45
Villiam A. Day, Villiam M. Prase, Idward H. Smith, E. Smith,	:	1	:	Vineyard Hav	en,		5	8	415	00	85	85	00	2,750	484	13	40
G. T. Wadsworth, A. Maybew & Co.,				South Duxbur Tisbury,	ry.		2	6	445	00	148 16	200 32	00	9,547	1,701	2027	111 20
Seils Vinal. Juniel Ward. Frank E. Phillips.			:	Samuel David					4.95		- 1.0				0021	Δ.	



No. 25

REPORT

OF THE

COMMISSIONERS

FISHERIES AND GAME

FOR THE

YEAR ENDING DECEMBER 31, 1908.



BOSTON:

WRIGHT & POTTER PRINTING CO., STATE PRINTERS, 18 Post Office Square. 1909. A COLORDO BUR TOTOLOGICAL



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18 POST OFFICE SQUARE.
1909.

APPROVED BY THE STATE BOARD OF PUBLICATION.

COMMISSIONERS ON FISHERIES AND GAME.

GEORGE W. FIELD, SHARON, Chairman.
JOHN W. DELANO, MARION.
GEORGE H. GARFIELD, BROCKTON.

Chief Deputy Commissioner.
WILLIAM W. NIXON, CAMBRIDGE.

Clerk.

W. RAYMOND COLLINS, Boston.

DAVID L. BELDING, CHATHAM, Biologist.

FERDINAND C. LANE, WELLFLEET, Assistant Biologist.

ARTHUR MERRILL, SUTTON, Superintendent.

OFFICE: Room 158, State House, Boston.

Telephone: Haymarket 2700.

Ohituary.

On March 16, 1908, the senior commissioner, the Hon. Edward A. Brackett of Winchester, passed away, at the age of eighty-nine. For the past thirty-nine years Mr. Brackett's best efforts have been spent in the service of the State.

Born in Vassalboro, Me., 1818, of Quaker parentage, his naturally strong artistic proclivities, early manifested, were frowned upon, his father striving in vain to have him trained in some "useful trade." The early years of manhood were those of a struggling artist, - a sculptor, - with a strong predilection for poetic expression, as is evinced in his masterpiece, "The Shipwrecked Mother and Child," now in the Worcester Art Museum; and also in the faculty of giving so much expression to his busts, one of which, that of Washington Allston, is on the main staircase of the Metropolitan Museum of New York. (A duplicate in marble is also in the Worcester Museum.) One of his notable busts was that of John Brown. the measurements for which were taken in the prison a few days before Brown's execution. Mr. Brackett went to Charleston, Va., for this purpose during the trial, at a time when the feeling against the north was so strong that it was at the risk of his life that a Boston man ventured there. He made many other busts, including those of President William Henry Harrison, of the poets William Cullen Bryant, Richard H. Dana, Henry W. Longfellow, of Gen. B. F. Butler, Wendell Phillips and William Lloyd Garrison. He never made a memorandum of his art works, and they have been so scattered that but few of them can be traced. In 1861 Gov. John A. Andrew appointed him first lieutenant and battalion quartermaster in the First Massachusetts Cavalry. The following March he resigned, in consequence of reorganization of the cavalry, and returned home.

Always abreast with advanced thought, his innate mental tendency was that of a pioneer; he continually had some new avocation, e.q., some experiment to work out, — running a winter greenhouse for grapes, cucumbers, roses and smilax; then rearing bees; again taking up some new psychological fad, as mesmerism, psychic subjects, etc. The pioneering work of Seth Green upon the maintenance of the shad and salmon by artificial propagation and the application of his discoveries and methods to the Connecticut and Merrimac rivers early attracted Mr. Brackett's interest, and he constructed a miniature hatchery in an old freight car, with runs, etc., and a small pond near, all supplied with good spring water, with which he could carry on his studies and experiments. This soon came to the ears of Colonel Lyman, the first member of the then newly created Commission on Inland Fisheries, and he was asked to work with and for them until 1869, when he was appointed a member of the Board by Governor Claffin. "toy" hatchery became the nucleus of the present Winchester hatchery, the first State hatchery. The special form of a fishway devised by Mr. Brackett is still continued in successful operation both in the United States and Europe. His hatching tray also served as the type form, which has been modified in various directions to meet special needs.

The giving up of his art work, involving the dismantling of his studio, was one of the bitter trials of his life; but he resolutely laid aside his preference, and threw himself into the work that had come to him, making himself so efficient and of such authority that in his eighty-seventh year he received his eighth consecutive appointment for five years each.

Mr. Brackett served on the commission thirty-eight years and eight months, and for twenty-seven years, from 1872 to 1899, as chairman. His interests as commissioner were not confined to the inland fisheries, but he personally and actively investigated the changing conditions surrounding our native birds, particularly the game birds. The importance of game birds as a source of recreation and food supply led Mr. Brackett, through Mr. S. Forehand of Worcester, to secure from Judge Denny from Oregon in 1895 the pheasant (P.

torquatus), which has become successfully naturalized in this State.

The dominant traits of character were versatility, rugged integrity and perseverance in surmounting obstacles, a sunny optimism and friendliness,—the characteristics of "a good neighbor,"—which made him a notably successful public servant.

The following resolutions were adopted by the Board: -

Whereas, The passing of the senior member of this commission, Hon. E. A. Brackett, who, for thirty-eight years and eight months, with conspicuous energy, fidelity and integrity served the Commonwealth, and for twenty-seven years, so long as his strength permitted, as the leader in thought and action in the work of this commission; and

Whereas, This Board, ever since his retirement from active participation in the daily routine, has depended upon his mature deliberation, ripe experience and wise counsels; therefore, be it

Resolved, That, while bowing reverently to the decree of the Divine will, the undersigned, members of this board, deeply feel the personal loss, the warm friendly greeting and the ripened counsel of our venerated colleague, and extend their profound sympathy to his family and relatives.

Resolved, That these resolutions be spread upon the records, and a copy thereof be sent to the widow.

GEORGE W. FIELD. JOHN W. DELANO.

On July 8, 1908, His Excellency Governor Guild nominated, for the term of five years, ex-Senator George H. Garfield of Brockton, as a member of the Commission on Fisheries and Game, and on the 15th the appointment was confirmed.

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The Commonwealth of Massachusetts.

To His Excellency the Governor and the Honorable Council.

The Commissioners on Fisheries and Game respectfully submit this their forty-third annual report.

GENERAL CONSIDERATIONS.

The special duty of the commissioners is to deal with those relations which already exist, and the new problems which are constantly arising concerning the wise utilization of valuable assets of the Commonwealth, involving the intelligent conservation, protection and utilization of the inland fisheries and game, valuable as a source of food and recreation; the protection of the insectivorous birds, which are directly and indirectly of incalculable benefit to all classes of our citizens; and the conservation, development and economic utilization of our sea and shore fisheries. We aim to perform our duties in such a manner as to act co-ordinately with other State and municipal officials. Without narrow-minded specialization we strive to study the subjects under our charge, and seek to merit the confidence not only of the general public but also of the legislative and executive branches of our government, who from the force of the circumstances cannot always command the time necessary to study the fish and game problems at first hand and in the broadest and most detailed manner. We are of the opinion that this department can and should be made self-supporting. small tax levied upon hunters (chapter 317, Acts of 1905, as amended by chapter 402, Acts of 1908, relative to innaturalized, foreign-born persons; chapter 198, Acts of 1907, relative to non-resident hunters; and chapter 484, Acts of 1908, relative to registration of resident hunters) should not only provide better protection for farmers, property owners and the useful birds, and check in a measurable degree disastrous forest fires by increasing the number of paid wardens (who in effect are a special rural police) in active service, but should provide funds for more effective stocking of waters with food fish and of covers with birds. The initiation of a system whereby the public fishing rights on the seashore may be leased for the purpose of increasing the yield of the mollusks from tidal flats, thus developing better business conditions in the shore towns, with increased opportunities for employment to our citizens, should vield a return to the citizens of the Commonwealth far in excess of the total annual expenditures of this commission. Of the subjects especially considered this year, detailed statements are given elsewhere in this report. These may be briefly summarized as follows: --

Expenditures. — The exact details of all expenditures are published in the annual report of the Auditor of the Commonwealth. In general, \$6,000 was expended for the benefit of the sea and shore fisheries; \$5,700 for maintenance of inland resources for the purchase and propagation of trout, quail, grouse and pheasants; \$30,000 for the enforcement of the fish, game and bird laws on land and sea; \$4,000 for the protection of the adult female lobsters by purchase of those caught when carrying eggs; \$5,100 for salaries of the commissioners; and \$4,100 for printing, postage, travelling expenses of the commissioners and for clerical and office expenses. The total amount of fines was \$6,957.50; and of all other additional moneys received and turned into the treasury of the Commonwealth, \$2,735.

Mollusk Fisheries. — In 1905 the Legislature ordered a biological survey of the coastal areas below high-water mark, in order to ascertain: —

- (1) The present and past conditions of the mollusk fisheries.
- (2) The possibilities of increasing the annual production by (a) increasing the annual yield per acre; (b) suitable methods of securing an annual yield from areas at present unproductive.
- (3) Ascertaining definite methods of increasing production by study of: —

- (a) Life histories of the economic mollusks, particularly the oyster, clam, quahaug and scallop.
 - (b) Methods of feeding and rate of growth.
 - (c) Effects of unfavorable conditions; e.g., pollution.
- (d) Methods of checking ravages of enemies; e.g., starfish, "drills," "winkles," etc.

A report to the Legislature upon this work states, in general, that of upwards of 60,000 acres of shellfish ground only about 3,552 acres are to-day yielding anything approximating the natural yield, i.e., from \$100 to \$800 profit per annum; while upwards of 40,000 acres are producing at least 90 per cent less than normal production; and about 15,000 acres at present unsuitable could at an expense of \$50 to \$300 per acre be made to yield from \$100 to \$500 profit annually. Under such development and utilization employment would be furnished to about 20,000 skilled and unskilled laborers, as compared with 2,184 in 1907; and a total production valued in the hands of the producers at \$6,000,000 annually, instead of \$752,000, as in 1907.

The results from more than 300 experimental plots prove conclusively that clams (Mya arenaria) and quahaugs (Venus mercenaria) can by appropriate methods be as successfully cultivated as are oysters to-day, or as any farm crop; that the value of a quahaug crop upon arrival at a marketable size often exceeds \$1,800 per acre; and that the annual profit should average not less than \$200 per acre.

These fisheries are prosecuted upon what is now in the east the last remnant of the public domain, viz., between high and low tide marks. The titles to the uplands have been acquired by individuals, and are subject to individual control and responsibility; and the title of the riparian owner extends to mean low-water mark, or to 100 rods beyond the mean high-water mark in cases where more than 100 rods of tidal flats are exposed by the average tide, but the riparian owner does not have an exclusive control of the fishing, fowling and boating. He may participate in these only on equal terms with the public, and subject to the disposing right of the General Court. Similarly, State laws have been enacted by which areas below high-water mark may be leased for oyster cultivation, but the lease holder can claim as his property only the oysters grown thereon.

Curiously enough, present laws permit the cultivation of oysters in the waters below low-tide mark, but not clams, quahaugs or scallops, either below or above low-water mark. It would be quite as logical for the State to permit the farmer to grow only corn.

The fisheries (which include the mollusk fisheries) are still public, and subject to the disposing action of the Legislature. If the Legislature should by appropriate laws make possible intensive cultivation of shellfish, e.g., the oyster, clam, quahaug, scallop and lobster, in the area below high-water mark, under proper safeguards devised to secure public and private rights, there would follow:—

- (1) Increased opportunities for skilled and unskilled labor.
- (2) Increased yield per acre above the natural productiveness.
- (3) Increased daily profits in proportion to the time and labor of the fishermen.
- (4) Increased definiteness of supply, thus permitting the fishermen to take advantage of market conditions.
- (5) Increased income to town from taxable property on the shellfish beds.
 - (6) Increased subsidiary industries.
- (7) Increased revenue to citizens, communities and State, from leases of public domain.

An extended discussion is to be found in a special report to the General Court upon the mollusk fisheries of Massachusetts.

Dogfish. — As stated in our previous reports, the aggregate annual damage during the past five years to Massachusetts' seafishing interests cannot be less than \$5,000,000. Some unsuccessful attempts have been made by oil and fertilizer manufacturers in Massachusetts to utilize the dogfish. The chief obstacles have been lack of a regular and definite source of supply, and a lack of knowledge of the best and cheapest methods of securing the maximum yield of oil and fish scrap for fertilizer. Scientific studies are now under way for the purpose of furnishing a standard by which manufacturers may test the efficiency of their processes of extracting oil and making fish scrap for use in commercial fertilizers.

Lobster Fisheries. - As a direct result of the first annual

Conference of the Governors of the New England States, held at Boston, Nov. 23, 24, 1908, at a convention of the commissioners of the States of Maine, New Hampshire, Massachusetts, Rhode Island and Connecticut, the following resolutions were adopted:—

That in the opinion of this convention a close season during a portion of the year is of greatest advantage to those who are in a position to deal with the lobster as a marketable commodity, but is of relatively little value in augmenting the total annual supply of lobsters, for the reason that the lobster is a slow breeder, and that the breeding season extends over at least ten months of the year.

If measurement is to be made the standard of legal length, the principle should be the measurement of the shell of the body, exclusive of the tail.

That it is the opinion of this convention that the artificial propagation and maintenance of the lobster up to at least the fourth stage in the development is of fundamental importance to the maintenance of the lobster fisheries of the United States.

That the Chair appoint the chairman or a representative from each of the commissions of the different States to confer within a short time, either by meeting or letter, as it seems best, with the New York commission concerning a uniform law relative to the legal length of the lobster, and report to this body.

That the chairman of this meeting is instructed to confer, either by letter or otherwise, with the commissioner of New York, looking towards the adoption of uniform laws on lines passed upon at this convention.

That it is the opinion of this convention that all the States should adopt the law which fixes at not less than $4\frac{3}{4}$ inches, as measured by the Maine standard, the size of lobsters legally taken.

That it is the opinion of this convention that it is advisable to license all lobster fishermen, dealers, smack captains and persons catching or transporting lobsters.

We respectfully invite your special consideration of these resolutions, and we earnestly recommend that appropriate legislation be speedily enacted.

Inland Fisheries. — As a result of drought, directly traceable in very considerable measure to unwise methods of deforestation of our hills, many of the smaller brooks and the upper reaches of larger brooks, which are the nurseries of brook trout, have been entirely depopulated. In addition, we again repeat

the statements given in the previous reports, that we should not be longer compelled to maintain unwise, inadequate and unbusiness-like methods of stocking public waters. We respectfully urge consideration of an improved system of stocking, whereby certain well-known and suitable waters, definitely designated as public waters under the control of the Commonwealth, and adequately protected and stocked, are maintained at their highest productive capacity.

Our present system of propagating, rearing and distributing fish is antiquated, and, while entirely adequate to meet the conditions under which it was developed, was not planned with a view to future extension of facilities, and has become entirely incapable of meeting the present demands. Greater results can be obtained from one model hatchery, having a sufficient water supply to maintain a stock of selected brood fish, and with hatching house, trays and rearing pools sufficient to turn out annually 5,000,000 fry, at least 250,000 fingerling trout, and at least 1,000,000 white perch.

Many inquiries have been made relative to the State hatcheries, which were established by special acts of the Legislature, as follows: resolve 114, Acts of 1896, appropriating \$3,000 for the establishment of a hatchery at Hadley; resolve 74, Acts of 1897, appropriating \$3,000 for the establishment of a hatchery at Winchester; resolve 60, Acts of 1898, appropriating \$2,500 for the establishment of a hatchery at Adams.

Previous to 1893 approximately 400,000 fry were annually received from the hatchery at Plymouth, N. H., the cost of maintenance of which the State of Massachusetts shared equally with New Hampshire. Since the establishment of the hatcheries at Winchester, Hadley and Adams the annual output from each has averaged about 200,000 trout fry. At the time of the establishment of those hatcheries there were practically no commercial hatcheries in the State, and the price at which the fish could be bought was at least five times that at which they may be bought at present. The total cost of maintaining the three small hatcheries for the rearing of fry only is less than \$1,100 annually. The average aggregate output for the three hatcheries is about 600,000 fry, which at \$1.50 per thousand would make the total yield valued at \$900. The cost of distribution from

these three hatcheries, situated respectively in the eastern, the middle western and western part of the State, is very much less than if the entire distribution were made from the eastern part of the State, as might be necessary if the fish were purchased; so that, in our opinion, there is practically no difference in the cost of buying the fish and the cost of hatching by the State.

We are informed by the Massachusetts Bureau of Statistics of Labor that wild trout are taken in this State to the value of \$66,000 per annum, at a total cost to the Commonwealth of about \$5,000 in the maintenance of the above three hatcheries and of the Sutton hatchery, which latter annually produces about 200,000 fry and from 70,000 to 115,000 fingerlings, or a total for the State of 800,000 to 900,000 fry and 70,000 to 115,000 fingerlings.

The chief difficulties in the maintenance of fish in Massachusetts waters are connected with the excessive pollution of the larger streams and the deforestation of the mountain slopes, resulting in the drying up of the nursery brooks. There is absolutely no question that a larger plant of cultivated fish would be more economical to the State, and is beyond question necessary in order to secure proper results.

In reference to the abandonment of the hatcheries at Winchester, Adams and Hadley, the commissioners are of the opinion that it is not expedient at present to discontinue these hatcheries, for the reasons stated above; and we are further of the opinion that we would have no right to abandon them until ordered to do so by legislative act.

Game Birds. — In the pioneering work of devising methods of rearing game birds in captivity much progress has been made. The area available for rearing the birds has been so circumscribed and so subject to infectious diseases, from long occupation, that many untoward losses have been experienced which would not have occurred in a location suitable for breeding quail and ruffed grouse, where the ground and air were uncontaminated by disease germs from domestic poultry and the birds safe from the abandoned cat. A movement to establish "sanctuaries," wherein native birds may breed in safety, is under way. The State reservations should be increased and utilized, particularly for breeding and feeding refuges for native

birds. We venture to express the opinion that the breeding of pheasants perhaps may ultimately be safely left to private individuals.

Deer. — While it is certainly a fact that the wild lands of the State are well adapted for producing an annual crop of wild deer, an undue increase will without doubt entail hardship upon farmers and property owners. Every possible safeguard should be adopted to protect property and the rights of property owners. In the near future it may be necessary to control the increase of deer. A general open season, even for a very few days, would bring out an indiscriminate rush of inexperienced and irresponsible hunters. To prevent untoward results it may be necessary to issue a special license for deer hunting, with a fee sufficient to limit it to persons of responsibility, and to ensure to the State reimbursement for moneys paid to land owners for damage to crops by deer.

Conservation of the Song, Insectivorous and Game Birds, Valuable Mammals, Food and Game Fishes. — Destruction of the evergreen forests, unrestricted shooting, rats, squirrels and mice, the introduction of cats, and infectious diseases, have completely exterminated the wild turkey and passenger pigeon; the pinnated grouse and the upland plover are possibly beyond recall; the ruffed grouse, woodcock and quail are steadily diminishing. Of these possibly there remains an average of 5 or 10 per square mile, as compared with an original population of 50 or 100, or even more. Though formerly a breeding ground for the Canada goose, black ducks and wood ducks, our shortsightedness in shooting birds on their northern migration now permits relatively very few to stop here. Favorably located at the junction of two of the great paths of bird migration, and on account of the locally congested population, Massachusetts has an unusual percentage of her territory still unspoiled for raising the optimum crop of game and insectivorous birds. More complete utilization of these conditions would be of permanent value not alone to farmers, but to all classes of the community. It seems probable that the avian population (exclusive of the English sparrow) has now sunk to one-tenth or possibly onehundredth of its natural number previous to the year 1620. Many of the conditions which caused this alarming decrease are

still active, and the decline still goes on, though perhaps at a somewhat diminished rate. The value of the insectivorous and song birds is entirely beyond estimation; but some approximate figures may be made of the value of the game birds, in addition to their beneficial capacity for destroying noxious insects. We are of the opinion that Massachusetts should produce an annual crop of at least 25,000 ruffed grouse (valued at \$25,000 as food), at least 20,000 quail (valued at \$5,000 as food, or better at ten times that amount as insect destroyers on the farm), and at least 25,000 black and wood ducks (valued at \$15,000), and in addition the wild lands should produce an annual crop of 1,000 wild deer (valued at \$25,000 as food). Besides this, there is reason to believe that not far from 50,000 to 100,000 people hunt and fish more or less in this State; and if it can be prosecuted with reasonable success here, between one and two millions of dollars will be spent annually in this State, instead of being diverted elsewhere for similar purposes of recreation.

Massachusetts is well studded with over 1,100 lakes and ponds. Of these, 860 are "State ponds" above 20 acres, and free to the public for fishing. The trout streams are numerous The State Bureau of Statistics of Labor and very accessible. is authority for the statement that the value of the wild trout taken in this Commonwealth in the year 1906 by hook and line was \$66,000. The food value of the bass, pickerel, perch, hornpouts and eels is probably at least \$10,000. We are safe in saving that not one of these ponds and streams is producing anvwhere near its maximum capacity. Scientific knowledge of the rate of growth of the minute and even microscopic plants and animals, the fundamental food supply for young fish, is important, for the reason that the quantity of such plants and animals largely determines the number of adult fish which a given area of water can support. Reasonably complete knowledge of such facts is necessary before adequate and economical results can be secured by stocking. It is, however, absolutely certain that well-advised methods of stocking, based upon accurate knowledge, should increase at least tenfold the yield of edible and game fish in Massachusetts waters.

MARINE FISHERIES.

The commissioners have made a first-hand study of the practices in the Maritime Provinces, especially in reference to handling the dogfish, and incidentally to the lobster and mollusk fisheries in Nova Scotia and Cape Breton, New Brunswick and Prince Edward Island. They personally observed and studied the dogfish plant at Clark's Harbor and at Canso and Shippegan. These factories buy dogfish at \$4 per ton and fish waste at \$3 per ton, and turn them into oil and fish scrap, a small portion of which is sold to near-by farmers at \$25 per ton, but the great bulk of oil and fertilizer is sold in the United States. annual product varies from 100 to 300 tons of dried fish scrap. or sufficient to furnish nitrogen for 500 to 1,500 tons of complete commercial fertilizer. In addition to the benefits to agriculture by the production of fertilizer, the fisheries are relieved of a very considerable number of enemies; i.e., each ton of dogfish scrap represents the destruction of approximately 37,000 dogfish. Every dogfish living to-day is being maintained at public expense as a boarder at nature's table, eating and destroying on an average not less than 1 to 5 pounds daily of commercially valuable food fish, worth at least, at a very conservative figure, 1 cent per pound. Thus it may be properly inferred that the dogfish destroy more fish than are caught by the combined. fishing fleets of the world. Public attention is awakening to the fact that many of our most valued sources of food are certainly becoming depleted, viz., lobster, bluefish, mackerel, etc., and that it is absolutely essential to assist nature in order to maintain the supply. It is a sound economic principle that man may increase the natural supply of animal-plants suitable for human food, by developing new methods of protecting the eggs, the young and the adults from the natural enemies. This principle has been reduced to practice in the case of the domesticated animals and plants, and of the trout, salmon and other fish. The dogfish has become so destructive to our marine fisheries that some relief is necessary. Dogfish are not at present brought in commercial quantities to market, for the reason that no methods have been developed to make them commercially profitable. Gloucester and Boston, Mass., have the largest markets for salt

and fresh fish in North America; and naturally there should exist facilities for caring for waste products, from which oil, glue and fertilizer can be made. The dogfish can be profitably handled, even if treated in the same class as fish waste; though it is valued as a food fish in many countries, and the dried fins are sold at a high price (25 cents per pound) in the Orient, where they are regarded as a special delicacy.

Education relating to Fisheries. — One of the most essential requisites for the intelligent conservation of our marine resources is a well-defined system of education, adapted not alone for giving instruction in the principles and practices of fisheries enterprises, but of conveying to the public trustworthy statements pertaining to the legislative, civic, economic and sanitary problems involved; a fisheries museum, built up in a manner adapted for imparting knowledge, rather than merely as a collection of curiosities; a library of technical books and journals relative to the fisheries and allied subjects; models of the latest and most approved types of boats and gear of all descriptions; illustrated lectures and practical discussions and demonstrations upon pertinent subjects both in the line of handling the raw materials and of manufactured products of the fisheries; and a staff of competent scientists, who would be available for rapid and comprehensive investigation of problems which require special scientific training. The commercial and economic value of our fisheries cannot be overestimated. Other nations have developed fisheries schools and institutes, which are rendering efficient service.

The visit to Massachusetts of the delegates to the Fisheries Congress, and the many admirable demonstrations of fisheries methods provided at Boston, and particularly at Gloucester, were greatly admired by all, and proved to be a most effective advertisement of the practical knowledge, experience, skill, enterprise and efficient organization of those who are responsible for maintaining the prestige of the Massachusetts fisheries, and of the unsurpassed qualities of the products manufactured from the results of these fisheries. The delegates were vastly impressed with the admirable sanitary precautions taken to ensure cleanliness and healthfulness in the special preparations sold in cans and other packages, as well as the scientific develop-

ment of efficient methods of utilizing the incidental products formerly wasted. The rapid development of such trade is a tribute to the ability of the men at the helms, both on the sea and in the office, and to the industry, intelligence and fidelity of the employees, and promises prosperity not alone to the people living in special trade centers, but healthful and economical food to all the public at large, as well as a marked check upon the unwise and wasteful methods and utter disregard for the future supply which too often notoriously characterize the fishing trade.

The fisheries shared in the general market depression. While the catches were up to the general average, prices were below the normal.

Boston continues pre-eminently the market for fresh fish. The fleet included 302 sailing vessels, 1 steam otter trawler, 1 gas-olene auxiliary steamer and 154 miscellaneous boats, chiefly gasolene.

The catch of fresh fish landed at Boston, as compiled by the Boston Fish Bureau, is shown below:—

Ground	Fish.
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	YE	R.	Haddock.	Cod.	Hake.	Cusk.	Pollock.	Halibut.	Total.
1908,		•,	87,581,600	27,502,000	11,365,800	1,668,100	6,617,400	301,550	85,036,450
1907,			36,082,200	29,274,950	9,963,400	2,324,200	4,244,100	215,630	82,104,480

Total Quantity of Fresh Fish of All Kinds landed at Boston.

	YEAR.						Arrivals.	Ground Fish.	Other Fish.	Totals.
1908,			•				8,818	74,039,865	6,227,007	80,266,872
1904,			:				4,056	75,920,980	6,173,186	82,094,166
1905,							4,280	94,194,980	7,111,765	101,306,695
1906,							4,505	86,986,350	2,787,020	89,693,870
1907,							4,383	81,104,480	6,006,556	88,111,086
1908,							4,500	85,036,450	6,841,180	91,877,580

VESSEL.						Ся	Gross Stock.				
"Tattler,"							Alden Geel, .				\$24,364
"Arethusa (knockabout),"					Clayton Morrise	у, .			28,389		
"J. J. Flabe	rty,'	٠.					Fred LeBlanc,				17,798
"Smuggler,	٠.						Fred A. Morrise	у,			15,558

Best Stock of Massachusetts Vessels for Codfisheries.

Best Stock of Massachusetts Vessels for Fresh or "Shack," Fisheries.

Vessei	••		Captain.					Gross Stock
"Mary C. Santos,"			Manuel C. Santos, .					\$40,100
"Mary E. Cooney,"			Frank Cooney, .					82,000
								82,000
			William H. Thomas,					81,190
"W. M. Goodspeed,"			George Perry, .					29,000

The Gloucester Fisheries. — The notable feature of the year in Gloucester, the home of the salt fish industries, was the ill success of the mackerel seiners, which was partially balanced by unusually good fortune in the banks codfishery, so that the total catch of the Gloucester fleet, in round numbers. was 100,000,000 pounds, generally regarded as an average and satisfactory catch. The value on the dock was not less than \$5,000,000, which was increased to \$8,000,000 by various processes of packing and manufacture.

The fishing season of 1908 at Gloucester was productive of many big stocks in the various branches of the fishery, and in some instances long-standing records were broken. Of course it is not to be supposed that these stocks represent fairly what the fleet did as a whole. Those mentioned below are the high liners in the different branches of the fishery, together with others that were up in the front rank, and as such are worthy of mention and credit.

In the mackerel fleet the schooner "A. M. Nicholson," commanded by the famous Capt. Solomon Jacobs, carried off the high line honor, with a stock of \$21,000, each member of the

crew sharing \$438. Captain Jacobs has held the honor of high line of the mackerel fleet more times than any skipper, and, although now one of the oldest in years as well as in point of service, is still able to keep in the front rank in this most trying and uncertain fishery.

Other notable stocks in this fishery were as follows: —

Schooner "Monarch," Capt. John F. Vautier, \$18,017.18 stock and \$360.74 share.

Schooner "Ingomar," Capt. Wallace Parsons, \$17,983.58 stock and \$403.74 share.

Schooner "Elizabeth Silsbee," Capt. John A. McKinnon, \$16,874.58 stock and \$336.88 share.

Schooner "Electric Flash," Capt. William Bissert, \$16,-184.60 stock and \$361.81 share.

Schooner "Clintonia," Capt. Ralph Webber, \$13,711 stock and \$292.72 share.

Schooner "Pinta," Capt. Douglass McLean, \$13,120.45 stock and \$280.93 share.

In the salt bank trawl codfishery the high liner was the new knockabout schooner, "Arethusa," Capt. Clayton Morrisey, one of the finest fishing vessels ever built. Her photograph was given in our report for 1907. This craft made two trips to the banks, sailing on the first February 27, returning June 20 and weighing off 389,000 pounds of salt cod; then sailing again June 30, returning October 27 and weighing off 350,000 pounds; giving her a season's total catch of 739,000 pounds, — an unusually large amount. On this was made the remarkable stock of \$23,398.62, considered the largest season's work ever made at salt bank cod trawling. The crew made the notable share of \$611.36.

Previous to going on her first bank trip, the "Arethusa's" maiden endeavor was a frozen herring trip to Newfoundland. After taking out her second bank trip last fall she again went on a Newfoundland trip, this time for salt herring, returning December 19. Since she was launched, thirteen months ago, she has made the remarkable stock of about \$40,000. Capt. Clayton Morrisey, her commander, is one of the most notable figures in the North Atlantic fisheries, and although one of the

youngest, has carried off the high line honor for many seasons in succession.

Another excellent stock in this fishery was that of the schooner "Smuggler," Capt. Fred A. Morrisey, \$15,558.98, the average share being \$424, as result of the two trips.

Schooner "J. J. Flaherty," Capt. Fred LeBlanc, on one trawl and one dory handline trip made the fine stock of \$17,798.23, the average share being \$328.12.

In the salt bank dory handline fishery another record was broken, the schooner "Tattler," Capt. Alden Geel, being the craft to perform the feat. Captain Geel made two trips, weighing off 674,764 pounds of salt cod and stocking \$24,364.09, the high line share being \$611.51. Previous to this the record had been held since 1902 by Capt. John McInnis, who in three trips that season in the schooner "Talisman" stocked \$24,291.28, his high line share being \$710.49, while 745,475 pounds of salt cod were weighed off as the result of the three trips.

Some notable single trips in the salt cod line in 1908 were as follows:—

Schooner "Ella M. Goodwin," Capt. James Goodwin, engaged in dory handlining, sailed July 1 and returned October 5, a very quick trip, weighing off 336,013 pounds of salt cod stocking \$12,276.23, the average share being \$248.19. The high liner of the crew, Edward Atkinson, made a share of \$324.64, while four others of the crew went over the \$300 mark.

Schooner "Arcadia," Capt. William Wharton, on a deck handline salt cod fishing trip to Western Bank weighed off 108,000 pounds of salt cod, stocking \$3,800. On this trip the high line share was \$150, while several of the crew made over \$100. This is accounted the largest and most remunerative salt cod deck handline trip ever landed.

Schooner "Aloha," Capt. John McInnis, on a late salt coddory handline trip to Grand Bank and Virgin Rocks weighed off 334,000 pounds of salt cod, stocking \$11,712.07, the high line share being \$283.51.

In the fresh halibut fishery the highliner from this port was the schooner "Cavalier," Capt. Robert Porper, with a stock of \$21,248.32, the crew sharing \$430.26.

Schooner "Monitor," Capt. John McKay, in the fresh halibut fishery stocked \$18,986.67, the crew sharing \$409.89.

The high line of the fresh halibut fleet is the schooner "Mooween" of Duxbury, commanded by Capt. Daniel McDonald of this city. The "Mooween's" stock for 1908 was in the neighborhood of \$24,000, the share of the crew being \$593.

In the Georges halibut fishery the schooner "Kineo," Capt. John G. Stream, is again the high liner, with a stock of \$22,-540.08 and a crew share of \$564.32.

Other good stocks in this fishery last season were: -

Schooner "Niagara," Capt. Fred Thompson, \$20,301.23 stock and \$516.52 share.

Schooner "Teazer," Capt. Peter Dunsky, stocked \$20,787.76, the crew sharing \$506.61.

Schooner "Paragon," Capt. William Hermon, stocked \$19,818, the crew sharing \$428.75.

In the flitched halibut fleet the highliner was the schooner "S. P. Willard," Capt. Augustus Peterson, with a stock of \$11,857.12, the crew sharing \$298.83.

Other good stocks in this branch of the fishery were: -

Schooner "Fannie A. Smith," Capt. Joseph V. Bonia, \$10,-849.74 stock and \$253.96 share.

Schooner "Admiral Dewey," Capt. James Hayes, \$9,013.17 stock and \$227.26 share.

The high line of the straight Georges handline fleet was the schooner "W. H. Moody," Capt. Andrew Gorveneau, with a stock of \$9,932.33, the crew's average share being \$257.12.

The high line of the "drift" or Rips salt cod fishing fleet was the schooner "Voland," Capt. Allen Doleman, with a stock of \$13,401.65, the average share of the crew being \$373.85.

Other vessels making good stocks and good shares in this branch of the fishery were:—

Schooner "Jubilee," Capt. Oscar Lyons, \$12,078.32 stock and an average crew share of \$339.21.

Schooner "Norman Fisher," Capt. John Williams, \$10,-463.44 stock.

The schooner "Etta Mildred," Capt. John Swim, has a stock of about \$8,000, and with a fair catch on the trip upon which she is now absent she will be up among the leaders.

The high line of the haddock and shack fleet from this port is the schooner "Thomas S. Gorton," Capt. William H. Thomas, with a stock of \$31,190.68.

Of the market boat fleet, the high liner is the schooner "Mary E. Cooney," Capt. Frank Cooney, with a stock of \$34,000 and a crew share of the splendid sum of \$1,115.

EDIBLE AND BAIT MOLLUSKS.

Dr. George W. Field, Chairman, Massachusetts Department of Fisheries and Game, Boston, Mass.

DEAR SIR: — I respectfully submit the following report of the shell-fish investigations for the year 1908.

The work of the biological staff of the Fish and Game Commission during the past season has been largely devoted to the study of the marine life of our coast. While considerable attention has been given to the relation of the various forms of sea life to the commercial fisheries, the main object of the work has been an investigation of the edible shellfish common in our tidal waters. This has been rendered necessary by the fact that the natural supply of shellfish, overtaxed by the exhaustive demands of the market, is fast diminishing, and unless the proper remedy is speedily imposed will soon reach the point of commercial extinction. Investigators who have been engaged in this type of work for years, and have a thorough knowledge of the prevailing conditions, believe that under a system of shellfish culture a far greater production can be brought about by the aid of man than can ever result under natural agencies. To this end many of the experiments of the past summer were directed, with the result that a practical solution of this important question has been presented in another report.

Reports. — In addition to this report, which covers in a general way the work of the past year, several pamphlets, dealing in a more specific manner with some of the important problems relating to the shellfisheries, are in preparation. It is the aim of these reports to present in concise form the mass of material accumulated in four years' study of the life history and habits of the edible shellfish. The essential object of these experiments, as clearly demonstrated in the reports, has been to provide practical methods for checking the waste of our natural resources and for building up the shellfish industries of the Commonwealth. Inasmuch as the work in question was undertaken for public benefit, and since its fulfillment in a great measure depends upon presenting this knowledge to the people at large, it follows that all the good which might properly result from these labors will be lost if this information is not widely disseminated. It is therefore necessary that ample appropriations be made whereby

these reports can be placed in the hands of every man in whose interests these experiments were undertaken and for whose benefit these papers were designed.

Assistants.— Two permanent assistants were appointed in 1908 to the biological investigation staff. Previous to this time the department of research had been conducted by the biologist, with temporary assistants during the summer months. F. C. Lane, A.B., of Boston University, was appointed assistant biologist, and Mr. Alvah A. Perkins was engaged as assistant. Prof. William G. Vinal of Marshall College was engaged as scientific assistant during the summer. The work of all the assistants was of the highest order and deserving of commendation.

Courtesies. — The commission wishes to express its deep appreciation to Mr. L. D. Baker of Wellfleet for providing suitable laboratory facilities, as well as for many other courtesies. Acknowledgment is also made to Capt. Z. A. Howes of Wellfleet for many valuable suggestions, as well as to the oystermen and quahaugers of Wellfleet for their hearty co-operation and courteous treatment. At Plymouth the commission is indebted to Mr. Frank F. Cole for his kindly oversight of the experimental clam beds.

Location of the Work in 1908.—While still continuing the work at the Monomoy Point laboratory and on the various experimental plots for studying the growth of mollusks along the coast, central headquarters were established for the summer at Wellfleet, which offered abundant opportunities for shellfish investigation. As an important part of the 1908 work consisted in the study of the spawning, life history and growth of the quahaug, it seemed desirable to locate at this place, which has long enjoyed the distinction of being the foremost quahaug fishing town in the State, and whose spacious bay possessed a variety of natural conditions favorable for the investigation of this important shellfish.

The Laboratory at Wellfleet. — Through the kindness of Mr. L. D. Baker the commission was given, free of expense, the privilege of occupying one of the buildings on Commercial Wharf. The largest of the three rooms, an apartment of some 30 by 20 feet, was converted into an excellent laboratory by the erection of suitable tables and benches for microscopy, while the central part of the room was given up to a series of tanks, hatching jars and aquaria, which were supplied with running salt water through a system of galvanized-iron pipes. The laboratory was further equipped with a stove and a sink supplied with running fresh water. In one corner a small office 8 by 10 feet was partitioned off, affording space for desk, filing systems, etc. Adjoining the laboratory were two smaller rooms, which furnished sleeping accommodations for four persons.

Conditions at Wellfleet. — Wellfleet Bay, a body of water some five miles long, fed by three large creeks, offers many interesting problems

in shellfish culture and presents a variety of conditions especially favorable for experimental work. A striking feature is the great difference in tides, the mean rise and fall being over 10 feet, which leaves at low water a large area of tidal flats, in some instances extending over a mile from shore. These flats, except for razor clams and a few scattering quahaugs, are practically devoid of shellfish life. The soft clam is found in only a few localities and nowhere to render digging extremely profitable. On the edges of the flats and in the channels extending far out into deep water quahaugs are found in large, though fast-diminishing quantities. Here in the deep water an extensive quahaug fishery is carried on by the aid of long-handled rakes manipulated from power or sail boats. In the more quiet waters are many oyster grants, which support a prosperous business, while scallops are occasionally found on the flats, but rarely in sufficient quantities to render their capture profitable.

Work at Wellfleet. — The work at Wellfleet during the past year consisted for the most part in a general study of the life history, growth and habits of the quahaug, clam and oyster, an investigation of the food of the edible shellfish, and various minor experiments on the seallop and other forms of marine life. In order to give a comprehensive account of the work it will be necessary to deal with each shellfish separately.

(a) The Oyster.— The main problem which presents itself in dealing with the oyster was a purely practical one, namely, a study of the causes influencing the set in Wellfleet harbor. For years this problem had completely baffled the local oystermen, and many of the planters maintained that the harbor was utterly unadapted for the capture of oyster spat. All were enthusiastic in wishing success to the investigations and co-operating with us in the work. While all the causes influencing oyster set may never be determined, even a partial solution of the difficulty, so as to enable the grower to control the set even to the slightest extent, would be worth thousands of dollars to this community.

In order to attack the problem in as effective a manner as possible in the limited time at our disposal we first made a comprehensive reconnaissance of the harbor to familiarize ourselves with its physical features, such as the configuration of the coast line, the formation of sand bars and flats at low tide, the various currents and eddies, registering their velocity at different times of tide in the apparently favorable localities. While this work was carried on in conjunction with the experiments on quahaugs, as only part of the time could be given to it, we were able in a general way to pick out, from our knowledge of the case as well as from the past experience of the local oystermen, the precise localities where the spat would be most likely to set. Meanwhile, by keeping careful note of the spawning of the oysters in the bay, both by microscopical examination of the oyster

itself and the floating larvæ, taken by means of tow nets of silk bolting cloth, we were able to time our future experiments accordingly. When the ripeness of the spawn and the prevalence of the small fry in the water indicated that the young oysters were ready to set, a series of spat collectors, seventy in number, was immediately put down in the localities most favorable for set. The particular type of collector which seems best adapted to the requirements of the case is simple in construction, consisting of a small heap of shells covered with a strip of galvanized wire netting held in place by stakes at each corner. It was necessary to cover the shells with the wire netting to prevent them from being washed away by the strong currents and scattered over the flats. The results from the use of these collectors were highly successful. Though some were washed completely away and others buried in sand and slime, the practicability of catching oyster spat on a commercial scale in Wellfleet harbor was demonstrated.

In completing the results of our investigations along this line we did not confine our observations to the spat collectors alone but took careful note of the set wherever found on rocks, stakes, shells, etc., along the shore. In this manner the entire set area of the harbor was mapped out in such a way as to show its relative abundance. It is only through observations of this character carried on for a series of years that anything definite will ever be learned of this important problem, and this is but the first step in the Wellfleet problem.

From the work briefly outlined above, as well as from other experiments in the laboratory, fairly accurate conclusions were worked out as to the following points: duration of the spawning season at Wellfleet, areas best adapted for catching set, factors influencing the set, and possibilities of commercial spat collecting. Of course no records covering but a single year, however accurate, can be considered reliable, and it will be necessary to supplement the experiments already made with others in the future before final results are obtainable.

(b) The Quahaug.— The biological survey of 1907 brought out very clearly the important fact that the quahaug industry of the State, worth nearly \$200,000 a year, is seriously threatened by the extinction of the natural supply unless some radical remedy is soon applied. As the result of cultural experiments conducted for the past three years the Fish and Game Commission has advocated putting the quahaug industry on a basis similar to that of the oyster industry. i.e., upon a system of grants leased to private individuals who shall depend to a greater or less extent upon the cultivation of quahaugs for a livelihood. It is not our purpose to discuss this system at any length here. We have already done so in other reports and will continue to do so from time to time. Neither do we advocate in any sense the system of oyster culture of the present day as applying to quahaug

culture, as there are many defects in the former system which should be done away with.

The question of "seed" raises a fundamental difference between quahaug and oyster culture. While it is possible to purchase oyster "seed" in large quantities, it is practically impossible to purchase any quahaug "seed" at all. The capture or raising of small quahaugs, entirely unlike that of the oyster, has never been successfully carried out on a large scale. It follows, then, that however necessary to the welfare of the quahaug industry in this State the inauguration of grants would be, such a system must inevitably fail of complete success unless some practical method can be devised for obtaining large quantities of the "seed." The solution of this problem proved an extremely difficult undertaking, and the result of the summer's work was in many regards extremely unsatisfactory. Knowing that an adult quahaug vields several million eggs in one season, and that under natural conditions most of these perish, we attempted to assist nature at her weakest point of resistance, and accordingly tried hatching experiments both in and out of the laboratory by artificial and natural fertilization, with the aim of confining the young larvæ in aquaria and spawning ponds until they attained adult size. experiments, though productive of much practical experience, failed of their main object, partly through necessary pioneer's mistakes in conducting the work, but mainly through lack of sufficient facilities and by reason that the work did not start until the spawning season was well under way. Under such disadvantageous conditions we do not feel discouraged with the somewhat meager results in this branch of our work. We have learned many things that should prove of material assistance in future endeavors along this line, and the mistakes of the past season need not be repeated. The results of this work have given us considerable information concerning the spawning season and many important points in the early life of the quahaug.

Further experiments on the growth of the quahaug and along the line of quahaug culture were made by planting nearly two hundred small beds along the shores of the harbor, for almost nine miles, under great diversity of environment. Our object was to determine what effect such conditions as current, soil, depth of water, time of exposure, salinity of water, shifting sand, etc., would have on the growth of different-sized quahaugs. In order to properly identify and accurately determine the rate of growth all planted quahaugs were notched with a file, which readily indicates the amount of growth when taken up. In this simple manner we were able to arrive at some interesting conclusions and to compile some useful facts for future reference. Although several of the beds were washed away by strong tides, or buried by shifting sand, the greater part of them gave very gratifying results and were an unqualified success.

- (c) The Clam.— While the main work of the year was in reference to the quahaug and oyster, some attention was given to completing the work on the clam, which had been extensively studied the two previous years. The chief part of this work was the study of the effect of different soils and locations on the growth of the clam, for which purpose about sixty beds were planted in the harbor. Difficulty was first found in procuring a sufficient quantity of seed clams, which were finally procured at Ipswich. The planted clam beds, all on barren flats, did not do particularly well, as shifting sand and cockles destroyed most of them. A few furnished satisfactory records for the amount of time devoted to this work. Wellfleet's barren flats are in part productive, and the causes which prevent restocking furnish abundant material for future experimental work.
- (d) The Scallop. The work on the scallop was confined to clearing up several points in the life history of the animal, and confirming the work of the previous year. For this purpose scallops were brought from Chatham to Wellfleet and kept in wire baskets near the laboratory.

The Biological Survey. — In connection with our experimental work it was a matter of the utmost importance that we have a thorough knowledge of the physical characteristics of Wellfleet Bay, which furnished the field for most of our experiments. It was necessary to learn as much as possible of the natural environment and physical features which influenced the results of our experiments. A well-grounded knowledge of the bay, its tides, currents, eddies, bars, rocks, characteristic soil and various living animals, was of great value in carrying out experiments such as the observations on the formation of oyster set. In this way a fairly complete record of the tidal flats and to some extent the deeper waters of the harbor was kept by means of maps ruled into squares and subsquares, which enabled us to locate exactly the site of any particular experiment and to keep accurate records of the different flats. This same system was also found to be of great use in our work along the Massachusetts coast.

Shellfish Food — Water Analysis. — Observations upon the supply of shellfish food in the sea water at Wellfleet were begun the first of the season. Methods were used whereby the amount of food, which chiefly consists of microscopic plants called diatoms, could be counted in a sample of water with but slight error. By taking a large number of samples in different localities from the water over the shellfish beds it was intended to deduce, if possible, some important facts about the food supply in Massachusetts waters. Eight representative localities were chosen in the bay, and samples taken from these as often as circumstances would permit. For uniformity, the water samples were taken at half tide, with a cylindrical brass cup designed for similar work by Dr. H. F. Moore of the United States Bureau of Fisheries. Observations on the time of tide, direction and force of wind, depth, temperature and salinity of the water, and velocity of current were

made at the time of taking. In spite of considerable work in this line we feel that we have made little more than a beginning. Through the co-operation of the United States Bureau of Fisheries we have been able to greatly improve our system, and next season hope to continue our investigations on a much larger scale.

Work at Monomoy Point.—The laboratory at the Powder Hole, Monomoy Point, was run in connection with the main laboratory at Wellfleet, and although no one was stationed there, frequent visits were made at definite intervals during the summer for the purpose of recording experimental data. As in previous years, the raft, from which were suspended the spat collectors and the growth boxes, was moored in the central part of the Powder Hole on June 15 and taken up November 10, completing three years of growth for the clams and quahaugs which were in the boxes.

- (a) Clams. Several beds in the Powder Hole flat planted in 1905 were taken up, the clams measured, filed and replanted. Various box experiments for growth were conducted on the raft. Data on the amount of spat caught in the collectors were recorded, while detailed observations were made on the effect on the growth of clams of certain physical changes in the flat.
- (b) Quahaugs.— The growth experiments of the previous years were continued both on the flats and in the raft boxes, completing three years' continuous record on the growth of the quahaug in this locality. Records of the spawning and the set were made, as shown by the spat caught in the box collectors on the raft.
- (c) Oysters. The growth experiments in regard to certain points of practical interest were continued by means of planted beds.
- (d) Scallops.—For the third consecutive year observations were made concerning the length of life and growth of the scallop, which confirm the results of the past two seasons. It is, perhaps, of special interest in this connection to show what can be done by the proper transplanting of scallops for the purpose of increasing the future supply in any locality. In the fall of 1906 the commission transplanted from the common flats of Chatham about fifty bushels of "seed" scallops to the Powder Hole. The following summer these spawned, with the result that there was an enormous set of scallops, so thick in the spring of 1908 that a person wading in the water could hardly step without crushing one. Such a heavy set had never before been known in the Powder Hole and undoubtedly was due to the importation of the "spawners."

Coast Work. — Records and observations were made on the clam growth experiments on the flats of Kingston, started by J. R. Stevenson in 1906.

Growth and cultural experiments on the clam in the Essex and Ipswich rivers and in Plum Island Sound were continued.

Growth experiments on clams and quahaugs were started at Barnstable and a partial survey of the flats was made.

Educational Work.—The importance of popularizing and of bringing the results of the investigations on the mollusk fisheries to the attention of the public, and particularly the fishermen, has been realized by the Fish and Game Commission, and in addition to the scientific work it has undertaken this work in three ways.

- (1) Exhibits at Fairs.— Exhibits, illustrating the life histories, growth and habits of the food mollusks, have been made at several county fairs, particularly along the seacoast. In these exhibits it has been the aim of the commission to present to the public practical illustrations of the financial returns and profits resulting from a system of under-water cultivation, such as is advocated by the commission. Exhibits were made at the Boston Food Fair, Lynn Horticultural Society Exhibit, Greenfield Fair, Great Barrington Fair and Barnstable County Fair, and in every instance were a source of great interest. Another year it is hoped to extend the scope of these exhibits, especially in the central and western part of the State, in order to bring before the public the practical side of the sea fisheries.
- (2) School Exhibits.— Several requests from schools in different parts of the State for museum specimens and displays illustrating the life and habits of the different mollusks have been made of the commission, and practically all these requests have been complied with. These displays are designed to facilitate the study of nature and sea life, and at the same time develop an interest among the future men and women of this Commonwealth in the conservation of not alone the shellfisheries, but of all the natural resources of the nation.
- (3) Lectures.—A most popular method of dispersing knowledge concerning the shellfisheries, especially along the seacoast, has been by illustrated lectures before the fishermen of the different towns. In this way the importance of preserving the great wealth of the ocean and the value of the tidal waters of Massachusetts has been brought clearly before the inhabitants of the coast towns. It is hoped that an extensive series of lectures can be given another year in the coast towns.

Investigation not Hatching. — Ever since the commission has been conducting scientific investigations on the mollusks it has been difficult to make people, particularly those in the coast towns, understand the exact nature of the work and its usefulness. The fishermen expect to see the barren flats at once completely stocked with millions of clams, and they are disappointed when nothing was done on so large a scale. They do not consider that such work would demand appropriations a hundred or even a thousand times as great as the small amounts that are given for the preliminary investigation which must precede any hatchery work. It is the investigator's duty to discover the ways and means; that of the hatchery, to put such into practical

execution. The commission can only point out the methods to be employed by those responsible for the successful maintenance of the fisheries.

The Fish and Game Commission v. the Fisherman. - In conclusion it seems advisable to attempt a correction of the mistaken opinions prevalent in some quarters regarding the purpose and value of the experimental work of the Fish and Game Commission. Among the hardy fishing communities of our coasts, inhabited for the most part by men accustomed to dealing with things in a solely practical way, there is perhaps quite logically a tendency to underrate the importance of all scientific research. There is also on the part of many of these worthy people a primitive caution, which leads them to distrust the motives of strangers, and particularly of scientific men. is gratifying to be able to state that this atmosphere of distrust is in great measure wearing away with the progress of time. The people of our coast communities are becoming educated to the value of scientific investigation; they are beginning to see that the government is the trustworthy friend of the common people, and that the commission is working to help them; and they are becoming more and more awake to the fact that the experiments conducted both by State and federal authorities are furnishing them much information of practical value which could be obtained in no other way. With the better establishment of this feeling of mutual understanding and good will, the work of this department cannot fail to be materially improved. When the fisherman joins his practical experience, attained through long years of observation, to that of the scientist, skilled not alone in observation but careful in the interpretation of these observations, both may work with far greater advantage to the benefit of the fishing interests of the Commonwealth.

D. L. BELDING, Biologist.

The Lobster Problem. — The unwise method of dealing with the lobster still continues, partly as a result of "log rolling," and partly as a result of a misconception on the part of many legislators who understood that in voting for the 9-inch bill (chapter 303, Acts of 1907) they were carrying out the recommendations of the commission, when as a matter of fact they were voting for only a part, and for a part which, shorn of the saving restrictions relative to the taking of all adults above 11 inches, is the most unwise and destructive legislation which can be conceived, and a mistaken provision, which has been chiefly responsible for the decline of the lobster supply from Massachusetts waters. It must be noted that instead, as formerly, of sending lobster smacks to the New York market from Provincetown as well as supplying our own local markets, less than 5 per cent. of the mere local supply now comes from Massachusetts waters. The ratio of decline is indicated in the following figures:—

	Yea	R.		Men.	Traps.	Lobsters.	Average per Pot.	Egg Lobsters.	Ratio of Egg-bearing Lobeters to Total Catch.
1890,				479	19,544	1,612,129	82	70,907	1:22
1906,			.	335	21,918	487,332	22	9,378	1:52
1907,1				379	21,342	1,039,886	49	10,348	1:100
1908,			.	349	19,294	1,035,123	54	9,081	1:115

¹ The increase in numbers resulted from a change in the law permitting the catch of lobsters down to 9 inches in length.

The chairman of this commission has persistently and consistently urged the logical advantages of using only the lobsters between 9 and 11 inches long for food, for the following reasons:—

- (1) The public can from such lobsters secure cheaper lobster meat, even if the price of large and of "chicken" lobster is identical; e.g., on a basis of 20 cents per pound in the shell, boiled, lobster meat costs the consumer approximately 90 cents per pound if taken from large lobsters, as compared with less than 70 cents per pound if taken from lobsters from 9 to 11 inches long.
- (2) The meat of the small lobsters is of better quality for eating.
- (3) The small lobsters live longer in transportation, and are more easily handled for marketing.
- (4) By protecting the lobsters which have reached the breeding age, a larger number of eggs would be produced annually. The larger lobsters are the most prolific breeders, and are practically secure from all enemies except man.
- (5) In dealing with all other animals which are of value as food for man, protection to the animals of breeding age has proved to be necessary (e.g., cattle, poultry, etc.), while a certain number of the young animals are used as food. If the supply of young animals is insufficient, more adults are kept

for breeding. This is a logical biological practice, necessitated by natural laws, and must ultimately be applied to the lobster problem.

- (6) A law protecting the adults of both sexes above 11 inches long could be readily enforced by forbidding the use of lobster pots having an entrance ring greater than $3\frac{1}{4}$ inches, inside diameter. The lobster fishermen on the north coast of Prince Edward Island have applied this principle, with most satisfactory results. This automatic protection of the adults of breeding age has resulted in a greatly increased number of lobsters below 11 inches, which ensures a supply best suited to local demands, and increasing returns to the fishermen of that region.
- (7) Such a law would combine all the advantages of (a) a close season (but without limiting the supply or seriously interfering with local market conditions), by essentially making a close season for all lobsters of breeding age, and of (b) the restrictions imposed by the lower-size limit, intended to check the use of lobsters too small to be of economic value for market. Present laws place a premium upon the destruction of the breeders, for the vast majority of lobsters placed upon the market today from Massachusetts waters have not reached the breeding age, or at best have produced in their lifetime less than 20,000 eggs, instead of upwards of 1,000,000 eggs per lobster, which nature has found necessary for the maintenance of this species. That such a practice does not quickly result in complete commercial extinction is due solely to the size of the area inhabited by lobsters, and the difficulties encountered by the fishermen. But the results already evident in the immediate neighborhood of the great markets, i.e., the waters of New Jersey, New York, Connecticut, Rhode Island and Massachusetts, will gradually extend farther north, though doubtless obscured for many years by the specially favorable character of the coasts of Maine, Nova Scotia and Cape Breton for lobster growing, and by the development of practical artificial methods for checking the natural destruction of newly hatched lobsterlings, and rearing these on a commercial scale. But the efficiency even of such practice is directly dependent upon an adequate supply of eggs from the

very best types of mature breeding animals, whereas under present laws we are relentlessly seeking out for destruction the best and largest breeders (together with the immature breeders 9 to 11 inches long), instead of reserving them for maintaining the supply of young.

The fallacious argument that the destruction of lobsters of breeding age is justified by the fact that a 9-inch lobster on the next moult (which may occur within a few hours, or at most within a few months) becomes a 101/2-inch lobster, worth much more money in the market, is as logical as to kill the best breeding hens or cows because they are worth more money than one which is about to attain the breeding age. To be in exact accord with facts, the fishermen, the dealers and the public should be made to realize that with similar rapidity the class of protected breeders above 11 inches (upon which alone the future supply must depend) would be recruited from the 9 to 11 inch The writer has said that one 11-inch lobster is worth for the maintenance of the fishery at least five 9-inch lobsters, but Dr. Herrick states the biological value of the adult in much stronger terms by saying that "in the twelve years" following the beginning of the reproductive age, when the lobster grows from a 9-inch lobster to a 15 or 16-inch animal, the value of one lobster "to the fishery has been increased 800 per cent." There is abundant evidence that there would be a very considerable and probably sufficient number of smaller lobsters which would at one moult pass into the exempt class, and thus become increasingly efficient breeders for the succeeding fifteen to thirty years. The all-important biological fact is that, whereas under the present law every lobster above 9 inches is exposed to capture throughout its life (possibly thirty to forty years), under the suggested law a lobster would be thus exposed during only a relatively brief space (not exceeding two years). There is no question that such efficient protection to the source of the lobster supply and adequate regulation of the fisheries would work hardship to many worthy fishermen, even to driving many out of business. Yet many worthy persons who formerly shot game and song birds or caught trout for market purposes have, as a result of wise and necessary restrictive laws, experienced a somewhat similar deprivation, for the immediate benefit of the public and the ultimate advantage of every individual.

The noteworthy paper by Professor Herrick, presented Nov. 24, 1908, at the recent Conference of the Governors of the New England States, held at Boston, is reprinted for the purpose of ensuring a wider audience to the careful statements of highest authority from the foremost student of the lobster in the world:—

THE PRESERVATION AND PROPAGATION OF THE LOBSTER.

By Dr. Francis H. Herrick, Special Investigator, United States Bureau of Fisheries, Professor of Biology, Adelbert College, Western Reserve University, Cleveland, Ohio.

The problem of preserving or restoring a natural food supply of a nation is sufficiently difficult in itself, though supported by all the knowledge which natural science can supply. If the supporting arm of science is necessary, the co-operation of the people is equally indispensable. Where, as in the present case, the interests of at least five sovereign States are materially involved, how much more difficult do such questions become; and without co-operation how impossible of solution. My first word is therefore one of congratulation to Governor Guild and to all who are responsible for this conference of States. It is the consummation of the desires of every thoughtful citizen and worker in the field and laboratory for the past twenty years. Whether entire agreement can now be reached upon every question, or not, all must agree that the right step has been taken, and we may look to the future for reports of progress that is real, if not for immediate success.

The lobster is easily the king of the crustacean class, and, though neither fish, flesh, fowl nor good red herring, he is excellent eating, and that his tribe may increase is a wish generally felt and often expressed.¹ Unfortunately, for many years past we have watched this race decline, until the goal of commercial extinction, not far remote in the future, seems to await the entire fishery. What is the matter with the lobster?

¹ While the public seems to demand the lobster in ever-increasing quantities, some diversity of opinion naturally occurs. Thus one person recently wrote that he must have at least one lobster a week, no matter what the price; while another expressed the fervent wish that this animal might be exterminated. — wiped completely off the map. — since it had given him so many hours of sorrow and repentance. Such expressions as the last, however, have their brighter side when we reflect upon the diminishing supplies now reaching the markets in many places.

Let us glance very briefly into economic and zoological history, before trying to find the right answer. The lobster has attracted many naturalists and other observers, both in this country and in Europe, especially during the past fifteen years, until it has become the focus of a wide literature, and few marine animals are now so well known. The main biological facts concerning this classical type are well in hand, and excuse can no longer be offered on the ground of ignorance.

White men caught lobsters in Massachusetts Bay for the first time early in the seventeenth century. The Pilgrims and Englishmen who began to flock into the bay colony about the year 1630 were well acquainted with the products of the sea in their old home, and the coast of New England supplied their tables with essentially the same kinds, only in far greater abundance. It is said, indeed, that the Pilgrims began at once to pay their debts, due in England, out of the products of their fisheries.

In the chronicles of those early days the lobster is honored with frequent mention, and the early colonists must have enjoyed to the full both the new and the familiar kinds of American fish, lobsters, crabs and clams, so big, so palatable, so abundant, and so cheap everywhere along this coast. Indeed, one would think there was no need of starvation, with lobsters and the other forms of sea food to be had on every shore. To quote from Mrs. Earle, the minister, Higginson, writing of Salem lobsters, said that many weighed twenty-five pounds apiece, and that "the least boy in the plantation may catch and eat what he will of them." Again, in 1623, when the ship "Anne" brought over many of the families of the earlier Pilgrims, the only feast of welcome which the latter had to offer was a "lobster or a piece of fish without bread or anything else but a cup of spring water."

The Pilgrim lobsters "five or six feet long," ascribed to New York Bay, take us back one hundred years farther, to the time of Olaus Magnus, who wrote that in the Orkneys and the Hebrides these animals were so huge that they could catch a strong swimmer and squeeze him to death in their claws. At this point it will be interesting to observe that in a tabulated list of some fourteen of the biggest lobsters ever captured on the Atlantic coast, and for which authentic weights or measurements have been preserved, the giant among them all weighed 34 pounds, and measured exactly 23¾ inches from spine to tail. All of them are males, and this one was caught off the Atlantic Highlands, New Jersey, in 1897, was kept for a time alive at the Aquarium in New York, and its skeleton may now be seen at the American Museum of Natural History in that city. No doubt the Pilgrims would measure a lobster as some fishermen do now, with the big claws stretched to their fullest extent in front of the head. In

¹ Earle, Alice Morse: "Home Life in Colonial Days," p. 117. New York, 1898.

this condition the actual length of the animal is about doubled, so that the length of our New Jersey record breaker, when distended in this way, would reach nearly four feet, and the Pilgrim six-foot lobsters have been stretched at least two.

In an account of marketing in Boston in 1740 "oysters and lobsters" are mentioned "in course the latter in large size at 3 halfpence each," and this abundance continued for over one hundred years.

To revert at once to modern times, it is not necessary to dwell upon the increase in price to the consumer which has followed the decrease in the supply of this animal. Many no doubt remember when lobsters were sold by the piece, and at a few pennies at that. Five years ago, with a market price of 25 cents per pound, a lobster weighing 3 pounds 9½ ounces cost, at an inland market in New Hampshire, 90 cents. The clear meat of the claws and tail of this animal, which had a fairly hard shell, were found to constitute but 27 per cent. of the whole. This would bring the cost of such meat to 90 cents per pound. Even when every edible part of this animal was saved, which is seldom or never done, the total waste was found to be 45 per cent., and the cost of all edible parts 45 cents per pound. At the present retail prices of from 30 to 35 cents per pound, these estimates would have to be considerably increased.

According to Mr. Richard Rathbun, who was the first to give us a history of the American lobster fisheries, this fishery as a separate industry began towards the close of the eighteenth or the beginning of the nineteenth century, and was first developed on the coast of Massachusetts and in the region of Cape Cod and Boston, some fishing being "done as early as 1810 among the Elizabeth Islands and on the coast of Connecticut." "Strangely enough, this industry was not extended to the coast of Maine, where it subsequently attained its greatest proportions, until about 1840."

The early white men learned many lessons in fishing from the Indians, and doubtless those living upon the coast in the course of time began to supply others more remote, until the Cape Cod region, having become famous, attracted fishermen with their smacks from Connecticut and from other States, and supplied most of the lobsters consumed both in Boston and New York for fifty years, or until the middle of the nineteenth century. As early as 1812, as Mr. Rathbun remarks, the citizens of Provincetown, realizing the danger of exhausting their fishing grounds, succeeded in having a protective law enacted through the State Legislature, apparently the first but not the last of its kind, for legal restrictions, including this statute, have been in force ever since. But this measure was designed to protect the fishermen rather than the lobster, for it was merely declared illegal

¹ "The Fisheries and Fishery Industries of the United States," Vol. II., sect. v, part xxi. Washington, 1887.

for any one not a resident of the Commonwealth to take lobsters from Provincetown without a permit. The laws later enacted proved of little or no avail; by 1880 the period of prosperity had long passed, and few lobsters were then taken from the Cape. Only eight decrepit men were then engaged in the business, and were earning about \$60 apiece. This great local fishery was thus rapidly exhausted by over-fishing, and it has never recuperated.

The history at Cape Cod has been repeated on one and another section of the coast, from Delaware to Maine, and is already well advanced in the greatest lobster fishing grounds of the world, the ocean and gulf coasts of the British Maritime Provinces of Canada, especially of New Brunswick and Nova Scotia, and in Newfoundland.

Every local fishery has either passed through, or is now passing through, the following stages:—

- 1. Period of plenty: lobsters large, abundant, cheap; traps and fishermen few.
- 2. Period of rapid extension: beginning in Canada about 1870, and much earlier in the older fishing regions of New England; greater supplies each year to meet a growing demand; lobsters in fair size and of moderate price.
- 3. Period of real decline, though often interpreted as one of increase: fluctuating yield, with tendency to decline, to prevent which we find a rapid extension of areas fished, multiplication of fishermen, traps and fishing gear or apparatus of all kinds; decrease in size of all lobsters caught, and consequently of those bearing eggs; steadily increasing prices.
- 4. General decrease all along the line, except in price to the consumer, and possibly in that paid the fisherman.

The official statistics for this State and for Canada afford pertinent illustrations of the older and newer phases of this history. Thus, in Massachusetts in 1890, 373 fishermen, working 19,554 traps, caught 1,612,129 lobsters of legal size and 70,909 egg-bearing females, with an average catch per pot of 82. Fifteen years later it required 287 fishermen, working 13,829 traps, to produce about one-quarter the number of lobsters, or 426,471, and less than one-seventh the number of egg-bearing lobsters, or 9,865; while the catch per trap had diminished by nearly two-thirds, and was only 31. No substantial increase followed until 1907, when the legal length was reduced to 9 inches, and this increase was undoubtedly due to the large number of small lobsters caught.

The lobster fisheries of Canada, which next to those of the codfish and salmon are most valuable to the Dominion, have yielded from 1869 to 1906 inclusive, a period of thirty-seven years, a grand total of \$83,291,553. In 1897 the produce of this fishery was 23,721,554 pounds, valued at \$3,485,265. Ten years later, in 1906, the yield had dropped to 10,132,000 pounds, but, though less than one-half as great,

it had nearly the same value, namely, \$3,422,927. Notwithstanding the increased cost to the consumer, even in Canada the total value of the fishery has begun to fall, the product for 1906 being less by half a million dollars than that of 1905.

The lobster grounds of the Atlantic coast were the finest the world has ever produced, a field, according to one estimate, 7,000 miles in length, when measured along the curve of the shores, and extending full 1,300 miles in a straight line from Delaware to Labrador, with a width reaching out to 50 miles or more from the coast. In Canada alone 100,000,000 lobsters have been captured in a single year.

If properly dealt with, it would seem as if this vast natural preserve should have yielded lobsters in abundance and in fair size for generations and even centuries to come. But instead, lean and still leaner years soon followed those of plenty, first in the older and more accessible regions of the fishery, until the decline, which has been watched for more than three decades, has extended to practically every part of this yast area.

The lobster fisheries of the old world, and especially the more important industries of Norway and Great Britain, when they came to be pursued with the system and energy characteristic of modern conditions, have experienced a similar decline, and upon the whole attempts have been made to meet it in a similar way and with the same result. The treatment has been of the symptomatic kind, and the real cause of the difficulty has not been reached. Sweden, indeed, is said to have felt the need of protective measures two hundred years ago, and to have framed the first laws regulating her lobster fishery in 1686. In 1865 the export of lobsters from Norway, to England chiefly, reached nearly 2,000,000 in numbers. Already as early as 1838 protective measures were being vigorously discussed, and it was proposed to establish a gauge-limit of 8 inches; but this was rejected, and a close season (July 15 to September 30, and later extended from July to November) adopted instead. From 1883 to 1887 about 1,000,000 lobsters were captured on the Norwegian coast yearly, having a value of 640,000 francs (\$128,000), a large part of the product being consumed in the interior, and the rest exported alive. While this small fishery has maintained itself better than most, it has probably suffered still greater reduction in recent years, but at this moment the later statistics are not available.

The yield of the lobster fisheries in the British Islands has in some years reached a total of 3,000,000 lobsters, and complaints of a diminishing supply have been loud and frequent. This would be a little over a third more than the returns of the Massachusetts fishery in 1888, with its higher gauge of $10\frac{1}{2}$ inches at that time.

What means have been adopted here and in other parts to check

¹ "Les Pécheries de la Norvége," Exposition Universelle de 1889 à Paris. Bergen, 1889.

the decline of this fishery, so general and so universally acknowledged? The more important restrictive measures enacted at sundry times and in divers places have been as follows: (1) Closed seasons, of various periods in different localities. (2) The legal gauge or length limit: namely: 9 inches in New York, Rhode Island and Connecticut; 1015 inches in Maine and New Hampshire, and in Massachusetts until reduced to 9 inches in 1907; 8 inches in Norway, and England; and 8, 9 and 10½ inches in different districts of Canada; in all cases penalizing the capture and sale of all lobsters under these limits, and legalizing the destruction of all adults above the gauge. (3) "Egglobster" laws, or the prohibition of the destruction of female lobsters carrying their external eggs. In addition to such legislative enactments. efforts of a constructive character have been made as follows: (4) To increase the supply of lobsters in the sea by fry or larvæ artificially hatched and immediately liberated, and, as practised chiefly in Canada. by holding the berried lobsters in large enclosures, called lobster pounds. ponds, preserves or parks, and subsequently setting them free when the young are ready to hatch. (5) By the rearing method lately being introduced of holding the fry artificially hatched, and rearing them until the fourth or fifth stages, when they go to the bottom, and are able to take care of themselves. We cannot at present enter into other legislative channels, such as laws prohibiting the sale of broken or picked-out lobster meat, the operation of canneries, or the construction of gear, however necessary they may be for this fishery. We must devote our attention to those subjects of most vital concern to the fisheries as a whole.

The most important things to consider first are: (2) the legal length limit; and (4) the hatching and immediate liberation of the young, because they are fundamentally related, have been long on trial, and have entailed great expense. That they have had a fair trial and that they have signally failed all must admit.

No doubt there are many who are ready to affirm that the present laws would be good enough, if enforced. Most people are aware that the gauge law has not been rigidly carried out, and that the illegal sale of short lobsters has become a trade of big proportions. I know very well that at many times of the year it is possible to buy short lobsters (said to come from Baltimore) in the markets of Cleveland and of other towns in the great middle west, but nevertheless I cannot share this idea. Both of these measures were bound to fail, and would have failed whether the short lobsters were destroyed or not.

To come back to our question, What is the matter with the lobster, or with our means of fostering it? We have committed a series of grave errors in dealing with this fishery, to the chief of which, the gauge law, the others have been contributory.

First, by legalizing the capture of the large adult animals, above 10½ inches in length, we have destroyed the chief egg-producers, upon

which the race in this animal, as in every other, must depend. Second, as supporting or contributory causes, some of us now, like others in the past, have entertained false ideas upon the biology of this animal, especially (a) upon the value of the eggs or their rate of survival, that is, the ratio between the eggs and the adults which come from them, and (b) of the true significance to the fisheries of the breeding habits, especially in regard to the time and frequency of spawning and the fosterage or carriage of the eggs. Our practices have been neither logical nor consistent, for, while we have overestimated the amount of gold in the egg, we have killed the goose which lays it. We have thought the eggs so valuable that we have been to great trouble and expense in collecting and afterwards hatching them and committing the young to the mercy of the sea, while we have legalized the destruction of the great source of the eggs themselves, — the large producing adults.

This fundamental error of destroying the adult lobster was first clearly pointed out in 1902 by Dr. George W. Field, chairman of the Commissioners on Fisheries and Game in Massachusetts, and who in various reports since has ably advocated a sounder policy, based both on science and common sense, as will appear later in this paper.

Our lobster fishery laws, which date in the main from 1873, are in principle like those which prevail elsewhere, and taken as a whole they illustrate the force of example and tradition, which were established long before the biology of this animal was even approximately understood. The past literature of this crustacean bristles everywhere with these false notions, which are more or less directly and mainly responsible for the enactment and maintenance of the present laws and practices of this fishery.

The legal length limits of 9 and $10\frac{1}{2}$ inches, which sanction the destruction of the big egg-producers, but for these supporting causes, would probably never have been retained, for these causes have led to a diversion of energy in various directions, such as the enactment of closed seasons and the practice of hatching and immediate liberation of the fry.

A closed season for any animal, during which it is made illegal to bunt or fish for it, can only be completely justified and placed upon a scientific basis when it is made to correspond to the breeding season of the species as a whole, and when this season is limited to a relatively small part of the year. Neither of these things is possible in the lobster, since the question is complicated by the fact that this

¹ Field, George W.: "A Report upon the Scientific Basis of the Lobster Industry, the Apparent Causes of its Decline, and suggestions for improving the Lobster Laws." Report of the Commissioners on Fisheries and Game of Massachusetts for 1901. Boston: 1902. Also. "The Biological Basis of Legislation governing the Lobster Industry." Science, N. S., vol. xv. New York, 1902. "The Lobster Fisheries and the Causes of their Decline." Fortieth Annual Report of the Commissioners on Fisheries and Game of Massachusetts. Boston, 1906.

animal spawns but once in two years, so that not more than one-half of the adult females reproduce annually, and these eggs when laid are carried about by the lobsters through nearly an entire year. Closed seasons of this character are therefore not to be recommended, since they serve merely to restrict the total amount of fishing done in the year, and do not touch the root of the difficulty.

The reasoning which has led to the establishment of the gauge limit has been somewhat as follows: lobsters come to breeding age when 9, 10 or 101/2 inches long, and when they spawn they spawn many thousands at a time, which is true. Therefore, by placing the legal gauge at 9 or 101/2 inches we allow this animal to breed at least once before it is sacrificed, which is also true in the main. Ten-inch lobsters lay on an average 10,000 eggs; the lobster, being a good mother to her unhatched progeny, and the best incubator known, will bring most of these eggs to term, and will emit to the sea her young by the tens of thousands. What more is needed to maintain this fishery? The answer is, Vastly more. This race needs eggs not by the tens of thousands merely, but by the tens of billions, and it must have them or perish. Moreover, it can get them only or mainly through the big producers, the destruction of which the present gauge laws have legalized. If the lobster is a good "incubator," the sea is a very poor nursery. We have put a false value upon the egg.

Before proceeding farther in this analysis, we must glance at the most pertinent facts in the biology of the lobster. These facts concern chiefly: (a) the period of maturity of adult lobsters; (b) the number of eggs borne by the females, or the size of the broods; (c) the frequency of spawning; (d) the treatment which these eggs receive, or the habits of spawning lobsters; (e) the habits of the fry or larvæ; and (f) possibly more important than all else, the death rate or the law of survival in the young.

The phrases "egg lobster," "berried lobster," or "lobster in berry," or "lobster with external eggs," are all synonymous, and always mean a female with her cargo of eggs, new or old, attached to the swimming feet under the tail.

- (a) Lobsters do not mature at a uniform age or size, but females produce their first broods when from 7 to 11 inches long, approximately, the difference between these limits representing a period of from two to three years (age of female lobsters at these limits about three and eight years, according to Hadley). Very rarely are eggs laid before the 8-inch stage is reached, and the majority are mature at 10 or 10½ inches, when some have reared more than one brood. Accordingly, by merely reducing the 10½-inch gauge to 9 or 8 inches we rob the animal of the very meager protection which it now enjoys.
- (b) The number of eggs produced increases with surprising rapidity in proportion to the cube of the length or the total volume of the body, from the very beginning of sexual maturity. The approximate

number of eggs at 8 inches is 5,000; at 10 inches, 10,000; at 12 inches, 20,000; at 14 inches, 40,000; at 16 inches, nearly 60,000; and at 18 inches, nearly 80,000. In the case of 532 10½-inch berried lobsters taken from the waters of this State, the smallest, average and largest number of eggs borne were 5,000, 13,000 and 36,000. The smallest number probably represents a first brood, so that the average berried lobster at this size is probably carrying eggs for the second time. The maximum of production is reached at the 15 to 16 inch stage when some individuals produce nearly 100,000 eggs at one time.

The average 10½-inch berried lobster is from five to seven years old; and assuming that it has borne eggs once before, it has lived to produce 23,000 eggs. On the other hand, an egg-bearer 16 inches in length which according to Hadley's estimate is nearly eighteen years old, has had a succession of eight broods and has produced 210,000 eggs. The larger animal is thus worth nine times as much as the smaller; in other words, in the course of twelve years its value to the fishery has been increased 800 per cent.

Again, it should be noted that it is the class of small adults up to, but not including the 9 or $10\frac{1}{2}$ -inch animals, those which produce by the fives or tens of thousands, upon which we have relied to maintain the race, while it is the class of big animals which produce the fifty and the hundred thousands which has been nearly wiped out.

It may be added here that the male lobster matures as early as the female, and possibly earlier; and that the female may be impregnated at any time, and by more than one male. The sperm is received into a peculiar pouch or seminal receptacle on the under side of the body of the female, between the third pair of walking legs. The sperm has great vitality, and will endure in this condition for months and possibly for years.

- (c) There is a definite spawning period for the majority of adults, ranging on this coast from July 15 to August 15, and averaging two weeks later in northern Maine. A relatively small per cent. lay their eggs in fall and winter.
- (d) It is a fact, though frequently denied, that the lobster lays her eggs, as already stated, but once in two years (though rare exceptions to this rule may be looked for), and not annually, as was formerly supposed. This was first proved by the anatomy and growth of the reproductive organs, and was confirmed by the statistics of the fisheries and by experiments conducted on a large scale by Appelöf at the fisheries station at Stavanger, Norway, in 1899.
 - (e) The eggs are not deposited on sand or trusted to the mercy

¹ Herrick, Francis H.: "The American Lobster; a Study of its Habits and Development," Bulletin of the United States Fish Commission for 1895, pp. 70, 246 (description Fig. 138). Washington, 1895. Also, "The Reproductive Period in the Lobster," Bulletin of the United States Fish Commission for 1901, pp. 161-166. Washington, 1902.

² Appelof, A.: "Mittheilungen aus der Lebensweise des Hummers." Mittheil. des Deutschen Seefischerei-Vereins. Bd. 15, s. 99. Berlin, 1899.

of the sea, but are carried attached to the under side of the tail, and admirably guarded by parental instinct for nearly a year, or until they are hatched ten or eleven months later.

It may be also added that lobsters move from deeper water towards the shores in spring, and return to deeper water in fall. The laying of the new eggs and hatching of the old, followed by a moult or casting off of the shell, takes place, as a rule, in warming, but not necessarily in very shallow, water. There is no general coastwise migration, nor do all execute the same movements to and from the shore.

Ignorance of the fact that there is a definite spawning period, that the eggs are laid but once in two years, and that they are subsequently carried for ten months, to hatch in June or July following the summer when laid, is responsible, in considerable measure, for erroneous ideas regarding the efficacy of closed seasons, laws protecting the berried lobster, and other matters of legislation, the effects of which have not yet worn away.

(f) The fry or young, when hatched, rise to the surface or towards it, and lead a free-swimming life for three weeks, hardly larger than a mosquito (being a little over one-third of an inch long), and infinitely more harmless, translucent, brilliant in reds and blues, and quite helpless in the presence of all but the minute animals upon which they prey. They perish by the thousands quickly before the storm and the countless fish and other enemies which they meet in their varied movements, and which do not disdain small fry.

At the third moult, or the fourth, counting that passed at the time of hatching, with what seems like a sudden leap and bound, they are transformed into the fourth or the lobsterling stage, which really looks like a little lobster. The six pairs of flexible oars at the sides of the body have been cast off, and permanent swimming feet have appeared under the tail. There is a new armor or shell, resplendent in reds, greens and browns, and a brand new equipment of instincts and other powers. For the first time it knows fear, and in either this or in the fifth stage which follows it goes to the bottom, hides under stones, burrows in the sand and shows an ability to protect itself. The most critical period of infancy being now past, one lobster at this stage is worth many thousands in the first. Therefore, our efforts, to be of real avail, should not end with the hatching and immediate liberation of the fry; we should rear them to the bottom-seeking stage.

(g) What is the death rate or the rate of survival in the lobster? Upon the answer to this question hinges the gauge or legal length law, as well as the expensive practice of hatching and turning loose the young, which has been pursued in this country and Canada for many years (since 1886 in the United States and since 1891 in Canada).

As was pointed out ten years ago, too many fish culturists have been content to turn out so many thousands or millions of eggs of lobsters and fish, and confidently expect results, to the neglect of the most important question of the whole business,—the rate of survival in the young set free, or the number of adults which can be raised from them, the very end for which all the time, trouble and money have been expended.

In the popular mind, an egg is an egg, like that of the fowl which we eat for breakfast. An egg really represents opportunity or chance to survive, and its biological value to the race depends upon the law or rate of survival, which was definitely fixed in nature before the advent of man with his traps and hatching jars, and differs in every species of animal and plant known. When the gauntlet of life is long and hazardous, especially in infancy, nature, as in the present case, multiplies the chances or multiplies the eggs. Many eggs always means death, under natural conditions, to all but a remnant of the host. The number of eggs alone serves as a rough gauge to determine the rate of survival.

At one end of the scale stand the birds and mammals, with few eggs and the highest life rate known, secured by guarding and parental instincts, with big yolks and rapid development in one case and the special conditions of fetal life in the other. At the other extreme we find a parasite like the tapeworm, where the conditions of early life are so unpromising—since it must run a long hazard of chances, and be eaten by two distinct vertebrates—that its eggs are required by the hundreds of millions or even billions. The lobster needs more eggs than the trout, and of smaller size, but far less than the edible blue crab, which sometimes carries five millions of eggs attached to its body. Each one of these is smaller than the dot over the letter i of ordinary print, and it must pass a long and dangerous larval period before reaching maturity.

What, then, is the life rate or rate of survival in the lobster? Probably not more than 2 in 30,000, and certainly not more than 2 in 10,000. This number would be exactly known, provided we knew the proportion of the sexes or the proportion of the total number of males to the total number of females, and the average number of eggs laid by mature females during their entire life.

Since the sexes are about equal numerically, it is only necessary, to maintain the species at an equilibrium, for each pair of adults or for each adult female to leave two children which attain adult age, whatever the actual length of life in either generation. If the adult progeny exceeds two, the race will increase; if less than two, it will

¹ Herrick, Francis H.: "Protection of the Lobster Fishery," Bulletin of the United States Fish Commission for 1897, p. 221. Washington, 1898.

diminish. Since under present conditions the race of this animal is falling off, the actual rate of survival for the individual having remained the same, the total number of survivals only has changed. In other words, there is at present a deficiency of eggs.

What is the average number of eggs for the entire life of this animal? We know the minimal and maximal limits of egg production in individuals (roughly, 3,000 and 100,000); we know the average number of eggs borne at the average age of maturity (at the 10-inch size, 10,000 eggs); but, as Allen, in discussing this question, points out, we do not know the number of female lobsters destroyed at different ages. Many after laying their first eggs are killed before any young are allowed to hatch, and the number which survive to produce successive broods is a constantly diminishing one; but this is made good in part by the rapid increase in the number of eggs.

The average number of eggs borne by all the berried lobsters captured should give us an indication of the average number of eggs borne by all female lobsters during life, — the number sought. 4,645 egg lobsters from the Woods Hole region, Massachusetts, the average number of eggs was 32,000, which would correspond to a 13 or 13½-inch lobster which had produced three or more broods. Allen found the number of eggs borne by 96,098 lobsters caught in Newfoundland to be 2,247,908,000, which would give an average of 23,000 to each female. This number corresponds to an animal 12 or 121/2 inches long, which, as he remarks, from the known average age at which female lobsters mature (10-10½ inches), would be carrying at least a second brood. Such a lobster must therefore have produced 13,000 eggs (the average product at 10½ inches) plus 23,000, or at least 36,000 in all. We are therefore right in concluding that the maximum rate of survival of 2 in 10,000, formerly given, was much too high, as it was known to be at the time, and that the proportion of 2 to 30,000 is much nearer the truth. Another estimate, by Meek, based upon the statistics of the fisheries of Northumberland, Eng., gives a life rate of 1 in 38,000.

If it is then true, as we are thoroughly convinced that it is, that the normal rate of survival in the lobster is not greater than 2 in 30,000 or 1 in 15,000 (and it cannot be greater than 2 in 10,000), the fact is big for the lobster fishery, and the sooner it is faced the better. It has a direct bearing upon our laws and fishery operations. It enables us to truly evaluate the egg and the egg lobster. It shows in a conclusive manner that the present gauge laws are indefensible, because they rob the fishery of the billions of eggs necessary to maintain it. It further shows that the method of hatching the eggs of this

¹ Allen, E. J.: "The Reproduction of the Lobster," Journal Marine Biological Association, Vol. iv. (N. S.). Plymouth, 1895-97.

¹ Meek, A.: "The Crab and Lobster Fisheries of Northumberland." Report for 1904. Newcastle-upon-Tyne, 1904.

animal and immediately liberating its young is ineffective, because of the meager results which can come from it. On the other hand, it speaks loudly in favor of a law to protect the large egg producers, and of the newer plan of rearing the young to the bottom-seeking stage, as the only means by which pisciculture can hope to materially aid this fishery.

The importance of the law of survival to the operations of the fisheries, and especially in its bearing upon some of our present illogical laws, is the only excuse for dwelling upon it at this length. illustrate further, - with respect to period of maturity and value to the fishery, all lobsters in the sea may be divided into three classes: (1) the young and adolescents, mainly from egg or larva, to the 8-inch stage; (2) intermediate class of adolescents and adults, 8 or 9 to 10½ inches in length; and (3) large adults, mainly above 10½ inches long. The biological value of the individual increases with every stage from egg to adult of largest size, and therefore is greatest in class 3. The present laws sanction the destruction of class 3, but class 1, the beginning of the series, must, as we have seen, be mainly recruited from this class, or from those animals which under present conditions are being wiped out. In other words, our policy shifts the duty of maintaining the race upon the small producers, which the law of survival plainly tells us it is unable to bear. There is no way of getting over this grave defect.

We speak of the "living chain" from egg to adult, but the metaphor is not a happy one. There is no "chain" relation in living nature, only a succession of individuals, of individual eggs, united in origin but discrete in each generation. The embryologist begins with the egg, but the fish culturist with the egg producer. Spare the egg producer, then, and nature will save the race. We cannot wholly take the place of nature in dealing with the eggs, but we can defeat the ends of nature by killing the "bird" which lays them.

But, do you say, "We have the egg lobster law, and the protection of lobsters in spawn should remedy our difficulties"? In reply, we have but to recall the fact that adults lay their eggs but once in two years, and consequently we should not expect to find more than one-half of this class with spawn attached to the body at any given time. This at once reduces the protection aimed at in the egg lobster law by one-half. The other half shrinks to small proportions when we consider that there is an overlap of four weeks in July between the climax of the periods of hatching and spawning, when the majority of all adult female lobsters are without eggs of any kind, and also when we further consider the ease with which a fisherman by a few strokes of the hand can make a berried lobster eggless.

When analyzed in the light of the law of survival, the showing of the lobster hatcheries is not very encouraging. The hatching and immediate liberation of the fry has been practised for many years in Europe, where experiments were made in Norway as early as 1873, as well as in Canada and the United States. The whole number of fry hatched and liberated on the Atlantic coast for a period of ten years, according to official returns from the hatcheries of the United States, Canada and Newfoundland, reached a grand total of 4,214,778,200. Applying the law of survival, with life rate of 2 in 30,000, which has been shown to be a fair allowance, this number of young would yield only 280,985, while there must have been captured on this coast in the same period nearly 1,000,000,000 lobsters. By applying the maximum rate of 2 in 10,000, which we are assured is far too large, the yield would be 842,955. To have held the fishery at an equilibrium by this means, there should have been hatched 5,000,000,000,000,000 young, or 1,250 times as many as were actually liberated.

To take another example, the total output of all the Canadian lobster hatcheries, for the entire history of this fishery, 1880 to 1906, was as follows:—

Bay View, N. S., 1891-1906, .					1,889,300,000
Canso, N. S., 1905-1906,					79,000,000
Shemogue, N. B., 1903-1906, .					291,000,000
Shippegan, N. B., 1904-1906, .					220,000,000
Charlottetown and Dunk R., P.	E. I.,	1880-	-1906,		256,085,000
					2 735 385 000

Again, allowing the maximum rate of 1 in 5,000, this product of the activity of twenty-four years would yield only 547,077 lobsters, or but little over the two-hundredth part of the numbers caught in certain years in Canada alone.

Such illustrations should make us pause to consider whether we have rightly evaluated the egg and the young in this animal. They show the hopelessness of restoring or of even maintaining this fishery by such a method when conducted on any possible scale.

In cases of this kind it is as detrimental to overestimate the value of the egg as to undervalue it. The eggs are true gold, although the amount which each weighs is infinitesimal. Like drops of water and grains of sand, these eggs count for but little singly, but in mass the inanimate particles can make the oceans and the continents, while the living germs can fill them with teeming inhabitants.

We cannot work on the colossal scale of nature in dealing with egg or larva, but we may frustrate nature by destroying the egg producers. Nature long ago provided for the cod, the shark and hundreds of other predaceous fishes; she took into account the tides, the storm and the rock-ribbed coast also, by giving to this race billions of eggs each year;

No hatchery operations apparently having been conducted in the years 1888 to 1890, inclusive.

but no provision was made for millions of traps working night and day at the bottom of the sea to destroy the producers of these eggs.

The method of rearing the young through their critical larval or pelagic period, until they finally go to the bottom in the fourth or fifth stages, promises to materially aid this fishery. Some efforts were made in this direction by MM. Gullion and Coste' at Concarneau, France, as early as 1865, when the necessity of rearing the little lobster through its dangerous period of infancy was as clearly understood as now; but, though heralded with enthusiastic reports, little real advance seems to have been made.

In the years 1873 to 1875 experiments in the hatching and rearing of lobsters were again undertaken by several gentlemen at Stavanger, Norway,² both independently and with the aid of the Royal Society for furthering the Industries of Norway. According to the reports of Professors Rasch and G. O. Sars, they were eminently successful; many young lobsters were carried to the ambulatory or bottom-seeking stage, the necessity of which was duly emphasized, and incidentally important facts on the natural history of the lobster were brought to light. Again, whatever progress was made at the time, the work was not systematically continued.

In 1883 Saville Kent* contributed a paper on "The Artificial Culture of Lobsters," which later appeared in the proceedings of the International Fisheries Exhibition at London for that year. He contended that the chief cause of the decline in the lobster fisheries was the destruction of the lobster eggs, and that it should be combated by artificial propagation. As a result of experiments, he strongly advised paying a bounty for the egg lobster, hatching the eggs and rearing the young to the ambulatory stage before liberation.

Still later, in 1885, Captain Dannevig⁴ also succeeded in hatching the eggs of the lobster and in rearing the young through the first three earliest stages, at Flodevig, Norway. He did not consider it of much service to hatch the eggs and to immediately set free the young; and he rightly said that, so great was the destruction in nature from storms and other causes, out of the 25,000 or 30,000 eggs which a lobster might produce, not a single one might reach its full development.

This work gave the first impetus to lobster culture in this country, where the hatching of eggs was accomplished in the summer of the

¹ Mocquin-Tandon, O., and Soubeiran, J. L.: "Établissements du Pisciculture de Concameau et de Port-de-Bonc." Bull. de la Soc. d'Acclimatation, 2d. Sér. T. II. Paris, 1865

² Rathbun, Richard (reported by): "The Fisheries and Fishery Industries of the United States," sect. v., Vol. II., pt. xxi., pp. 736-738. Washington, 1887.

³ Kent, W. Saville: "On the Artificial Culture of Lobsters," International Fisheries Exhibition, London, 1883, pp. 1-24. London, 1883.

^{*} Raveret-Wattel: "L'Aquiculture Marine en Norvége," Revue Sc. Nat. Appliquées, T. 37. Paris, 1890.

same year (1885) at the newly opened laboratory of the United States Fish Commission, at Woods Hole, Mass., as reported by Mr. Rathbun.'

In 1894 we urged the importance of finding a means of rearing the young through the free-swimming stages, and thereby reducing the terrible death rate which inevitably occurs under natural conditions. As we then remarked: "If we could save 100 instead of 2 out of every 10,000 hatched, every million young would produce 10,000 adults, and every billion would yield 10,000,000 lobsters, capable of reproduction."

While results somewhat similar to those outlined above have been obtained in England and in other parts of Europe, signal success in providing the young with a proper food supply and in maintaining them in a healthy condition up to the lobsterling stage has only been obtained in recent years in this country through the admirable work of Messrs. Bumpus³ and Mead⁴ and their associates. These experiments were begun under the auspices of the United States Fish Commission, at Woods Hole, Mass., in 1890, and were continued at other points on the coast, and especially at Wickford, R. I., where, under the direction of Professor Mead and of the Commissioners of Inland Fisheries of Rhode Island, the most efficient apparatus yet devised for the culture of lobsters has been gradually perfected and installed.

Given a water supply which has been found by experiment to offer favorable conditions for the growth of lobster larvæ, and a suitable food supply, such as minced clams, the apparatus mechanically aerates the water, and at the same time holds both the lobsters and their food in suspension in the water with little detriment to the larvæ themselves. Some experiments have been lately conducted by the United States Bureau of Fisheries at Boothbay Harbor, Me.

At an early stage in his work Professor Mead found that in no case was the number of lobsters reared to the fourth stage less than 16 per cent. of the total number of fry placed in the brood chambers (scrim bags, or wooden boxes, as now in use). The ratio of survival may even exceed 50 per cent. In 1901, between 9,000 and 10,000 lobsterlings were thus reared at the Wickford station to the bottom-seeking stage; in 1908, between 300,000 and 400,000 fourth or fifth stage lobsters were reared and distributed on the coast.

The rate of survival of the larvæ up to the ambulatory stage is not

¹ Rathbun, Richard: "Notes on Lobster Culture," Bulletin of the United States Fish Commission, Vol. VI., p. 18. Washington, 1886.

² Herrick, Francis H.: "The Habits and Development of the Lobster, and their Bearing upon its Artificial Propagation." Bulletin of the United States Fish Commission for 1893. p. 86. Washington, 1894.

³ Bumpus, H. C.: "The Results attending the Experiments in Lobster Culture made by the United States Commission of Fish and Fisheries." Science, N. S., vol. 14, pp. 1013-1015. New York, 1901.

⁴ Mead, A. D.: "Experiments in Lobster Culture." Thirty-fourth Annual Report of the Commissioners of Inland Fisheries of Rhode Island for 1904. Providence, 1904. (See also later papers published in reports of the same commission for 1901 to 1903.)

known, but it is certainly not greater than 1 in several thousand, or a small fraction of 1 per cent.

Instead of striving to work on the vast scale of nature in dealing with the egg, this is an attempt to improve upon nature by lowering the death rate in the most critical period. Great care, however, is needed at every stage of the process, and especially at the last, since the young do not seek the bottom at a uniform time.

Had it been our attempt to destroy this animal, could we have acted more effectively than by destroying its great egg-producing class? When we attempt to rid this country of the English or house sparrow, will it help greatly to break its eggs and destroy its young ones, though so relatively few and with a far higher life rate than in the crustacean? Must we not eventually kill the producers of the eggs, if we would be rid of the pest? This is the nature of the treatment which the lobster has received. If we would preserve this fishery, we must reverse our laws, as Dr. Field has ably pointed out, and follow the principles and practice of breeders of domestic animals everywhere: use the smaller and better animals for food, and keep the older, and in this case by far the most valuable, for propagation.

To apply the principles already discussed, I would make the following recommendations:—

- 1. Adopt a double gauge or length limit, placing in a perpetual close season or protected class all below and all above these limits. Place the legal bar so as to embrace the average period of sexual maturity, and thus to include what we have called the intermediate class of adolescents, or smaller adults. These limits should be approximately 9 inches and 11 inches, inclusive, thus legalizing the destruction of lobsters from 9 to 11 inches long only, when measured alive. In this way we protect the young as well as the larger adults, upon which we depend for a continuous supply of eggs. The precise terms of these limits are not so vital, provided we preserve the principle of protecting the larger adults.
- 2. Protect the "berried" lobster on principle, and pay a bounty for it, as is now done, whether the law is evaded or not, and use its eggs for constructive work, or for experimental purposes with such work in view.
- 3. Abolish the present close season; let the fishing extend throughout the year.
- 4. Wherever possible, adopt the plan of rearing the young to the bottom-seeking stage before liberation, or co-operate with the United States Bureau of Fisheries or with sister States to this end.
 - 5. License every lobster fisherman, and adopt a standard trap or

¹ This recommendation has been re-cast and made more explicit in regard to the adoption of a standard trap with entrance rings of specified diameter, in accordance with a suggestion made by Governor Guild; and the subject of licensing the fishermen, which is herein included, was suggested by a recommendation made at the conference by Mayor Herrick of Portsmouth, N. H.

pot which shall work automatically, so far as possible, in favor of upique Sio double gauge, the entrance rings being of such a diameter as to exc 'station all lobsters above the gauge, and the slats of the trap of such a 'upiquital tance apart as to permit the under-sized animals to escape. Since jo is dimensions should be determined by careful experiments, based upits sufficiently those already made by Dr. Field.

Many objections can be raised, but this plan is defensible on sc and total tific grounds, while the older methods are not. The best thing who can be said of it is, that it would eventually give us more eggs, and in an ever-increasing quantity,—the greatest need of this fishery, both now and in the future. Under present conditions, the supply of eggs is yearly diminishing, and at a tremendous rate.

The most striking objection to the proposed changes would be that if class 3, that of the big producers, has been nearly exterminated, and we proceed to wipe out class 2, the smaller adults, there will soon be no more lobsters; but this is not valid. No doubt if this change were made, the supply of smaller lobsters would be temporarily increased where the 10½-inch gauge law still prevails, as was the case in this State in 1907 when the 9-inch law went into effect; and this might be followed by a temporary stringency. No one can speak with positive assurance upon this subject, but the important point to bear in mind is, that under such an arrangement we would have a perpetually protected class constantly growing, and at work all the time.

Again, it may be asked, Will enough lobsters survive to enter the exempt class? We believe that there would, and that the answer to this question is to be found in the records of catches for every locality where lobsters are now trapped. Even in places where the average size is small, larger lobsters occasionally appear, and in sizes showing more than one year's growth. Why were not all such animals weeded out the previous year? Instead of waiting to be caught up in the end, these "escapes" would all enter the protected growing class, to enjoy a green old age of fifty years and possibly more; but we have no positive knowledge of the life span in this interesting race.

The trouble of a double gauge, such expense as would be needed in adjusting traps to admit and hold lobsters of the legal size, would have to be met, and it would be well worth while. In our opinion, the markets would not be seriously disturbed. Protect the big egg producers, and nature will preserve the race.

Collection and Purchase of Lobsters with Eggs attached. — Acting under the provisions of chapter 408, Acts of 1904, the launch "Egret" purchased from the fishermen 2912 lobsters, weighing 6.2791/4 pounds, at an average price of 20 cents per pound; and, in addition, 261 lobsters above 12 inches long at 40 cents each and 91 below 12 inches long at 25 cents each.

Of these lobsters, 197 were sent to the hatchery of the United

States Bureau of Fisheries, at Woods Hole; 378 were sent to the United States Bureau of Fisheries station, at Gloucester; 2,337 were liberated off shore; of these, 49 were recaptured by fishermen; 47 were therefore purchased twice, and 2 three times, as indicated by punch marks in edge of the shell on the tail.

Deputy Mecarta purchased from fishermen at Chatham and East Orleans 1,254 lobsters, weighing 4,314½ pounds, at an average price of 14 cents per pound. All of these lobsters were liberated off shore.

The total number of egg-bearing lobsters purchased from the fishermen in 1908 was 4,518, and of these nearly 87 per cent were liberated and the eggs therefore hatched in the sea under natural conditions.

Table showing Measurements of Egg-bearing Lobsters collected by the Commissioners on Fisheries and Game during the Years 1906, 1907 and 1908.

Size in inches).	Number.	Size (in inches).	Number.	Size (in inches).	Number.	Size (in inches).	Number
7%	1.	101/2	658	131/4	817	16	67
8	1	10%	889	181/2	499	161/4	6
81/4	1	11	987	13%	205	161/2	17
81/2	1	111/4	870	14	483	16%	3
8%	3	111/2	746	141/4	76	17	14
9	16	11%	438	141/2	169	171/2	5
91/4	12	12	212	14%	48	17%	1
91/2	69	121/4	1,135	15	158	. 18	4
9%	58	121/2	1,048	151/4	11	181/4	2
10	217	12%	628	151/2	-54	191/4	1
101/4	86	13	1,114	15%	10		
Total,							10,325

DEPARTMENT OF COMMERCE AND LABOR, BUREAU OF FISHERIES, GLOUCESTER, MASS., June 5, 1909.

Commissioners on Fisheries and Game, Room 158, State House, Boston,
Mass.

Gentlemen: — I submit herewith a brief report of the lobster work accomplished at Gloucester, Mass., station during the season of 1908.

During the season of 1908, 1,283 egg-bearing lobsters were received at this station, of which 419 were collected in the fall of 1907 and

held in live-cars till the following spring, and 864 were collected during the spring months.

The total yield of eggs for the season amounted to 14,495,000, from which were obtained 12,760,000 fry, which were distributed in Massachusetts waters.

The experiment of holding egg lobsters in live-cars through the winter months did not prove a success, as only 122, or 29.1 per cent., were taken out alive in the spring. This severe loss was probably due to overcrowding the lobsters while waiting for a larger car to be constructed.

Of the total egg lobsters received, 507 were furnished by the Massachusetts commission.

Respectfully,

C. G. Corliss, Superintendent.

Statement of Fish and Eggs distributed from Gloucester, Mass., Station for Season of 1908.

[Species, lobster; age, fry.]

DATE.	To whom delivered.	Address or Point of Deposit.	Water stocked.	Number.				
1908.								
June 11,	Bureau of Fisheries, con- signment.	Manchester, Mass.,	Massachusetts Bay,	600,000				
18,	Bureau of Fisheries, con-	Gloucester, Mass.,	Massachusetts Bay,	420,000				
16,	Bureau of Fisheries, con-	Salem, Mass., .	Massachusetts Bay,	1,000,000				
18,	Bureau of Fisheries, con-	Gloucester, Mass.,	Ipswich Bay,	480,000				
20,	signment. Bureau of Fisheries, con-	Rockport, Mass., .	Lobiolly Cove, .	360,000				
20,	signment. Bureau of Fisheries, con-	Rockport, Mass., .	Ipswich Bay,	900,000				
22,	signment. Bureau of Fisheries, con-	Beverly, Mass.,	Massachusetts Bay,	450,000				
22,	signment. Bureau of Fisheries, con-	Manchester, Mass.,	Massachusetts Bay,	450,000				
•	signment.]					
24,	Launch "Egret,"	Nahant, Mass., .	Massachusetts Bay,	500,000				
24,	Launch "Egret,"	Boston, Mass., .	Massachusetts Bay,	1,000,000				
27,	Launch "Egret,"	Boston, Mass., .	Massachusetts Bay,	1,300,000				
30,	Launch "Egret,"	Cohasset, Mass., .	Massachusetts Bay,	700,000				
30,	Launch "Egret,"	Scituate, Mass., .	Massachusetts Bay,	800,000				
July 3,	Launch "Egret,"	Nahant, Mass., .	Massachusetts Bay,	800,000				
6,	Bureau of Fisheries, con-	Gloucester, Mass.,	Massachusetts Bay,	500,000				
8,	algument. Launch "Egret,"	Swampscott, Mass.,	Massachusetts Bay,	560,000				
11,	Bureau of Fisheries, con-	Rockport, Mass., .	Ipswich Bay,	240,000				
15,	signment. Bureau of Fisheries, con-	Rockport, Mass., .	Ipswich Bay,	450,000				
18,	signment. Bureau of Fisheries, con-	Gloucester, Mass.,	Ipswich Bay,	480,000				
20,	signment. Bureau of Fisheries, con-	Gloucester, Mass.,	-	240,000				
-	signment.		1					
23,	Bureau of Fisheries, con- signment.	Gloucester, Mass.,	Massachusetts Bay,	320,000				
25,	Bureau of Fisheries, con-	Gloucester, Mass.,	Massachusetts Bay,	160,000				
28,	Bureau of Fisheries, con- signment.	Gloucester, Mass.,	Massachusetts Bay,	50,000				
	Total,			12,760,000				

DEPARTMENT OF COMMERCE AND LABOR, BUREAU OF FISHERIES. WOODS HOLE, Mass., June 12, 1909.

Commissioners on Fisheries and Game, Room 158, State House, Boston.

Mass.

Gentlemen: — In accordance with your request of May 28, 1909, I beg to submit the following brief report of the lobster work done at this station during the season 1908.

The collection of egg-bearing lobsters was begun in October, 1907, and continued into December of the same year; 474 were received during that time; 310, or 65.4 per cent., of these survived the winter and yielded 3,666,000 eggs. Collections were begun again about the middle of May, 1908, and continued during June. Our receipts for the territory adjacent to the station were slightly in excess of those of the previous year, but the yield from the territory north of Cape Cod, which is covered by one of your launches, showed a very marked falling off, the receipts being only about 11.6 per cent. of those of the previous year. A total of 23,337,000 eggs were received, and from these, 18,419,000 fry were hatched and liberated in Massachusetts waters. These eggs were taken from 2,792 lobsters, 353 of which were furnished by the employees of the Massachusetts commission, the remainder being collected by the force at this station.

Respectfully,

E. F. Locke, Superintendent.

INLAND FISHERIES.

Trout. — We believe that the time will come when the people will demand that certain brooks be acquired by the State, to be set apart and stocked, for the purpose of furnishing healthful and sane recreation for the public. Such a proceeding would be as logical as public parks, gardens, base ball and golf and tennis grounds.

On account of the drought this year enormous quantities of trout were destroyed, not alone in the nursery brooks, but where the large fish were compelled to resort in numbers. As an instance, we quote from the daily report of Deputy Ruberg:—

We drove to Rowe, and found that the people were up in arms because people were catching so many trout out of Pelham Pond. Yesterday, July 8, there were 141 pounds of brook trout brought into Charlemont from that pond, and all were taken with a hook and line. The pond is low, and there is very little water running in; but where the main stream runs into the pond the water is shallow, and the trout run up there, evidently to get at the cool water. The trout lay in this spot just as thick as they can lay, and the men bait their hooks just

enough to cover the law, and hook them out, as they do not seem at all wild. The fish run in weight all the way from $\frac{1}{4}$ of a pound to 2 pounds, and it is a fair estimate that 500 pounds of trout were taken this week up to last night. This pond is an artificial pond, but was never stocked, only as it has stocked itself. We informed the owners that they had only to post for trespass, and it would probably stop this slaughter, as we could not see where there was any violation of the fish laws.

The artificial propagation and distribution of trout has been carried on as usual. The total output from the Sutton hatchery showed a marked increase over any previous year, chiefly as the result of increased experience in dealing with local conditions, and in part due to the construction of new pools and the progressive extension of protection to the young fish.

So much of Superintendent Merrill's report as relates to the propagation of trout follows:—

To the Commissioners on Fisheries and Game.

GENTLEMEN: — I herewith submit a report on the hatching and raising of trout and the work connected with the same.

The eggs collected in 1907 for hatching in the present season amounted to 50,000 from the brown trout and 627,000 from the brook trout,—a substantial increase over the usual number collected for several years, due in part to the new stock of breeders secured in the previous December. These fish, as yearling spawners, gave 216,000 eggs, or an average of nearly 400 for each female spawned.

The brown trout eggs hatched with the usual small percentage of loss, which is less than half the usual loss of brook trout eggs; and the fry were successfully raised in the pools below the dam, passing the summer in that trying water with no appearance of disease among them.

Rainbow trout eggs numbering 15,000 were received from the United States Bureau of Fisheries, and were successfully hatched and reared, growing to large fingerlings in the lakes that were out of use the previous season.

Two hundred thousand of the brook trout eggs were sent to Winchester, and the 427,000 remaining were hatched here, resulting in 375,000 fry.

The quality of the fry has probably not been equalled since the hatchery was established, and as a result the fingerlings raised were of excellent quality and more than double the usual number.

Two of the three things that mainly contributed to this end — the use of outside hatching troughs, and the protection of the hatchery water

supply by collecting it in covered tile drains in place of open ditches—are permanent, and can be expected to aid in more successful hatching each year; but the third and perhaps the most important—the large volume of water flowing from the springs, resulting from the heavy fall rains—is exceptional, and may not occur again in several years.

The flow of water was so abundant as to fill the pipe to the hatchery to its full capacity, and by its more rapid flow to pass through with less reduction of temperature. During the winter it was not noted below 40°, but during the previous winter it frequently fell to 34°. The pipe through its 500 feet of length is not in many places below frost, and a part of its length is laid on the bottom of the pond, where the cooling influence of the surrounding cold water is even greater; consequently, the temperature of the water in its flow in the pipe is always reduced, and in the case of a scanty flow to a point as low as the surrounding influences.

The drought of the present season promises low water for the winter of 1908-09, with the probably accompanying low temperature that will delay the hatching at least three weeks or more. That this is a serious injury to the fish, resulting in a poor lot of fry for the spring distribution and likewise an inferior lot of fingerlings, is established beyond a doubt. The remedy is equally certain, and consists of increasing the number of outside rearing troughs placed at the springs, or, what would be still better, the use of these troughs in a temporary building until a similar permanent arrangement can be made.

The large increase of trout fingerlings was due mainly to the excellent quality of fry, that made it possible to stock the ponds to their full capacity and to carry the fish through the summer without loss. The improvements which have been made in giving the ponds shade and protection have also aided largely.

The sixteen troughs made for hatching were used for rearing, and these yielded 15,000 fish. Pond No. 3, formerly used for rainbow trout, gave 8,000; 9,000 were grown in a new pond built above Pond No. 6. These additional ponds were stocked with fish which had been carried in the outside troughs until the ponds could be made ready, which was much later in the season than they could be carried in the hatchery troughs.

The work on the grounds and houses was curtailed, and only the extension of facilities for raising fry received much attention, this work being mainly the planking of these lower ponds where rock and quicksand made concrete work impracticable. In addition to this was the construction of a new pond with a concrete dam in the old channel of the brook above Pond No. 6; the enlargement of the pool below the main dam, putting in concrete and gravel banks, to receive adult brown trout, so that the pens below could be used for fry; and the partial construction of two concrete pools to such a stage that they could be readily finished for receiving fry in 1909.

The development of the hatchery should continue, as in the past, by making extensions where it can be demonstrated that any extension will not detract from the efficiency of the existing ponds, and by replacing the decaying wooden pens with permanent work of concrete.

There is a probability that the output of fingerlings could be increased by utilizing outlying springs, which are so near that the fish can receive daily attention from the hatchery. The water available for this work would rear 30,000 to 40,000 fingerlings, and the expense involved in making ponds at these springs would be far less than would be required for an equal number of fingerlings on the hatchery grounds.

The hatchery equipment is in a very advanced stage of decay, and measures to remedy it cannot be long delayed, but it would be unwise to merely repair. The hatching troughs are those of forty years ago, and are generally discarded; while the house, from its faulty location, has been a serious handicap in carrying on the work of the station. As originally attempted, the hatching was a virtual failure for a succession of years, and was made tolerable by many costly changes, which have involved seeking the water supply from six different sources and laying three lines of supply pipe, each approximately 500 feet in length. Some of the sills of the building are entirely gone, the floor in part has fallen and rests on the mud beneath, and by steadily settling is constantly throwing the troughs out of level, so that in spite of careful watching the loss of eggs from interrupted circulation of water cannot be wholly prevented. The decay into which the building has fallen makes it a perfect harbor for rats; they enter it at will, and seriously damage the eggs. In the spring they go out to infest the bird pens, requiring continuous warfare through all the year to keep them in check.

The main difficulty which results from the unfortunate location of the hatchery and water supply is retardation of hatching, which causes loss from weakness and disease, and inferior fry for distribution and for stocking the rearing ponds. In addition, the present location and equipment is entirely useless in the season for raising and distributing fingerlings and in handling spawning fish for taking eggs. The more modern equipment in general use at the State and federal hatcheries would be useful equally in hatching eggs and in rearing fingerlings, and also would facilitate counting them into lots for shipping when they are taken from the ponds for that purpose. The fingerlings thus reared could be produced with considerable economy of water, thus largely increasing the output; and the fingerlings, when ready for shipment, would go out in exact lots to each applicant, — something that cannot be done at present, through lack of equipment.

The records kept here show a wide variation in the spawning of the trout. These variations are correlated with changes in the stock. In the years from 1899 to 1901 the stock consisted very largely of a strain

of sea trout from the streams flowing into Buzzards Bay; the average number of eggs per fish increased from 1,000 in 1898 to 1,500 the next year and 1,800 in 1901, but the spawning was very late, the fish yielding heavily in December or late in November. By 1902 this stock was considerably depleted, and was largely replaced with stock grown from the wild trout of Lake Quinsigamond. The fish caught for spawning were unusually fine specimens, ranging in weight from 1 to 5 pounds. The eggs were taken in 1899, and the fish were spawned as two-vearolds in 1902. The spawning was early that year, the fish yielding early in November, but the average number of eggs per fish was reduced to 1,000. The following year the stock was mainly three-year-olds, no two-year-olds having been added, and the average was 1,400, but by 1906 and 1907 it fell to 900. For the present year an increase to 1,000 is shown, the breeders being mainly private hatchery stock, and a further increase may be expected when they spawn as three-year-olds. The vearlings have at all times been spawned and accounted for separately. the fish two years old or more together; and the proportion of two, three and four year olds that have spawned have influenced the yearly averages somewhat, but not so much as to impair the value of the record in indicating the stock of fish best for breeding here.

For the purpose of comparing fry from yearling and from adult fish, and to determine the relative value of eggs from yearling trout for rearing brood stock, fry from adult breeders descended from the Lake Quinsigamond stock and fry from the yearling private hatchery stock were grown in parallel lots, as follows: Lot 1A, old stock fry in rearing tubs; Lot 2A, old stock fry in rearing troughs; Lot 3A, old stock fry in ponds; Lot 1B, yearling fry in rearing tubs; Lot 2B, yearling fry in rearing troughs; Lot 3B, yearling fry in ponds.

The conditions were nearly identical. The fry from adult stock hatched earlier, and, being from larger eggs, had an advantage in size in the beginning; but by midsummer the yearling fry equalled them in size, and by the end of the season showed much superiority in size, condition and numbers. This seems to indicate that the strain of fish developed at the commercial hatcheries are especially adapted to the conditions introduced by domestication, at least so far as relates to rapidity of growth and to earlier maturity. In the two years that these fish have been spawned as yearlings, practically none of the females have failed to develop eggs; while in the old stock a very large proportion did not develop eggs until two years old. This early maturity is of the greatest importance in natural reproduction in streams. Few fish that failed to spawn as yearlings would live to spawn as twoyear-olds; and the smaller fish have a great advantage in effective spawning, as they are able to reach and to spawn in the upper parts of the stream, where the eggs are less liable to be destroyed and the fry have a better chance to live.

The matter of purchasing lands and of improving the road leading to the hatchery grounds is again urged, for the reason that the unpleasant and unsafe conditions incidental to leaving or entering through land that is used as a pasture still continue. Since this was explained and some improvement urged, several years ago, the number of visitors has largely increased, particularly of individuals, parties and schools, seeking information concerning this branch of the State's work. many of these it is very annoying to have to enter the grounds by making detours over wet or bushy land and climbing intervening fences. Additional land is also needed for bird work. During the present season it was found advisable to go outside the grounds, and this will be a necessity in the future. The margin of the strip suggested for the road would fill a part of this need admirably. Further, to control the water supply and protect the timber shading the upper springs, additional lands should be bought. This land, however, would not be of much use in bird work.

The recommendations for increased land and for suggested improvements if carried out would not be entirely sufficient to place the station on a fair basis for carrying on the work to its natural capacity. It would still require many minor improvements to properly economize the time required for routine work. Power is urgently needed for chopping meat. A water wheel or gasoline engine would supply this at a cost less than the annual cost of labor applied to chopping meat by hand. A cooking house is indispensable, but the one in use is the same temporary shed erected six years ago for one summer's use. The ice box was bought nine years ago, at a cost of \$2, and will neither hold nor keep fresh the ordinary supply of meat. The meat house is too small to shelter either the ice box or the cooking facilities. This has made it inexpedient to carry out the small improvements, as these changes would in the aggregate be unnecessarily expensive, and to delay the changes which are reasonable and necessary for a permanent arrangement. The meat house should be replaced with a building of sufficient capacity to shelter power, refrigerator and cooking facilities, including dryers for bird food, as well as the means for preparing fish food. We are certain that the entire cost of these suggested changes would be wiped out within two years by increased economies in administration.

Respectfully submitted,

ARTHUR MERRILL.

Migratory Fish. — After a controversy extending over many years, the passage of alewives up the Nemasket River into Assawompsett Lake is assured by the co-operation of the town officials and the owner of the dam, through the construction of a stone and cement fishway, which closely simulates nature by providing a series of pools under the bridge at Wareham Street, Middleborough.

We desire again to call special attention to the fact that more rational methods of dealing with the shad are immediately necessary, if the supply is to be maintained.

Pollution. — The water courses of the New England States have long been regarded as natural sewers by unwise individuals and corporations. Doubtless there are many special instances where sewage, manufactory wastes and other materials can be commercially disposed of only by such methods. Such instances must have individual consideration, and it would be decidedly unwise to handicap any manufacturing enterprise, however small or large, by compelling the adoption of an expensive method of disposal. On the other hand, in many instances material is permitted to enter, either directly or indirectly, which could be better disposed of on land, resulting not only in most cases in a very considerable and in the aggregate a stupendous loss of nitrogenous substances which are needed for agricultural operations, but also rendering the streams unsuitable for fish life and at length a menace to the public health.

In this connection the following resolution was adopted at the conference of commissioners held in connection with the Conference of Governors for the Conservation of the Resources of the New England States:—

Whereas, In all New England States there exist conditions whereby the public waters are becoming annually more polluted by the introduction of sewage, manufactory wastes, etc., resulting in a distinct menace to the public health and seriously impairing the productive capacity of the water and of the land under the water; and

Whereas, With increasing population these waters and submarine areas are becoming more necessary for the production of human food, both of fish and shellfish, both for local consumption and for sale in distant markets; and

Whereas, A private individual or corporation is not permitted by law to run sewage, manufactory waste, etc., upon the land of his neighbor, similarly it should not be permitted to run these materials into public waters or upon public land; therefore, be it

Resolved, That it is the carefully considered opinion of this conference of delegates, meeting in Boston in this the first annual conference called by the Governors of the New England States, that the

unnecessary pollution of the public streams and coastal waters should be immediately and decisively checked by suitable action of the respective legislatures.

GAME AND INSECTIVOROUS BIRDS.

We are of the opinion that constantly increasing attention to the maintenance by artificial propagation and protection of the native varieties of birds is more essential at present than the introduction of new varieties, such as the Hungarian partridge, the migratory quail, the capercailzie and "black game." Massachusetts is favored above practically all the States east of the Mississippi, from the fact that it has possibilities of maintaining in relative abundance the three most notable species of game birds, - the quail, ruffed grouse and pinnated grouse. ruffed and pinnated grouse find here no difficulties connected with climatic conditions, and the problem is solely their relation to man and conditions introduced by human agencies. With quail, however, the question is further complicated by the fact that, while the quail are fitted by nature to withstand any degree of cold, they are especially subject to the ill effects of the sleet storms of New England.

Of the unfavorable conditions introduced by man, the destruction of covers and breeding places will doubtless be remedied by the results of reforestation, and by that increase of orchards and of grain fields which must follow the increase of population in Massachusetts and the incidental increased demands for fruit and grain. The most serious problems (which, however, are fortunately within the control of man) are the destructive effects of the increased number of cats, rats, mice, squirrels and English sparrows, together with certain infectious diseases, both of plant and animal nature; for example, various types of bacilli which cause infectious intestinal diseases in birds. and several species of animal parasites, notably coccidia of various species. Of all these diseases as yet practically nothing is known as to the life histories of the organisms, what species are liable to infection, the manner of infection and the remedies. It is known, however, that these diseases are spread by domestic fowl, by the English sparrow and certain other species of wild and domesticated birds. They are transported mechanically in dust from hen yards, etc., by the wind, and to a certain extent doubtless by rainfall and water courses. Special knowledge is imperatively demanded if we would check an unnecessary destruction of bird life.

In spite of all these untoward conditions, which can and must be promptly and properly dealt with by man, the covers of Massachusetts are amply able to support a large population of birds, - certainly 50, and possibly 100 or 200 or more grouse to the square mile, and even larger numbers of quail. The development of good roads and the extension of the possibility of travel by automobile and trolley cars make these covers far more accessible than those of any other State in the Union, with the result that a relatively larger number of hunters go afield from the exceptionally large number of cities within our borders, carrying with them the best type of equipment, both in guns and ammunition and in carefully trained dogs. It is, however, possible for the Commonwealth to meet these conditions and provide a suitable remedy. It is a notable fact that the older countries, for example, Germany and England, have passed through a similar condition, and have now a far greater number of birds per square mile than has probably any State in the Union. In other words, the annual bird crop in England, Germany and France is able in a much greater measure than with us to control the insects injurious to vegetation, and to provide a surplus of game birds for food to such an extent even that at least two species of wild plover, in addition to semi-domesticated pheasants and grouse, are exported from these countries to Boston and New York markets, and sold at a price less than that at which our native game is offered. Well-advised and extensive operations for developing our bird population, for the purpose of providing an adequate safeguard against the advances of insect pests, for example, the gypsy moth, cut worms and other noxious insects, are necessary, as well as to maintain an æsthetic asset of the State, and to provide game birds for food and recreation. Action should be taken particularly by enacting such laws as will not alone permit but encourage the rearing of birds of all species under suitable conditions by people who are properly qualified to undertake the work, either for pleasure or profit.

Under our laws as interpreted by the highest courts of the land, the fish, birds and game are the property of the State, but the regulation of their capture is within the police power of the State: further, the fish and birds do not become the property of the person upon whose land they chance to come for the time being. The history of both fish and game legislation has been almost exclusively one of progressively increasing restriction. In spite of all these restrictive laws, wise and otherwise, there has been a constant diminution in the number of species and the number of individuals. Several species have been entirely exterminated, and many species, formerly notable for the extreme number of individuals, have been reduced almost to the verge of extinction. The statement that a public supply is always subject to irrational use is but to repeat a commonplace which has become obvious in the case of marine and fresh-water fishes, of game birds and mammals, as well as of forests and of other public resources of States and nations. Laws restrictive in the minutest detail have not been sufficient to entirely control. Private ownership is absolutely necessary for conservation of at least a part of the supply. In the case of game, private individuals under present laws seek to secure control of fish and game by posting their lands. These people fall into two distinct classes: (1) those seeking exclusive shooting or fishing privileges for themselves, their friends or associates: (2) the other seeking to make sanctuaries where birds may be protected, not alone during the season of propagation, but during their entire lives. On this territory not alone is the shooting of birds prohibited, but suitable nesting places and food supplies are provided. By traps and other devices, the animals which are in any degree destructive to the birds, their nests or eggs, are so far as possible reduced in numbers.

In the case of the first type, the posting of land practically secures individual possession of the fish and game, even though theoretically such practically amounts to conversion of public property, if the owner of the land maintains and uses this public asset for his private use. Such conditions have been dealt with in the case of the public timber, grazing lands, mines and water power; and, while it is true that all private rights to land, mines, etc., were originally derived from and

by the consent of the public, these have always carried, in theory at least, some compensation to the public through direct taxes. It is, therefore, worthy of consideration whether the person who thus posts his land for the purpose of securing to himself or associates exclusive rights of fishing or fowling should not be called upon to pay an adequate tax for this privilege, and whether such reservations should not be made subject to a special tax in addition to the tax placed upon the general public, collected in the ordinary hunting license. over and above the general and special restrictive legislation there must be a considerable amount of constructive legislation, directed to the establishment of the utmost possible number of sanctuaries, or public and private reservations, where the birds are protected by every known device. should the metropolitan parks and State reservations be utilized for these purposes, but every possible assistance should be extended to associations and to private individuals who are sufficiently public-spirited to set apart land for these purposes.

Further, every practicable effort should be made to encourage the breeding of game birds, both in confinement and on wild tracts, by individuals, corporations and associations. Care should be taken, however, to have such efforts conducted by capable and responsible people, under State supervision and regulation, in order, among other things, to prevent the introduction and dissemination of contagious diseases. It is questionable to what extent the Commonwealth may be expected to maintain artificially a continuous supply of game birds which are liberated from time to time merely for the purpose of affording recreation to sportsmen. Without doubt it would be unwise to use any considerable amount of public money for the purpose of rearing game birds, unless such birds are of very considerable value in the destruction of insect pests, any more than that the State should cultivate or maintain apple and pear orchards in the public parks. Nevertheless, it is the duty of the State to ascertain and to point out the very best methods for developing and maintaining a food supply for birds, of devising and advising on the most satisfactory methods of handling wild birds under complete or semi-domestication, of making studies of the life history and the feeding and breeding habits of the native game birds, for the purpose of establishing a system of maintaining the source of this most healthful recreation, which makes the State attractive to a large number of permanent residents and occasional visitors whose means do not permit more extensive trips for recreation in fishing and gunning. At best the annual output of game birds reared by this commission must necessarily be limited; but its value to the people is not to be reckoned in the actual number of birds liberated for the benefit of the sportsmen, but in the amount of information and valuable facts which will ultimately make possible a better understanding of the value of game birds to the community, and definite, economic methods by which the annual crop of birds in the State may be maintained and greatly increased.

We therefore urge most strongly the generous public support for the greatest possible number of sanctuaries and breeding places for wild or insectivorous birds, — quail, ruffed and pinnated grouse, — and the encouragement of all well-advised projects for rearing these birds, either in captivity or under semi-domestication. We hope to institute special experiments for the purpose of ascertaining definitely the value of pheasants as efficient destroyers of gypsy moths, by confining pheasants in a small area badly infested by gypsy moths.

Further, we definitely urge the necessity of definite quarantine regulations upon birds brought into the State for purposes of liberation. There is considerable evidence that game birds infected with dangerous infectious diseases have been brought into the State and liberated.

The report of Prof. C. F. Hodge, relative to the propagation of ruffed grouse and quail in confinement, follows:—

CLARK UNIVERSITY, WORCESTER, MASS., Nov. 27, 1908.

Dr. George W. Field, Commissioner of Fisheries and Game, Boston, Mass.

My Dear Dr. Field: — Ruffed grouse were so scarce in the covers last spring that I made little effort to secure eggs of wild birds from Massachusetts, and all my attempts to have them collected from other States and from Canada proved futile. One clutch, however, of 12 eggs, was obtained and 10 chicks hatched. Of these, 3 were reared to maturity. In the loss of the 7 in this brood I encountered a new difficulty,

against which we must be on our guard in the future. Striped plant bugs were abundant on the grass, and were easily obtained by sweeping with insect nets. The young chicks ate them greedily, and simply went to sleep and died as if they had been chloroformed. These bugs had the strong odor of squash bugs, by feeding which to toads Conradi found that they died as though they had been poisoned with chloroform.

Conradi found that 5 or 6 squash bugs might be sufficient to kill a toad, and Miss Morse has fed as many as 11 to a bob-white at a single meal, with no ill effects. Plant bugs are not so strong as squash bugs, and I have observed a toad eat over 250 of them in a day without showing ill effects. Still, while this evidence is not conclusive, I did not wish to push the experiment further. With complete change of diet, fatalities ceased; no lesions of disease could be discovered in the dead chicks; but I think that we should be careful in future not to feed too many strong-smelling bugs to young grouse chicks.

Of the grouse reared last year and carried through the winter, one of the best cocks was turned over to Mr. Merrill at Wilkinsonville to breed with his hens. Only one of the flock proved to be a hen, and she laid a clutch of 12 eggs. She brooded them for about two weeks, and deserted the nest. The eggs were not allowed to become chilled before I placed them under a bantam hen. They all proved, however, to be infertile. We have held our own with the ruffed grouse this season, and gained some valuable experience. As stated under plans for next year, at the close of this letter, I hope to specialize on them next year and rear a large flock from eggs collected from widely distributed points in the range of the species.

Experiments with the bob-white have proved more interesting and successful than anything yet attempted. We began the season with five pairs and several extra cocks. The first egg was laid May 6, and four of the hens had begun laying by May 10. In all 247 eggs were laid,—an average of 49 to the pair. One hen died from a large internal tumor, after laying 36 eggs, and another was killed by accident after laying only 16 eggs. The three hens that survived the season laid respectively 69, 68 and 58 eggs,—an average of 65 eggs apiece. Mr. Merrill has reported 100 eggs laid by a bob-white hen this season. These figures suggest some of the possibilities of rapid increase of these valuable birds in domestication.

In all, 114 chicks were hatched and 75 reared. While this showing is not bad under some of the difficulties encountered, it is reasonably certain that a larger percentage of hatching can be secured another season and a much larger proportion of the chicks can undoubtedly be reared.

Great variation in habits was evinced by the different pairs of bobwhites, especially with respect to broading and care of young. One pair was kept in the large cage with the partridges. The cage is about 40 feet square, and includes the bases of two large spruces. The quail and grouse did not appear to interfere with each other at all. After making and filling several nests, the cock began brooding a nest with 16 eggs, August 20, hatching 15 chicks September 13. The hen made another nest on the opposite side of the enclosure and laid 3 eggs in it, and ceased laying for the season, producing 58 eggs in all. Both birds joined in the care of the brood.

Another pair, kept in a cage 6 by 12 feet, produced a succession of nestfulls of eggs, 69 in all, and neither bird showed any signs of brooding. The cock, however, reared a brood of bantam-hatched chicks, while his hen refused to associate with him as long as he had the chicks, even going so far as to roost on a perch in the top of the cage.

The third pair were kept in a cage 3 by 6 feet, and produced 68 eggs in a single well-made nest. The eggs were removed at intervals, because neither bird showed signs of brooding; but plaster of Paris eggs were placed in the nest when the others were taken out. On the 9 eggs last laid the hen began brooding September 12 and brought out 9 chicks October 6. The cock was attentive to his mate on the nest, but was seen brooding it only once, for a few minutes, while the hen was feeding. Both joined in the care of the young.

Of the two unmated cocks, one readily adopted a brood of bantamhatched chicks and reared them with great fidelity. The other not only refused to brood chicks offered him, but pecked them savagely, and, if not prevented, would probably have killed any chicks left in his cage.

These data prove that a cage as small as 3 by 6 feet is well suited for propagation, and that there are good chances for selection of breeding stock. The pairs that brooded well and reared their young are being preserved with special care, along with their progeny, to form the breeding stock for next season's experiments.

Valuable observations were made on the brooding habit, and in this the two birds differed strangely. The cock remained on the nest continuously from 1 P.M. to 12 M., at which time he usually took about an hour off to feed and wallow. The hen usually left the nest to feed for about half an hour between 6 and 7 A.M. and between 5 and 6 in the evening; and she would slip off to feed when grasshoppers or other insect food was in sight. The weather was cold toward the last, and it seemed certain on frosty mornings that the eggs would be chilled. However, I did not meddle with her housekeeping, and she brought off all the fertile eggs.

A few preliminary observations were made on the temperature of birds, in order to gain points for artificial incubation, and it is hoped to carry out this line of study more completely next season. I did not dare risk disturbing my brooding grouse hen.

	<u> </u>									
Birds.						Internal Body.	Nest.			
Ruffed grouse cock,						106.8	_			
Ruffed grouse hen (not brooding),						107.3	-			
Bob white cock (brooding), .						111-0	103.1			
Bob-white hen (not brooding), .						108.3	-			
Bob-white cock (not brooding),						107.2	-			
Cochin bantam (brooding), .						108.0	103.0			
Cochin bantam (laying),					-	106.4	-			
Cochin bantam (laying),						107.3	-			
Rhode Island Red hen (laying),						106.4	-			
Rhode Island Red hen,						106.5	-			
Rhode Island Red cockerell, .						108.6	-			

The nest temperature in case of the hen was taken at the top of the eggs in contact with the body. The bob-white persisted in either working the thermometer down under the eggs or out of the nest, so this reading does not indicate a maximal temperature.

Our indications indicate that the bob-white broods rather more continuously than we expected to find, and still they do give the eggs rather long periods of cooling once or twice a day. The remarkable temperature of the brooding cock, 111°, suggests that probably an incubator should be run 1° or 2° higher than for domestic fowls, giving rather long periods of cooling. It is proposed next year, if possible, to obtain a complete nest record—times of brooding and cooling, with body and nest temperatures, as far as practicable—for each day of the incubation period, for both the ruffed grouse and the bob-white. This will yield valuable data for artificial incubation, which, especially in view of the excess egg production of the bob-white, will greatly facilitate extensive propagation and avoidance of contagious disease.

With regard to brooder temperatures, too, it has been noted in the experience of the past two years that the bob-white and ruffed grouse chicks appear to thrive much better when the hovers are kept a good deal warmer than indicated in the directions for domestic chicks. For bob-white chicks the later part of this season I ran the hovers at least 5° warmer than the directions indicated, with apparently only favorable results. This means, in practice: First to fifth day, 100° to 105° (105° at night); fifth to fifteenth day, 95° to 100° (with not less than 100° at night); fifteenth to thirtieth day, keep the hover at 95° at night and allow the chicks to choose cooler places in the brooder, or even sleep out doors in the attached cage, if they wish. At this time the flock will often be found asleep outside in the evening, and huddled in

the warm hover after the first early feeding, if the morning is chilly. If I had followed the above plan for the entire season I feel confident that a much larger percentage of the chicks might have been reared.

In reading Bulletin No. 123 of the Rhode Island Experiment Station, on "The Rearing and the Management of Turkeys," we note how often all, or a large percentage, of the poults of any lot are recorded as dying of "brooder troubles." As with the turkeys, we thus find ourselves in the rearing of bob-white and grouse between the "devil" of blackhead disease, which is sure to kill the whole flock, if we brood with hens, and the "deep sea" of "brooder troubles," if we rear in brooders.

The first part of the season was apparently unfavorable, and only one chick was reared from about the first 100 eggs. I was obliged to be away during this time, and up to July 26.

On August 24 I received 50 bob-white chicks, hatched by Mr. Merrill from eggs sent to Wilkinsonville, and on August 31, 18 more, hatched under a bantam on the place. This lot of 68 were kept in two brooders, which had just been fumigated with sulphur after a thorough scrubbing and saturating with hot lime wash. All went well for the first week, but the temperature had not been run high enough. On about the tenth day they began dying, 24 in two days, bringing the flock down to 44. I transferred them to freshly fumigated and whitewashed brooders, in which I ran the temperature as indicated above, and made a complete change in the diet. Whenever the weather permitted, I gave them the run of the hillside, where they were active in catching grasshoppers. crickets and other insects. At about four weeks of age the two brooder flocks united while they were out foraging, and thereafter I kept them in a cage attached to the brooder. Only one died, early in November, and examination showed infection with coccidia, an undoubted case of blackhead disease. This was the only case the entire season. others all died of "brooder troubles," which in the case of this flock I take to be acute indigestion.

In the feeding of young grouse and bob-white chicks I have had in mind from the start the necessity of variety. Their natural food consists of a ceaseless variety of different insects, fruits, seeds, leaves and so on. This is especially true of the food of the young of both species, coming as they do when nature's repast is most varied. The most careful artificial feeding of a flock in confinement cannot approach in variety the food of the wild birds; but the main lines of natural variety feeding may be followed, if their significance is appreciated. From examination of the birds as they died and the study of my flocks this season, the real meaning of "variety diet" took form in my mind about as follows:—

The birds that died of "brooder troubles" showed intestines filled with foam and intensely inflamed. They died suddenly; with no appearance of illness at night, several would be dead in the morning. This indicates acute bacterial infection, and it comes about in this way: in

a meal of rich food, custard, we will say, bacteria, which are always present in comparatively harmless numbers, multiply rapidly; a meal of the same food follows, and an explosive growth occurs which kills the bird. If, instead, a meal of some entirely different food had been given, preferably of coarse or bulky material, after a rich meal, the bacterial growth would have been swept out before it caused appreciable harm; then another meal of richer material might follow. Knowing, as we do, how sensitive bacteria are to the constitution of the culture media, and realizing how fast they can multiply if conditions are favorable, it seems to me that this theory explains all the "brooder troubles" I had this season; in fact, no loss or trouble attributable to foods occurred after this theory was consistently followed.

In practice, the feeding of a brood of bob-whites would proceed as follows. We will say that the chicks are removed from the hen as soon as dry. They are put into the hover at 105°, and the window darkened to let them sleep quietly for half a day at least. As soon as they begin to call and wander about the brooder, let in the light, sunshine if possible, and give them access to a mixture of fine grit or coarse sand, granulated bone, fine oyster shell and charcoal in equal parts, and clean water. Remove the water and leave them for two hours. Then give them, preferably, a net full of insects swept from the grass, or weeds or twigs covered with plant lice, or a trap of singed flies, or a few well-cleaned maggots. Supposing we have begun operations at noon, this will be the 2 P.M. feeding; at 4 o'clock we let them eat their fill of freshly cooked custard; at 6 give them again all the insects they will catch and eat. After a day like this we may be sure they will all be alive the next morning.

The second day at sunrise feed sour milk curd (I use it made very dry and pressed through a potato masher). At 7 to 8 o'clock put them out on the grass in a sheltered place in the sunshine to forage for themselves; and as soon as they cluster after feeding, or begin to call for help, or show signs of chilling, gather in an insect net and replace in warm hover.

To save trouble in catching and handling, I have now devised a little tray that fits exactly in the hover (of my model brooders), and closes by a hinged door which drops flat on the floor of the brooders. Thus, when the chicks go under the hover they enter this box; and if it is desired to take them out, it is only necessary to close the flap door and draw out the tray. The bottom, sides and ends are made of thin board, and the top of black woolen cloth. On warm, sunny days this "sunshine hover" may be all the chicks need for warmth. Bedding of warm, dry lawn clippings or cut clover is kept in the bottom, to facilitate cleaning and for the chicks' comfort. The whole device makes it an easy matter to keep the brooders clean. There must be no narrow cracks or chinks anywhere about the brooder or cages, into which a chick can possibly wedge itself. Ordinary brooders are never made

tight enough to hold the grouse or bob-white chicks, and at first I lost several by their creeping into the cracks over the heater or into the chink behind the block which separates the compartments. If a box is put carelessly against a wall anywhere, we are likely to find the chink full of dead and dying chicks an hour or so later.

To return to the feeding of the second day, if ground insects are abundant, the day hot and sunny and not too windy, the chicks may be allowed to forage around their hover until within an hour of sundown. A clean, shallow dish of water is kept with them. I use the glass cover of a fruit can for the first few days (I have had young chicks drown in a small tumbler), and it is filled when I go to see that they are getting along all right. It is well also to offer them a tray of maggots or meal worms or singed flies, or a dish of custard or scalded ants' eggs from time to time, to be sure they are finding food enough. At about sundown let them have their fill of any one of the above foods which has not been given before. So much if the day is bright and hot. If the day is stormy, as it is almost sure to be, they will have to be kept in a brooder. They are then fed as follows: 5 to 6 A.M., curd; 7 to 8 A.M., maggots; 10 A.M., custard; 12 M., something bulky, - berries of the season, raspberries, strawberries, elderberries, apple or grated carrots, mashed potato; 2 P.M., singed flies or meal worms or scalded ants' eggs: 4 P.M., net full of swept insects; 6 P.M., all the meal worms they will eat.

On the third day, if sunny and hot, manage like the second day, except add mixed weed seed, rice meal, corn meal or some good dry chicks' feed to their grit mixture, and be sure they have fresh green stuff, chickweed, dandelion seed heads, sorrel blossoms and seed, June grass or pigeon grass or millet heads to pick at. Offer them a tray of sifted dry loam, kept in the sun or in an oven until it is thoroughly warm. They will probably tumble into it like little ducks into water. They often use the dust bath twice and three times a day, and they should have it constantly in their home cage. I think nothing attaches them more strongly to a homing place than a warm dust bath and a constant supply of clean, fresh water.

If the weather is inclement, the third to the tenth days are practical repetitions of the second. Intervals between feeding may be stretched gradually, the rule being to feed little and often and have them good and hungry at every feed, removing all foods except the greens and grit mixture as soon as they have eaten.

From the tenth day on there should be little difficulty, so far as feeding is concerned. If kept in the brooder with cage attached, the cage can be raised at one corner, and they will go out to feed on insects and probably come home to drink and wallow. If insects are abundant on the ground, they may require no other feeding than the curd or custard, maggots or meal worms in the early morning and the last thing at night.

The little fellows have an affinity for brush patches, corn, asparagus

beds or any sort of natural cover, like that of ducks for water. Instead of proving the nuisance that I at first feared, this affinity may be turned to excellent account if properly indulged and arranged for. I always keep a little brush pile, with an armful of hay or freshly cut weeds thrown over it, in the home cage. This also attracts them to the place. If they have located in a clump of bushes or a weed patch, they are safe for the day. Should a thunder storm come up, and the birds are as tame as they should be, they can be whistled home, or an insect net be put over the entire cluster and they can be carried into the brooder. When they began to fly, in the second week, I expected to be obliged to clip their wings. I did not do this, however, and, as the sequel proved, their ability to fly is a great advantage in rearing them. Within the past few days a wind storm opened one of my cages, containing adult and young birds. Though able to fly for miles, I drove them back into the cage as easily as if they had been a flock of little chickens. During the summer the flocks would range out afoot to feed and fly home. In feeding the birds I used from the first a low whistle, in imitation of the feeding note of the chicks themselves. On coming home at noon or night the flock might be nowhere in sight, but on giving the whistle I would be assured by a chorus of eager replies, and in a moment the air would be full of whirring wings, as the flock flew in with a rush and lighted at the entrance of the cage. This might be repeated as many as a dozen times a day.

Wintering the bob-white offers no difficulty. I set the cages with the shelter end open to the south, build a brushwood pile in the middle of the cage, see that they are supplied with weed seed, grain mixture and water when snow is lacking, and keep a cabbage, a mangel wurtzel or an apple where they can pick at it. It might be well to see that the cluster is not imprisoned under the ice after a sleet storm, but the brush pile has afforded insurance against this so far. This brushwood pile is made by placing a few stout branches on the ground in a sheltered, sunny exposure, and on these pile about two feet of weeds cut before the seeds fall, - ragweed, lamb's quarter, pigweed, smartweed, wild buckwheat (chaff straw or loft sweepings would do, if weeds are not at hand); then pile on a foot or two of stout brush, which cannot be crushed down by heavy snows, and on top of this place a good thick covering of weeds. This will give the flock scratching material all winter, afford shelter from cold and storms, and protect from vermin, especially hawks, owls and cats. For bob-white in the open I think this simple winter provision would insure against winter-killing, and extend the range of the species at least several hundred miles to the north. The great value of the bird in insect and weed-seed destruction would amply repay farmers for their work.

As spring comes on, the cocks fight a good deal; but still breeders generally advise keeping several pairs in the same cage. I tried both methods this season, keeping four pairs in the same cage (6 by 12 feet)

through May and June. They laid well under these conditions, but there was so much disturbance and persecution that there was little hope of either hens or cocks beginning to brood. Each pair was then given a separate cage, and they did so much better that this plan will be generally adopted in future.

I have given the above suggestions to answer the many inquiries which have come to me as to practical methods of rearing, especially the bob-white. The methods indicated apply equally well to the ruffed grouse and possibly to the prairie chicken. In judging the results, we should bear in mind that the breeding of game birds, even by the trained game keepers in Europe, is rather difficult, and that not very large percentages of the birds hatched are brought to maturity. With our native species, further, we lack the advantage of possessing stock which has been bred and selected for some centuries past. On the whole, it seems to me that an impartial judge would say that the results of the six years' work fully warrant continuing the experiment. Six years is a short time, compared with the nearly three centuries since the settlement of the continent. We now see clearly that we must bid farewell to all our native game birds, or work out methods of propagating them.

I wish to focus effort next season especially on the ruffed grouse. I am more confident than ever before that I can now rear practically every healthy chick hatched. I wish particularly to secure unincubated eggs from widely distant points in the range of the species. The 8 sent me from Canada last year were probably fertile, but did not hatch, indicating that they need to be packed with great care in order to make the express journey safely. If I could pick my stations, I should ask for two clutches of eggs from each of the following regions: eastern Maine: Canada, well to the north; western Massachusetts, or the Adirondacks of New York, where the species is said to reach its largest size; the Alleghenv or Smoky Mountains in northern Georgia. or the Carolinas; and finally, northwestern Montana, Washington or British Columbia. This would afford us an opportunity for studying regional variations in the species, differences in size and vigor, and possibly in resistance to disease, and enable us to select the best possible stock for the establishment of a suitable strain for further propagation. I have put aside all further engagements for next summer, so that I shall be able to devote my entire time to the work. I hope the sportsmen and naturalists of America will realize the opportunity presented, and join in making this not only a national but also a continental effort to insure the perpetuation of "the finest game bird that flies."

As you are already aware, this work has been carried on for the past two years under a grant from the Carnegie Institute of Washington. I now have in preparation a detailed report on "The Domestication of the Bob-white." I hope at the close of next season to have materials for a similar monograph on the ruffed grouse. Numerous photographs have been taken with which to properly illustrate both these reports.

By the kindness of Mr. Richard E. Follett, a single pair of sharptailed grouse from the Saskatchewan were presented to me last May for experiments in propagation. They made themselves at home in a breeding cage, and apparently throve upon ordinary poultry grain. trying different foods, however, I discovered that they were especially fond of clover; and after being fed on this abundantly for several days they were seen to mate, and the hen scooped out a hollow under a thick cover in the cage and began to lay. After laying 10 eggs she was found dead, and examination showed intense infection with coccidia. were 7 more ova developed, which would indicate that the normal clutch would have been 17 eggs. The male died soon after. Five of the eggs hatched under a bantam hen, but all died from the "brooder troubles" during the first few days. I was obliged to be away from Worcester at the time, and so cannot give more exact data. The result would indicate that the species could be easily bred in confinement. I think that the birds must have been infected before coming into my possession.

I am promised eggs or breeding stock of the prairie chicken from three reliable sources, and hope to begin experiments with this most interesting and valuable species next season.

I am happy to report that, in return for past courtesies, permits and favors, help and valuable suggestion from your honored commission, I have turned back to the State for use in propagation 24 of the best bob-whites reared this year. I have also sent 5 pairs to the farm of Professor Morse at Pelham, which is being organized as a preserve for native game birds. These birds have been provided with a large cage, will be fed and protected through the winter, and will either be liberated to breed in the spring or be given a number of cages in which to breed under control. No poultry have ever been kept on this place, and it thus offers a rare opportunity for starting a flourishing colony.

Three pairs of the birds have been turned over to Dr. Emes P. Porter, and are being kept on the Hadwen estate in Worcester. Dr. Porter is making a careful study of the instincts, habits, intelligence and general psychology of the species.

I cannot close this report without acknowledging in full my great indebtedness to Mr. Arthur Merrill of the Sutton hatchery. The success of the season is very largely due to his intelligent assistance with regard to foods and general management during breeding operations. Most of our chicks, as indicated above, were also hatched at Sutton under his personal supervision.

C. F. HODGE.

The report of the superintendent of the Sutton hatchery, relative to rearing useful birds, follows:—

To the Commissioners on Fisheries and Game.

I herewith submit a report on work with quail, grouse and pheasants for the year 1908.

Practically the same problems are met with in rearing quail, ruffed grouse and pheasants, and the data secured with one can be largely applied to the work with the others.

As heretofore, the work was considered as incidental to the work of conducting the fish hatchery, and was carried on with the same force and largely on the same time, but with the disadvantage incident to the large increase in the stock of fish and the work of caring for them. This, with the increase in the work of caring for a larger number of birds, trying new methods and moving out to uninfected ground, imposed a burden that made it impossible to secure the exact data so valuable at this stage of the undertaking. Several accidents seriously impaired the value of the season's work. However, the net results showed a very marked advance, notably (1) in the determination of the most serious diseases likely to be met with, (2) in further demonstrating the adaptability of the quail and grouse to domestication, and (3) in definitely establishing the fact that disease rather than method of feeding is the controlling factor in rearing the young.

In the work of the previous season it was shown that disease was transmitted by intestinal parasites, supposedly from infected ground, and that such infected ground was unsafe for a period as yet undetermined. The presence of additional diseases was noted, though the agent was not demonstrated. More recent information points to infectious diseases of the lungs and intestines of the type more or less familiar to those engaged in brooder work.

The agency of poultry in transmitting dangerous intestinal parasites directly and through other birds is well established, but it does not appear that these diseases are solely transmitted by or from poultry. They have appeared when previously healthy lots were grown in the brooders, and the conditions were decidedly unfavorable for direct transmission.

From a more extensive pathological examination of dead birds examined in a fresh condition, it was determined that the loss of young birds from what was suggestive of an intestinal disturbance, due to the food given, was caused by a bacterial infection. The loss from this disease appears to have been confined largely to young birds, generally under one week, or, if older, birds that appeared weaker and having less resisting power. The loss was more general among brooder birds, and especially in some lots where disinfection was uncertain from methods or disinfectant agent used. It was not established that this disease caused any loss under hens. The grouse so grown that were examined showed another disease, and of the quail placed under hens, the loss was very slight from any cause. It was found that in using

brooders the most thorough disinfection (as detailed later) would keep the disease in check, and as the young birds grown under hens seem generally immune, it is reasonably certain that the infection can be kept under control. It appears very probable, and may later be established, that this infection is only fatal to birds that have slight resisting power, such as young birds weakened in the brooders or those that have developed weakness in hatching. The value of the disinfection that was so successful in the late lots seems to have been largely instrumental in keeping them free from attack until they have gained sufficient strength to be practically immune.

The lung disease, a "brooder pneumonia," was produced by a mold infection, which could with equal probability be attributed to conditions in the brooder at that time or to previous uses, but very likely both, and developed through dampness or unfavorable temperature. This infection, like the bacterial disease previously mentioned, is probably rather generally distributed, and its control is largely a matter of developing the resisting power of the birds. Disinfecting the brooder and all it contains, and possibly sterilizing such food as is likely to convey infection, will serve to keep it in check until the birds have gained such strength that its introduction would have no ill effect. That this is not an exclusively brooder disease is shown by its presence in birds that were not kept in brooders.

Some young grouse seven weeks old were lost under conditions that suggested infection from hens, and a careful examination was made for the parasite *Coccidium* or *Amæba*, with negative results, the cause of death being shown to be a bacterial infection producing intestinal lesions similar to those in the Alabama quail disease. The birds were reared under hens, but had been removed to coops on fresh ground four weeks previously.

In three instances this disease appeared among the birds at an interval of four weeks after they were taken from the hens, and when they were seven weeks old, indicating either that a period of four weeks or more was required for the incubation of the disease, or that the birds carried the infection until they were weakened by moulting.

This did not appear among brooder birds, with the exception of one quail, and did not appear among quail grown under hens under conditions exactly similar to which the grouse were subjected. Three hens having thirty-eight young quail lost only one, and it must be believed that these birds were exposed to this disease, also to the bacterial infection that was noted among young birds in brooders, but that conditions were more favorable for resisting it.

In the case of some winter loss, where infection was suspected, examination showed that the birds died of lung congestion, due to weather conditions. Should this loss occur again, it will indicate the need of different quarters for winter, with more protection against dampness than cold, as this loss occurred during some very wet winter weather.

The parasite Coccidium was found in the examination of some adult birds, with indications of it in some younger ones, but it would require a close examination of fresh subjects to prove that it caused any loss among the young birds. Where it was clearly demonstrated as the cause, the disease produced was chronic, the birds showing obvious indications of illness and dving in very poor flesh. The season's work seems to justify the belief that it is not an extremely difficult matter to disinfect pens, and only occasional loss from Coccidiosis may be expected. In some cases, even though there were indications of Coccidium, or its presence was demonstrated, bacteria were also found, and were the evident cause of death, producing an acute disease, the birds showing no appearance of illness and no loss of flesh.

The brood stock was only slightly affected by disease, Coccidiosis being reported wherever examination was made. In one case a tumor was found on the ovary, this bird being the female that laid 100 eggs.

With the recognition that disease was the really serious problem to solve, the season's work turned largely to practical methods of handling the birds, that would at the same time permit absolutely healthy conditions to be maintained. It was suspected that disease was carried in dust blown from the hen vards, and as there was an evident limit to moving the coops and brooders back into the woods, small coops were filled with fresh loam, seeded to grass, clover, buckwheat and lettuce, and were used when the vegetation was from one to two inches high. This gave entire satisfaction, and possessed the great advantage of keeping the broods close and under better control. — an important consideration, as it is a yet unsettled question what temperature is most favorable for the birds or what is fatal. Probably in the case of grouse or quail any very moderate drop is harmful. - 70° was known to be fatal in one case. The characteristic congestion of the blood vessels and organs was ascertained from examination of one lot known to be chilled, and this condition was regarded as indicating the cause of loss in some other lots not known to be chilled, and believed to have been scattered by a panic in the brooder during the night, some of them staving in the colder parts.

This liability to panies seems more characteristic of quail than of grouse or pheasants. In some instances here grown quail have beaten themselves to death in the night, and younger birds have left the brooder in a storm, to perish from the drenching received outside. In the night inspection of the brooders it is a common occurrence to find the young birds scattered, when the previous examination had shown them bunched in the proper place. It is also noted that, unlike grouse and pheasants, quail when very young cannot be relied upon to seek heat when necessary, and they are frequently found hidden outside day or night when the weather conditions were unfavorable for them.

In raising birds under hens, already referred to, the hens were kept in a box and given food and water on a shelf out of reach of the chicks. and the chicks were fed and watered in the yard outside, readily seeking their food where it was placed and returning to the hen when necessary for warmth, though often preferring the warmth of the sun outside.

The best method of disinfecting the brooders and pens is a matter to be settled in detail in the future, but it is evident that only the most thorough work is of use. In the breeding pens the use of lime was effective; and where this could not be extensively used, as in some of the large pens, or those that drained into the trout ponds, good results were obtained by burning the grass and brush, the sunlight getting into the previously shaded pen being no small aid. To sterilize the brooders by swabbing the interior with disinfectant was found to be ineffective, the manner of construction making numerous crevices where the infecting organisms remained untouched. Eventually the practice followed was to scrub the brooder out thoroughly, disinfect it with formalin, then fumigate it, together with the dust and bedding of pine needles, with sulphur. This practice will be followed unless varied through more extended experience in the future, and in addition the brooder will be enclosed in a tight box or covered with canvas, to make the fumigation more effective and to save surrounding vegetation.

As to the effect of disease and confinement on young birds, it appears that pheasants, quail and grouse are hardy in the order named; but each year information gained in working with the early hatched grouse has been applied with evident benefit to the quail and pheasants hatched later. In the case of the adult birds the experience of three years indicates that the grouse is quite equal to the pheasant in ability to thrive in confinement, though it is yet to be determined how well it may breed. However, the results so far are encouraging. The quail may possibly prove to be more susceptible to disease than the pheasant, but, as developed at present, is superior as a pen bird, quite as prolific, and adapts itself to all conditions as to size of pens and surroundings.

Of a series of pens containing both wild and pen-grown birds, the average number of eggs laid was 38, which is threefold the first year's average. The present record is held by a bird that laid 100 eggs, beginning April 18 and finishing about September 12. All of these eggs were well fertilized, and when it became evident that she was laying an unusual number, they were tested with care, the last 43 laid testing 42 fertile. From the last 24 laid, hatching in September and October, 20 were hatched and 14 reared. This prolificness certainly did not result in infertile eggs or in impaired vitality in the chicks, and is an effective demonstration of the breeding capacity of captive quail, and of the value of small pens, as the pen containing this bird was but 12 feet square, and had but a slight amount of vegetation.

During the season of 1906 several pens were kept with two females to one cock or three females to two cocks, and many infertile eggs were noted, occasionally a nestful testing all infertile. This at the time was attributed to the eggs laying in the nests undiscovered until spoiled.

During the next year all the eggs were well fertilized, the birds being paired, except one pen that contained two hens and one cock. Of the 74 eggs taken from this pen 37 were infertile. The fact that during the present season some eggs were known to lie as long as did the suspected ones in 1906, and yet hatched well, is evidence that the cause of the infertility then was the failure of the cocks to mate with the extra hens. Therefore the best practice is to pair all birds, but it is yet to be established by sufficient tests whether more than one pair of birds will mate in an ordinary breeding pen.

During the present season no quail failed to lay, and only one laid a noticeably small number of eggs. This was a wild bird, captured outside of the pens early in the spring. A wild Alabama female, the only one that failed to lay the previous season, nested three times, laying 39 eggs. She showed a decided tendency to incubate her eggs, and hatched out two broods, nesting in both cases where she could be freely observed and closely approached by visitors. The second brood was hatched in October, and on account of the lateness of the season the mother and chicks were placed in a brooder, where she successfully reared a portion of the flock.

Another lot of birds that hatched the same day were placed with the male in another brooder. He promptly adopted them and was very successful in rearing them.

This male while in the pen with the female was never seen on or near the nest, but when the chicks hatched he was very active in caring for them. In a nearby pen a male undertook to incubate some eggs without aid from the female, but abandoned them before they were quite ready to hatch.

In the earlier attempt at hatching quail, considerable loss was experienced through breakage of eggs, and it was considered unavoidable at the time, if hens were used, owing to the fragility of the shell, and the following season incubators were used, with some success, hatching 80 per cent., but at the same time the work with hens showed a decided improvement. During the present season work with incubators has been unsatisfactory, except where eggs were finished after partial incubation under hens. The hens gave entire satisfaction, the greater number breaking no eggs. This improvement resulted from a more careful selection of hens, older and quieter ones being preferred.

It will require much additional data before the very best method of feeding can be definitely laid down; but what was secured this season largely confirms the previously formed opinion that there is no great difficulty in providing food for the birds, and the care of them does not necessitate the exact attention held to be so important at first. With the conclusion that the loss of birds from intestinal disorders was due to specific diseases, and not to errors in feeding, simpler methods were tried, and the tests showed most satisfactory results. The several lots grown with little or no loss were those given the most restricted

quarters and with no insect food. The practice that was concluded to be the most successful was to feed with ant eggs, maggots, berries and green food, and dry food of mixed grain, seeds, bread crumbs and meat scrap, with some cereal preparations. Shredded wheat was the best; shredded wheat was also used in the custard that was fed largely to the pheasants. Made in the proportions of one egg to one biscuit, with enough milk added to give it a good consistency for feeding, it appeared to be more satisfactory than the ordinary thick custard used.

In feeding, a proper rotation was followed; but as far as possible the food was kept before the birds, they being allowed to eat whenever they chose, which resulted in small amounts taken frequently. The most necessary precaution to follow was to renew the food before it could possibly become stale.

The relative value of the various sizes of pens tried was not settled definitely, but for young chicks it did not appear that the large pens had any decided advantage over the small ones. The birds found some insect food, but this was quickly exhausted; the supply of green food lasted longer, but a satisfactory supply can be fed to the birds in any pen.

The added vigor in pheasants that had a measure of liberty could not be noted in the other birds; and it could not be claimed, as between large and small pens, that one had an advantage over the other in producing vigorous birds; but it is not improbable that quail and perhaps grouse can be allowed to run free at certain ages, and if this proves to be so, there will be no occasion to use anything but a small The wholly different habits of the pheasants, however, make roomy pens a necessity if any number of birds are to be kept together. For wintering quail and grouse small pens have given entire satisfaction except in the accumulating waste and snow that results in foul pens when the snow melts. Smaller pens, that could be kept wholly dry, but open to fresh air, would be better. These could be adapted to some extent from existing buildings. It has been noted that breeding is entirely satisfactory in small pens when the birds are fairly tame, and it may be assumed that these are best for use except when trapped birds are added to the stock. These, to breed without long delay, would require large pens well filled with brush; and it is yet to be determined if the larger pens are not necessary for grouse, especially for the safety of the female in mating.

The year's work with pheasants showed a largely increased number, raised with only a moderate increase in the equipment or brood stock. The use of hens for hatching and rearing was continued, incubators and brooders being used experimentally, as the equipment could handle only a small part of the eggs and chicks. The incubators were used mainly to finish the eggs partly incubated by hens, saving the loss of some chicks killed in hatching, and all loss by vicious hens, besides giving opportunity to clean the hens of lice. The use of

brooders, as was the case the year before, was very satisfactory, especially when managed in the way found necessary for getting good results with quail. Then the loss of young chicks was only the apparently weak and crippled ones.

The work with hens was so far improved as to be nearly equal to that with brooders, on the average, and somewhat better with a few lots placed out in the sprout land and allowed to run free in the underbrush. These birds, after a few days, were not confined day or night, and the loss from unknown causes was so slight as to make it certain that they were not molested by any enemies. The thick growth of huckleberry bushes, sumach and sweet fern made the best possible protection against birds, but a fox, cat or snake would rather find this an aid, and if they molest lots so placed in the future the area worked should be large enough to place the successive lots far apart. These birds were moved into the pens when three weeks old, and showed a more vigorous growth there than the incubator birds. One lot that was much below the average of the others in healthiness was placed under hens on open grass land, and lost 30 per cent. of its number between the second and third weeks, the birds that died showing indications of Coccidiosis. There is no suspicion of the ground these birds lived on, and disease must have been transmitted from the hens they were with, and the reason this exceptional case occurred among many, may indicate that hens infected with and distributing Coccidia freely are exceptional. This lot of birds was taken from the hens, placed in a pen and treated, with the result that no further loss occurred.

It is possible that with thorough treatment and change of conditions previous to being used for setting, the hens may be more or less freed from infectious disease germs, and in so much tend to reduce the danger to the chicks from infections from this source. This will be attempted with the regular stock of hens, and a special stock is being grown from the shell under the best conditions for keeping them free from disease.

The results of the propagation of game birds is sufficiently encouraging to justify urgent recommendations for putting it on a better footing. The results should not be dependent on the exigencies of the hatchery work, to be carried on with a fair measure of attention when the hatchery work can be curtailed, or with the least that can be given when the hatchery work is pressing and cannot be cut without danger of impairing the result in eggs and fish.

It would be better, until data are collected to determine the routine necessary to follow, to have this work done apart from the ordinary hatchery work, and, as it is doubtful if the results desired would be reached with ordinary labor, the services of a special investigator should be secured to carry on that part relating to breeding, hatching and rearing, so that whatever investigation was undertaken, it could

be carried on in detail, and on such a scale that satisfactory conclusions could be speedily reached.

Some of the more important points are suggested below.

The breeding quail should be closely watched in their mating and nesting,—a field of observation only slightly covered. The question as to whether a male will mate with more than one female when they are in a pen together cannot be considered settled by the limited data recorded, and, further, the question as to how many pair will mate in the same pen is of considerable importance in the breeding work.

The breeding of grouse is a particularly vexatious problem, owing to the uncertain temper of the male. It will require a large measure of close attention to develop a reasonably safe practice for handling them in small pens, or note their behavior in a pen large enough to be safe for the female. The fecundity of individual birds should be further investigated and developed. This will require a great deal of work in keeping exact records of the eggs as laid, percentage of fertilized and hatched; and to carry this to the proper end, the birds may be reared in separate lots, so that advantageous selections may be made for future breeding.

The conditions under which birds will breed calls for study, to know by what arrangement this can be brought about when it is desirable. The action of quail so far has been very erratic; they have abandoned their nests, partly incubated, nearly as often as they have finished incubation, and have not as a rule attempted incubation at all, the tendency each year being more to continuous laying. The grouse have shown more inclination to incubate, and have so far failed to continue laying when eggs were taken from them.

The problem of hatching appears to be more nearly worked out, but much remains to be done with incubators, especially in the matter of regulating the moisture supply, airing and cooling. To perfect the methods of rearing young requires extensive comparative feeding tests, the end sought being to care for the birds with no excessive expenditure of time, as would be the case if reliance must be placed largely upon insect food, or a routine, calling for constant attention, followed. Substitutes for insect food should be tested, carrying further the trials already made, which indicate that maggots and dried ant eggs are sufficient. It should be decided if these are necessary, or if milk or egg foods can be substituted to the exclusion of one or both.

The feeding tests should show, in connection with bacteriological work, to what extent development of pathogenic bacteria in chicks is due to outside infection, through air, water or food; whether these bacteria act directly upon the tissues, or whether they multiply upon the food as a medium, and liberate chemical substances which ultimately kill the bird. Can such a condition be controlled by a proper selection or rotation of food?

Bacteriological work should be carried on at the laboratory, as the

difficulty in getting subjects examined in fresh condition has delayed the establishment of certain facts, and the work is far from being complete. It would aid the work to have preliminary examinations made here, referring to eminent authorities cases that seem proper subjects for future examination.

The brood stock for future work is largely increased and is well proportioned, there being an excess of females for the first time.

The stock loaned Dr. Hodge was returned in an increased number of young birds, but as this does not add new blood, which will be very desirable in the near future, it seems an appropriate time to provide for it by securing a stock of wild birds while there is ample equipment of movable pens for quarantine purposes and large pens for breeding. It would be a very material aid in getting the work of rearing game birds established on a definite basis to have it taken up at other places, and under diverse conditions. The facilities offered at Springfield by the park commission have been investigated and everything appears most favorable for success. Some of the birds on hand are so domesticated that they would hardly fail to breed wherever put, and there the work would be done under conditions distinctly valuable for extending it.

Detail of Quail Eggs hatched in 1908.

[The 100 total is included in the 470 total.]

DATE OF HATCHING.		Number.	Laid by One Hen.	Hatched.	Remarks.
June	13,	18	18	8	Hatched under hen, 2 broken, 8 probably infertile Eventually all lost, but 2 lived to age of two months.
	27,	18	5	11	Hatched under hen, none broken; 2 chicks died in hatching; chicks kept under hen; 2 escaped No loss while with hen, 1 several weeks afte being taken away.
Jul y	7,	20	-	13	Seven died in one brooder, imperfectly disin fected eggs; 6 in other brooder; 3 escaped, survived.
	7,	40	-	12	Twelve broken, mostly under one hen; 7 kep under one hen; 1 lived. Five put with som of Dr. Hodge's that hatched same time.
	7,	23	12	5	In incubator chicks died quickly after hatching.
	12,	40	-	30	Twelve under one hen, all saved; 13 in brooder 12 saved; partial loss in both lots late in Augus through accidental overdose of cholera cure.
	19,	32	10	-	In incubator; hatched under hen.
,	26,	20	-	.18	In brooder; lost mainly through chilling; som stayed out in grass till found after dark; other left brooder in storm.
	26,	20	-	19	Hatched under hen kept in brooder; 13 on hand when mostly lost, like lots of July 12.
	26,	19	-	19	Hatched and kept under hen; all alive until los by snake, and August accident left 2.
Aug.	1,	52	12	5	In incubator one-half period, finished under hem 2 survived until lost in August.
	11,	11	-	6	Hatched by female quali; lost lot in August through accident.
	17,	24	-	-	Under hen, 4 infertile; placed in incubator t hatch; lost through overheating.

Detail of Quail Eggs hatched in 1908 — Concluded.

OI	Number. Laid by One Hen.		Number. Laid by One Hen.				Remarks.
Aug.	21,	19	19	16	Hatched under hens; placed in brooder; raided by ants; removed second night; put with next lot.		
	21,	35	-	14	This and preceeding lot in incubator one week, then put under hens: lots united and mostly lost by accidental chilling.		
Sept.	8,	14	14	11	All fertile; 3 lost in hatching, 8 reared in brooder.		
	8,	32	-	13	Hatched under hen kept in brooder; 8 escaped; others lost by chilling and staying close in brooder.		
	18,	8	-	8	Hatched under and killed by hen.		
Oct.	7,	10	10	9	Hatched under hen; placed in brooder with male; 6 reared.		
	7,	10	-	5	Hatched in pen by female quail, then placed in brooder; 2 reared.		
	7,	10	-	-	Spoiled eggs found in pen.		
To	tal.	470	100	222			

Detail of Pheasant Eggs hatched, 1908.

OLD STOCK.			OLD	STOCK.	WHITIN	'в Втоск.						
DATE.		Eggs.	Hatched.	Eggs.	Hatched.	:		Rema	rks.			
May 24,			104	18		- 1						-
31,			124	38	95	87	1					
June 11,			100	33	-	-						
19,			140	60	100	67						
28,			175	83	48	8	It wa	s not	pra	etica	ble to	fol-
July 8,			160	95	_	_	ant	chick	8, 800	s or ionl	the pl	iens. otals
16,			-	_	124	52	can	be g	ven.			
24,			204	80	_	-						
Aug. 1,			126	35	90	25	}					
24,			92	28	60	12	t .					
Total,			1,225	465	517	201	•					
Number II Number II Number p	berat berat reser	ed inted inved	n the spr n the sun for incre	nmer and fa	all, .	: :				· · ·	36 330 70 36 12	4
	-1.40			, .	•	. •	•			·		4

Detail of	Grouse	Eggs.	hatched.
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		Nu	one.			
Mestred.	Hambed	Escatind.	Hatched.	Deputy.	Town.	Keuntka.
May 8,	June 2,	11	11	Ruberg	ant,	All lots were lost under mid
-12,	May	-0	7.	Puinam, .	Antonn, .	week except where noted.
15,	June 6,	18	14	Millia, .	Bhirley,	Hatched by Mr. Codlo.
10,	8,	0	0	Dinesa,	Easthampton,	
16,	hi.	11	-6	Zelgler,	Simmold, .	Placed under hen; Traised to
18,	\mathbf{D}_{i}	Dk	10	Shen, ;	Presentt,	Placed under ben ; 5 mised to
18,	8,	18	10	Converse,	Leominster, -	seven weaks.
20,	10	13	13	Pumam,	Spencer, .	Two of this lot were saved
21,	4,	16	.11.	Zeigler, .	Pittaffeld, .	and are on hand now.
25,	May 28,	18	10	Leonard,	Sharon,	
28,	June 3,	18	11	Bemis, .	Marlborough,	
June 1,	i.	10	10	Smith, x	Chester,	All lost second week.
18,	±0,	8	7	S.C. Weir,	Sution,	Placed under hen; 4 kept
Total,	5 5 5	120	122			until seventh week.

It is shown by the detail that the grouse eggs hatched very well as a rule. The failures were about equally due to three causes, infertile eggs, broken eggs and dead embryos. Further work with grouse lies in doing the hatching so the vigor of the chicks will not be impaired, and in perfecting methods of rearing.

The pheasants, as has been the case for several years, showed poor hatching, poorer than usual this year on account of the failure of many lots in the incubators, but no lot under hens or in incubators hatched satisfactorily. What examinations have been made have shown it to be owing more largely to embryos dying in the shells than to infertility. Both causes should be studied, as both can doubtless to a large extent be remedied.

Thirty-eight per cent. of the pheasants hatched, as compared with 50 per cent. last year; then about 30 per cent. of the hatched birds were reared, this year nearly 60 per cent. The number of birds reared per 100 eggs was 22, last year 15, the year previous to that 5; thus it may be seen that while the improvement in hatching and rearing is considerable, there is opportunity for even more.

It will be seen by an examination of the detail of quail hatching that the hatching in many cases was very good; the most of the poor lots were due to the use of incubators. Where incubators were used mainly the number hatched was 10 per cent. of the eggs; where hens were used mainly 65 per cent. were hatched. The number of chicks

lost by unavoidable disease was much less than the loss by unavoidable accident; this loss included 20 eggs, 45 young chicks and 45 well-grown chicks.

The number raised and on hand is 34,—10 males, 16 females and 8 undetermined young; 8 males and 16 females received from Dr. Hodge are on hand, and 18 males, 8 females of the old breeding stock.

Respectfully submitted,

ARTHUR MERRILL.

ENFORCEMENT OF LAW.

The fish and game laws have been enforced this year by twenty-four paid deputies, and we hope before another year to report an extension of the paid deputy service, through a plan which is now under advisement, whereby each of these twenty-four deputies is made more directly responsible for the conditions in his respective district, and secure for him the aid of the necessary number of assistant deputies, who under a nominal salary can be depended upon to give efficient and unprejudiced service.

The names and locations of these paid deputies, together with the tentative districts covered by each, are given below:—

Deputy Fish and Game Commissioners, with the Number of their Districts and Residences.

Assign	ED T	Du	TRICT	r—	Name.	Residence.	Telephone Number.
No. 1,					Everett B. Mecarta, .	Harwich,	86-4.
No. 2,					Samuel J. Lowe, .	New Bedford, .	761-2.
No. 3 ,					Allen A. David,	Taunton,	966-1.
No. 4,					Charles E. Tribou,	Brockton,	2101.
No. 5,					William H. Leonard,	Foxborough, .	9-4.
				ſ	William W. Nixon,1 .	Cambridge,	466-2.
No. 6,				{	Benjamin A. Foster,1	Dorchester,	_
				- (Orrin C. Bourne,1 .	Malden,	1071-4.
No. 7,					Edward J. Cogan, .	Gloucester,	348-L.
No. 8,					Thomas L. Burney,	Lynn,	1613-13.
No. 9,					Walter A. Larkin,	Andover,	172-5.
No. 10,					James I. Milis,	Ayer,	51-2.
No. 11,					James E. Bemis, .	South Framingham,	226-J.
No. 12,					Irving O. Converse, .	Fitchburg,	53-14.
No. 13,					A. D. Putnam,	Spencer,	75-4 or 75-

¹ Central office, Room 158, State House.

Deputy Fish and Game Commissioners, etc. — Concluded.

Assigned to District -			TRIC	r —	Name.			Residence.	Telephone Number.	
No. 14,					John F. Luman,			Palmer, .	. ,	17-5.
No. 15,					Dennis F. Shea, .			Ware,		132.
No. 16,					James P. Hatch,			Springfield,		2571-3.
No. 17,					Lyman E. Ruberg,			Greenfield,		376-R.
No. 18,				•	Arthur M. Nichols,			North Adams,		391-12.
No. 19,					Fred R. Zeigler,			Pittsfield,		369-11.
No. 20,					DeWitt Smith, .			Great Barrington	, .	79-6.
No. 21,					Charles L. Savery,			West Tiebury,		_

List of Cities and Towns included in Each Tentative District assigned to Deputy Fish and Game Commissioner.

DISTRICT No. 1.

Deputy EVERETT B. MECARTA, Harwich.

Telephone, 36-4.

Barnstable.	Falmouth.	Sandwich.
Bourne.	Gosnold.	Truro.
Brewster.	Harwich.	Wellfleet.
Chatham.	Mashpee.	Yarmouth.
Dennis.	Orleans.	
Eastham.	Provincetown.	

DISTRICT No. 2.

Deputy SAMUEL J. LOWE, New Bedford.

Telephone, 761-2.

Acushnet.	Freetown.	Rochester
Dartmouth.	New Bedford.	Wareham
Fairbaven.	Mattapolsett.	Westport
Fall River.	Marion.	-

DISTRICT No. 3.

Deputy ALLEN A. DAVID, Taunton.

Telephone, 966-1.

Attleborough.	Lakeville.	Rehoboth.
Berkley.	Mansfield.	Seekonk.
Bridgewater.	Middleborough.	Somerset.
Carver.	North Attleborough.	Swansea.
Dighton.	Norton.	Taunton.
Easton.	Raynham.	

DISTRICT No. 4.

Deputy CHARLES E. TRIBOU, Brockton.

Telephone, 2101

	Telephone, 2101.	
Abington.	Hanover.	Pembroke.
Avon.	Hanson.	Plymouth.
Braintree.	Hingham.	Plympton.
Brockton.	Holbrook.	Rockland.
Cohasset.	Hull.	Scituate.
Duxbury.	Kingston.	West Bridgewater.
East Bridgewater.	Marshfield.	Weymouth.
Halifax.	Norwell.	Whitman.

DISTRICT NO. 5.

Deputy WILLIAM H. LEONARD, East Foxborough.

Telephone, Foxborough 9-4.

Bellingham. Medfield. Sharon. Canton. Needham. Stoughton. Dedham Norfolk Walpole. Dover. Norwood. Westwood. Plainfield. Wrentham. Foxborough. Franklin. Randolph.

DISTRICT No. 6.

Deputy Chief, WILLIAM W. NIXON, Central Office, State House.

Deputies BENJAMIN A. FOSTER and ORRIN C. BOURNE, assigned to launch "Egret" and special duty.

Arlington. Chelses. Revere. Belmont. Everett. Somerville Boston. Hyde Park. Watertown. Brookline. Milton. Winthrop. Quincy. Cambridge.

DISTRICT NO. 7.

Deputy EDWARD J. COGAN, Gloucester.

Telephone, 848-L.

Manchester. Rowley. Amesbury. Merrimac. Salisbury. Essex. Gloucester. Newbury. Topsfield. Hamilton. Newburyport. Wanham. Ipswich. Rockport. West Newbury.

DISTRICT No. 8.

Deputy THOMAS L. BURNEY, Lynn.

Telephone, 1613-13.

Medford. Beverly. Saugus. Danvers. Melrose. Stoneham. Lynn. Middleton. Swampscott. Wakefield. Lynnfield. Nahant. Winchester. Malden. Peabody. Marbiehead. Salem. Woburn.

DISTRICT NO. 9.

Deputy WALTER A. LARKIN, Andover.

Telephone 172-5.

Andover. Georgetown. North Andover Bedford. Groveland. North Reading. Reading. Billerica. Haverhill. Lawrence. Tewksbury. Boxford. Lexington. Wilmington. Burlington. Chelmsford. Lowell. Dracut. Methuen.

DISTRICT NO. 10.

Deputy James I. MILLS, Ayer.

Telephone 51-2.

Acton. Concord. Pepperell. Shirley. Ashby. Dunstable. Stow. Aver. Groton. Berlin. Harvard. Townsend. Bolton. Hudson. Tyngsborough. Boxborough. Westford. Littleton. Carliale. Maynard.

DISTRICT NO. 11.

Deputy JAMES E. BEMIS, South Framingham.

Telephone 2126-J.

Ashland. Marlborough. Sherborn. Blackstone. Medway. Southborough. Framingham. Mendon. Sudbury. Milford. Holliston. Waltham. Millia. Hopedale. Wayland. Hopkinton. Natick. Wellesley. Lincoln. Newton. Weston.

DISTRICT No. 12.

Deputy IRVING O. CONVERSE, Fitchburg.

Telephone, 58-14.

Ashburnham. Lancaster. Royalston. Athol. Leominster. Rutland. Clinton. Lunenburg. Sterling. Fitchburg. Petersham. Templeton. Gardner. Phillipston. Westminster. Hubbardston. Princeton. Winchendon.

DISTRICT No. 13.

Deputy A. D. PUTNAM, Spencer.

Telephone, 75-4 or 75-6.

Northborough. Auburn. Upton. Boylston. Northbridge. Uxbridge. North Brookfield. Douglas. West Boylston. Grafton. Westborough. Paxton. Shrewsbury. Holden. Worcester. Leicester. Spencer. Millbury. Sutton.

DISTRICT No. 14.

Deputy JOHN F. LUMAN, Palmer.

Telephone, 17-5.

Brimfield. Ludlow. Wales. Brookfield. Monson. Warren. Charlton. Oxford. Webster. Dudley. Palmer. West Brookfield. Hampden. Southbridge. Wilbraham, Holland. Sturbridge.

DISTRICT No. 15.

Deputy DENNIS F. SHEA, Ware.

Telephone, 132.

Amherst. Hadley. Prescott. South Hadley. Barre. Hardwick. Shutesbury. Belchertown. Leverett. Dana. New Braintree. Sunderland. Enfleld. New Salem. Ware. Granby. Oakham.

Pelham.

Greenwich.

DISTRICT NO. 16.

Deputy JAMES P. HATCH, Springfield.

Telephone, 2571-8.

Agawam.
Blandford.
Chesterfield.
Chicopee.

Holyoke. Longmeadow. Montgomery. Northampton. Russell. Springfield.
Westfield.
Westhampton.
West Springfield.
Williamsburg.

East Longmeadow. Easthampton. Granville.

Southampton. Southwick.

DISTRICT NO. 17.

Deputy LYMAN E. RUBERG, Greenfield.

Telephone, 376-R.

Ashfield.
Bernardston.
Buckland.
Colrain.
Conway.
Deerfield.

Erving.
Gill.
Greenfield.
Hatfield.
Leyden.
Montague.

Northfield. Orange. Shelburne. Warwick. Wendell. Whately.

DISTRICT No. 18.

Deputy ARTHUR M. NICHOLS, North Adams.

Telephone, 391-12.

Adams.
Charlemont.
Cheshire.
Clarksburg.

Florida.

Hancock.

Hawley.
Heath.
Monroe.
New Ashford.

New Ashford. North Adams. Plainfield. Rowe. Savoy. Williamstown.

Windsor.

DISTRICT NO. 19.

Deputy FRED R. ZEIGLER, Pittsfield.

Telephone, 862-11.

Chester.
Cummington.
Dalton.
Goshen.

Hinsdale.

Huntington,
Lanesborough,
Lee.
Lenox.
Middlefield.

Peru.
Pittefield.
Richmond.
Washington.
Worthington.

DISTRICT NO. 20.

Deputy DEWITT SMITH, Great Barrington.

Telephone, 72-6.

Mount Washington.

Alford. Becket. Egremont.

New Marlborough. Otis. Sandisfield. Stockbridge.
Tyringham.
West Stockbridge.
Tolland.

Monterey.

Great Barrington.

Sheffield.

DISTRICT No. 21.

Deputy CHARLES L. SAVERY, West Tisbury.

Chilmark. Edgartown. Gay Head. Oak Bluffs.

Tisbury.

Comparative Table of Law Enforcement for Years 1907 and 1908.

ITEMS.												1907.	1908.	
Total fines impo	sed,				•	-						\$8,470 20	\$7,097 50	
Fines from arre	sta by	pai	d de	outles	3, .							1,921 20	6,348 50	
Fines from arre	sts b	y un j	biac	depu	tles,					٠		1,549 00	759 00	
Total counts tak	en to	cour	t,									390	472	
Total number of	peri	eacos	arres	ted,								85 8	455	
Convictions,1.												827	424	
Discharged, .												56	45	
Defaulted, .												7	2	
Cases filed,												63	77	

¹ One case pending (1968) on which no decision has been rendered.

Classification of Arrests during the Year 1908.

	Fo	RM OF	Vio	LATIC	ow.						Number of Counts.
Shellfish laws, section 114,	chapt	ær 91,	Rev	ised	Law	8, .					78
Hunting on Lord's day, .											45
Aliens hunting without lice	nse,									•	30
Illegal possession of game,											19
Using over ten books on po	nds,	etc.,		•					•	•	8
Fishing on closed ponds, .		•									30
Possession of short lobster	3, .			•		•				•	17
Possession of short trout,											11
Killing song or insectivorou	as bir	ds,									18
Possession of probibited fe	ather	s for	mill	lnery	pur	poses	ι, .				54
Dogs chasing deer,	•					•					2
Killing, hunting or woundi	ng de	er,									15
Setting forest fires,									•		8
Hunting with ferret, .											11
Taking short pickerel, .				•	•						9
Taking short bass,								•			13
Seining for smelts,											9
Smelts in close season, .											10
Violation of chapter 401, A	cts of	1855,						•			4
Having trout out of season	, .										2
Taking trout with net, .											1
Setting net in pond,											2

Classification of Arrests during the Year 1908 — Concluded.

FORM OF VIOLATION.					Number of Counts.
Seining in violation of chapter 91, section 42, Revised Laws,					8
Pollution of stream by sawdust,	•	•	٠	•	1
Spearing fish,		•	•	•	1
Having egg-bearing lobsters for sale,	•				8
Torching herring within prohibited waters,		٠			10
Using over one hook on stocked pond,			•		19
Trapping fish, section 182, chapter 91, Revised Laws,			•		1
Having unmarked lobster car,					2
Capturing eagle,					3
Setting net,					2
Setting lobster traps, section 92, chapter 91, Revised Laws,					8
Setting nets in Buzzards Bay, section 122, chapter 91, Revised	La	ws,			2
Taking eggs of birds protected by law,					1
Refusing to show game in possession,					1
Killing bittern or heron,					8
Having scallops in close season,					1
Using set line,					2
Taking fish with sweep seine,					4
Pursuing wild fowl with power boat,					5
Sending game birds out of State,					1
Hunting out of season,					1
Using 11/2 inch mesh seine in Plum Island Sound,					5
Non-resident hunting without license,					1
Snaring game,					1
Hunting pheasants,					2
Having seed scallops,					5
					472

Number of Packages of Game in Cold Storage sealed in 1908, accord-										
ing to	Acts	of	1908,	Cha	pter	441,	and	Acts	of 1906, Chapter 201.	
Quail,									49 packages; 254 dozen.	
Teal,									11 packages; 312 birds.	
Black du	cks,		•			•		•	41 packages; 469 pairs.	
								-		
Tota	al.		_	_	_	_			101	

Many abuses of the laws relative to the sale of game have existed since the passage of the law forbidding the sale of

partridge, woodcock and quail killed in this Commonwealth. Until such time as the best sentiment of the sportsmen and of the general public is developed to a point where such a state of affairs is impossible, these evasions will probably exist in spite of the best efforts towards the enforcement of the law. Numberless cases are known where wealthy men directly or indirectly hire persons to shoot game birds to furnish "crumbs for the rich man's table." Similarly, birds are placed in storage where in many cases change of ownership is concealed in various ways. There is, however, a decided tendency among the best type of citizens to discountenance this condition of affairs, as is noted from the following letter, the names in which, for obvious reasons, are omitted:—

Ост. 11, 1908.

Dr. GEORGE W. FIELD.

My Dear Sir: — Last year two of the best shots in L—— left their regular work and hunted every day, a rich man paying them so much per week, they to turn over to him whatever number of birds they secured. Some of the business men and leading sportsmen came to me to see what could be done. Am pleased to report that this season neither will shoot for wages, — one not at all, and the other only one day a week, just for recreation. Many different influences have been brought to bear to bring about this result.

(Signed) ————

The first year's experience with the law compelling the display of game by the person suspected of hunting illegally has been extremely satisfactory. We know of no case where the deputy has abused the confidence placed in him by the General Court, and we can point to many cases where gross violations of the law would otherwise have remained undetected. But most important has been the restraining influence upon would-be violators of a knowledge that they might at any time be called upon to exhibit the fish or game in possession.

The laws relative to requirements of hunters' licenses or registration for every person who hunts (with the sole exception of the farmer hunting upon land used exclusively for agricultural purposes) have fully met expectations, and have resulted not only in more efficient enforcement of the law,

but also have made it possible for a land owner to identify with certainty a person who either is doing or under certain circumstances might do damage to property.

Under the Acts of 1905, chapter 311, requiring unnaturalized foreign-born persons to procure from the town or city clerk a license to hunt, the following licenses were issued by sundry town and city clerks:—

1905 (2 licenses),					\$30	00
1906 (9 licenses),			•		135	00
1907 (70 licenses),					1,053	00
1908 (40 licenses),					600	20
				-		—
					\$1,818	20

Under the Acts of 1907, chapter 198, this commission which issues hunting licenses to non-residents, has granted licenses as follows:—

1907, 81 licenses at \$10,					\$810	00
18 licenses at \$1,					18	00
1908, 46 licenses at \$10,					460	00
21 licenses at \$1,	•	•	•	•	21	00
					\$1,309	00

These amounts will be multiplied several fold by the returns from the hunting licenses for residents, according to Acts of 1908, chapter 484, which becomes operative Jan. 1, 1909. These licenses are issued by the clerk of the town or city, and the moneys are transmitted directly to the State Treasurer.

A systematic search for feathers of protected birds used for millinery purposes is being carried on among the stocks of the wholesale and retail dealers in the State. Information is freely given relative to methods of recognizing the forbidden feathers, even when disguised by dyes, cutting, etc. In cases of persistent violation the offenders are summoned to court. During the past year there has been a further development relative to the law prohibiting the possession of feathers of such protected birds for millinery purposes. During the past three

years warnings of various types have been extended to milliners and others relative to the law. During the past year 54 milliners and others have been called to court and fined for having such feathers in possession for millinery purposes. We believe that this is a most beneficial law, and that with the development of public sentiment and the wider knowledge of the deplorable destruction of birds which exists, a still larger number of States will place similar laws on their statute books.

The laws relative to the use of lobsters under 9 inches is well nigh a dead letter, on account of the practical impossibility of enforcing it with the means available.

Summary and Comparison of Deer Statistics, 1907 and 1908.

										1997.	1905.
Deer seen,					•		•			1,298	2,065
Deer chased by dogs,								•	$\cdot $	114	120
Deer that have injured	cro	ps,								85	100
Deer shot illegally,										40	86
Deer killed by trains a	nd t	rolle	y cai	18,						25	60
Deer shot while in the	act	of da	ımag	ing c	rops	, .				16	17
Dead from other cause	٤,									47	83
Notices issued relative	to (dogs	chas	lng d	leer,					27	87
Court cases: —											
Dogs chasing deer,										5	2
Killing, hunting or	wo	undi	ng đợ	er,						6	15
Live deer,										1,497	2,255
Dead deer,										128	196
Total number of de	er	(alive	and	dea	d),					1,625	2,451

Money paid by the State Treasurer, according to Acts of 1903, chapter 407, for damage done by wild deer:—

1903,						•	\$237 30
1904,	•		•	•	•	•	392 25
1905,							1,117 05
1906,							2,822 73
1907,							2,912 78
1908,							4,370 03

Itemized List of Moneys received by the Commissioners on Fisheries and Game during the Year 1908 and paid to the Treasurer and Receiver-General.

Ввения рок—												Amour	ıt.
Issuance of non-resident h	unte	rs' lic	conse	es, ch	apte	198,	Act	s of 1	1907,			\$492	84
Heath-hen fund, chapter 50	4, A	cts o	f 1907	7, .								1,832	0
Saie of egg-bearing lobste	rs to	Uni	ted 8	State	s Bur	eau	of F1	sher	ies St	atio	ns,	840	6
Sale of deer carcasses by t	uw o	cleri	s, cì	apte	r 3 77,	Act	s of 1	908,				36	0
Forfeitures (nets, etc.),.									•			16	0
Forfeitures (pike perch),									•			80	0
											ľ	\$9,747	_

Inspection of Fish. — There have been no requests for the inspection of fish, under chapter 138, Acts of 1902, and no fees have been received.

RECOMMENDATIONS FOR LEGISLATION.

The Commissioners on Fisheries and Game respectfully recommend the passage of laws designed to accomplish the following purposes:—

- 1. That investigation be made of the infectious diseases of native birds, and of foreign birds introduced into the State, with a report including expert opinions upon the probability of such diseases spreading among our native birds, and, so far as possible, suggesting remedies and methods for preventing such infection, and that for these purposes money be appropriated from money received by the Commonwealth for hunting licenses.
- 2. That a biological investigation and report be made upon the adaptability of the public waters of the State for rearing food fishes, to devise methods and to determine as nearly as possible the quantity of fish which various waters are capable of producing annually, to ascertain the best methods of stocking such waters, and that an appropriation not exceeding \$2,000 a year for three years be appropriated for this purpose.
- 3. That paid deputies of this commission should be given power to arrest hunters when in the act of damaging property or of trespassing, or upon complaint of a land owner.

- 4. That the laws relative to shooting from boats propelled by mechanical means other than oars should be so defined as to make plain their meaning relative to power boats when not under power.
- 5. For the protection of birds on their northern migration, and to secure an increase in the birds of various species which formerly nested in large numbers in this State, no shooting should be permitted after January first.
- 6. The killdeer and the piping plovers should be protected at all times, on account of the imminence of extinction.
- 7. Suitable provision should be made to grant non-residents the right to hunt foxes in this State without the necessity of a ten-dollar license.
- 8. That the commission should have authority to purchase, lease or receive as gift lands to be used as bird reservations, i.e., specially protected breeding places for birds. Property thus acquired should become the property of the Commonwealth, to be administered by the Commissioners on Fisheries and Game for the purpose of securing the utmost possible population of useful birds. Whenever necessary to confirm titles, power of eminent domain should be given similar to that in chapter 504, Acts of 1907, and that of the money received by the Commonwealth for hunters' licenses a sum not exceeding \$5,000 annually may be expended for the purpose of acquiring land.
- 9. That to secure more satisfactory enforcement of the laws the legal measurement of lobsters should be made upon the shell (carapace), exclusive of the tail, and that this legal measure of length should be 43/4 inches, in conformity with the law of Maine.
- 10. That all lobster fishermen, dealers, smack captains and all persons catching or transporting lobsters within this Commonwealth should be licensed, and that persons convicted of violation of the State law should be prohibited from fishing for one year from date of conviction.
- 11. We renew our recommendations of last year for more adequate and economical facilities for propagating and distributing food fish and useful birds.

- 12. Also for such amendment of the laws as to ensure the development of the mollusk fisheries below high-water mark in such a manner as to permit increase in the economic yield of food material; to furnish wider opportunities for remunerative employment of skilled and unskilled labor; to increase the taxable property of the shore towns and cities; and to bring revenue to the Commonwealth.
- 13. The following resolutions were passed at a conference of the State commissioners on fisheries of New England, held in Boston Dec. 8, 1908, and we urgently recommend these to your attention:—

Resolved, (1) That it is the opinion of this conference that the land below high water should be made more available for cultivation of mollusks.

- (2) That such areas should be leased for the purpose of securing individual opportunities for cultivation.
- (3) That such leases should be controlled by the State in order to secure the maximum amount of protection to the lease holders, permanency of policy, freedom from petty politics and greater responsibility in administration.

Resolution of the committee: -

Whereas, In all New England States there exist conditions whereby the public waters are becoming annually more polluted by the introduction of sewage, manufactory wastes, etc., resulting in a distinct menace to the public health and seriously impairing the productive capacity of the water and of the land under the water; and

Whereas, With increasing population these waters and submarine areas are becoming more necessary for the production of human food, both of fish and shellfish, both for local consumption and for sale in distant markets; and

Whereas, A private individual or corporation is not permitted by law to run sewage, manufactory waste, etc., upon the land of his neighbor, similarly it should not be permitted to run these materials into public waters or upon public land; therefore, be it

Resolved, That it is the carefully considered opinion of this conference of delegates, meeting in Boston in this the first an-

nual conference called by the Governors of the New England States, that the unnecessary pollution of the public streams and coastal waters should be immediately and decisively checked by suitable action of the respective legislatures. Voted.

- 14. That the laws be amended so as to permit the purchase, sale and possession at any time of rabbits or hares, which have not been taken or killed contrary to the laws of this Commonwealth or of any other State or country.
- 15. Inasmuch as those mechanical devices known as "silencers," which have been adapted for firearms, can be used to make the enforcement of the game laws still more difficult than at present, we suggest that the question of the prohibition of the use, sale or possession of such devices may be properly considered, and the necessary action taken.
- 16. Amendment of chapter 401, Acts of 1855, for the purpose of securing free passage of migratory fish, both up and down Taunton Great River and Nemasket.
- 17. Artificially reared trout should be sold at any season of the year, provided the proper safeguards exist for distinguishing wild from artificially reared trout.

Courtesies.

It is a pleasure again to acknowledge the assistance so courteously rendered to the commission by Mr. Arthur L. Millett, local agent of the United States Bureau of Fisheries at Gloucester, and by Mr. F. F. Dimick, the efficient secretary of the Boston Fish Bureau.

Permits to hold in confinement egg-bearing lobsters for collection by the agents of this commission, according to chapter 408, Acts of 1904, were issued to 499 fishermen and dealers.

Permits for taking birds and eggs under section 9, chapter 92 of the Revised Laws, as amended by chapter 287, Acts of 1903, were issued to the following-named persons:—

Chester S. Day, West Roxbury.
B. G. Willard, Millis.
Nathan F. Stone, Worcester.
F. B. McKechnie, Boston.
F. H. Carpenter, Seekonk.
John H. Hardy, Jr., Boston.
Clarence Birdseye, Amherst.
Chester A. Reed, Worcester.
A. H. Tuttle, Cambridge.
A. C. Bent, Taunton.

J. A. Barton, Fitchburg.

Owen Durfee, Fall River.
Frederick H. Kennard, Boston.
Arthur F. Gilbert, New Bedford.
Frank S. Akin, Fall River.
William H. Dearden, Springfield.
Haynes H. Chilson, Northampton.
F. H. Scott, Westfield.
Robert O. Morris, Springfield.
George M. Gray, Woods Hole.
W. W. Judd, North Adams.

Permit to take gulls and terns for scientific purposes was issued to: —

Clarence L. Hauthaway, Cambridge.

Permit to have in possession for purposes of propagation live quail was issued to:—

Clarence M. Snow, Provincetown.

Permit to have in possession for purposes of propagation ruffed grouse and quail was issued to:—

C. F. Hodge, Worcester.

Permit to have in possession native insectivorous birds, to be used in connection with experiments and observations upon the use of birds for destroying certain flies, in greenhouses, was issued to:—

Seth A. Borden, Fall River.

Permits to have in possession for purposes of propagation wild ducks were issued to:—

Seth A. Borden, Fall River. Charles D. Hunt, Fall River.

Permits to shoot pheasants under chapter 477, Acts of 1908, were issued to:—

Bayard Thayer, Lancaster. Laurence Minot, Wareham. Stephen M. Weld, Boston.

Permits to have in possession ducks of any species, anywhere in Massachusetts, at any season, were issued to:—

William P. Wharton, Groton.
Guilford C. Hathaway, Fall River.
Benjamin Brown, Fall River.

Permit to have black ducks in possession for purposes of propagation was issued to:—

R. E. Warren, Boston.

Permit to have in possession pheasant, woodcock and partridge, for scientific purposes, was issued to: —

John H. Hardy, Jr., Boston.

Permits to take sand eels for bait, under chapter 164, Acts of 1902, were issued to the following persons:—

Elmer A. Durgin, Rowley.
Walter N. Johnson, Rowley.
Alfred Richardson, Rowley.
A. P. Hilton, Newburyport.
Maynard Eaton, Newburyport.
James Crooks, Newburyport.

George L. Whittemore, Newburyport.
G. E. Pettingill, Newburyport.
H. G. W. Graf, Newburyport.
Fred McBurney, Newburyport.
Henry Godfrey, Newburyport.
Richard E. Pierce, Newburyport.

Permit to have in possession at any season of the year, for purposes of propagation, black bass, trout and pickerel, also to use minnow traps and casting nets, was issued to:—

W. Endicott Dexter, Boston.

Permit to take smelts from any stream, during the close season, for the purpose of ascertaining facts regarding breeding habits, was issued to:—

William W. Nixon, Somerville.

Permits to take lamprey eels for scientific purposes were issued to: —

William N. Holmes, Lawrence. George M. Gray, Woods Hole.

Permit to transfer spawning white perch and pickerel to a satisfactory spawning ground was issued to:—

Charles E. Tribou, Brockton.

Permit to transfer spawning white perch to a satisfactory spawning ground was issued to:—

Havier L. Gonzales, Lowell.

Permit to have in possession for scientific purposes lobsters of any size was issued to:—

Marine Biological Laboratory, Woods Hole.

Permit to use a seine in ponds of the Commonwealth for taking fish for scientific purposes was issued to:—

Thomas L. Burney, West Lynn.

Permit to catch trout in fly-casting tournament was issued to:—

New England Forest, Fish and Game Association, Boston.

Permission has been given in eleven instances during the past year to M. Abbott Frazar Company of Boston to mount birds protected by law, which have been killed accidentally.

Respectfully submitted,

GEORGE W. FIELD.
JOHN W. DELANO.
GEORGE H. GARFIELD.

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APPENDICES.



[A.]

LIST OF COMMISSIONERS.

UNITED STATES BUREAU OF FISHERIES, WASHINGTON, D. C.

George M. Bowers, Commissioner.

Hugh M. Smith, Deputy Commissioner.

Irving H. Dunlap, Chief Clerk.

John W. Titcomb, Assistant in charge of Division of Fish Culture.

Barton W. Everman, Assistant in charge of Division of Inquiry Respecting Food Fishes.

A. B. Alexander, Assistant in charge of Division of Statistics and Methods. Hector Von Bayer, Architect and Engineer.

Superintendents of United States Fisheries Stations.

E. E. Race, Green Lake, Me.

Charles G. Atkins, Craig Brook, East Orland, Me.

E. E. Hahn, Boothbay Harbor, Me.

W. F. Hubbard, Nashua, N. H.

E. N. Carter, St. Johnsbury, Vt.

C. G. Corliss, Gloucester, Mass.

E. F. Locke, Woods Hole, Mass.

Chester K. Green, Cape Vincent, N. Y.

L. G. Harron, Washington, D. C.

George A. Seagle, Wytheville, Va.

R. K. Robinson, White Sulpher Springs, W. Va.

H. D. Aller, Beaufort, N. C.

J. J. Stranahan, Cold Springs, Bullochville, Ga.

C. W. Burnham, Tupelo, Miss.

S. G. Worth, Edenton, N. C.

A. G. Keesecker, Fishery, Tenn.

S. W. Downing, Put-in-Bay, O.

Frank N. Clark, Northville, Mich.

S. P. Wires, Duluth, Minn.

S. P. Bartlett, Quincy, Ill.

R. S. Johnson, Manchester, Ia.

H. D. Dean, Neosho, Mo.

J. L. Leary, San Marcos, Tex.

W. T. Thompson, Leadville, Col.

D. C. Booth, Spearfish, S. D. James A. Henshall, Bozema G. H. Lambson, Baird, Cal. Henry O'Malley, Clackamas A. H. Dinsmore, Baker Lak W. K. Hancock, Yes Lake, M. F. Stapleton, Mammoth C. P. Henkle, Afognak, Alas	n, Mont , Ore. e, Wash Alaska. Spring,	l .	,	•						
a		BAMA								
	and Fis									
John H. Wallace, Jr., .	•	•	•	•	Montgomery.					
	Arı	ZONA	•							
	Fish a	nd Ga	me.							
T. S. Bunch,					Safford.					
W. L. Pinney, Secretary, .	•				Phœnix.					
E. A. Sliker,	•		•		Flagstaff.					
Commo Chara - Provident	CALII				O P					
George Stone, President, .	•	•		•	San Francisco. Alameda.					
F. W. VanSicklen, M. J. Connell,	•	•	•		Los Angeles.					
Charles A. Vogelsang, Chief	Deputy	· ·			San Francisco.					
	r <i>j</i>	, .	•	•						
	Cor	ORADO) .							
David E. Farr, Commissione	er, .		•		Denver.					
R. L. Spargur, Chief Clerk,	•				Denver.					
W. S. Kincaide, Superintend					Denver.					
C. W. Lake, Deputy Commi	ssioner,	•	•	•	Denver.					
	Conni	ECTIC	UT.							
George T. Mathewson, Presi					Thompsonville.					
E. Hart Geer, Secretary, .		·			Hadlyme.					
John M. Crampton,					New Haven.					
	DEL	WAR	E.							
Game	Protect	ive A	ssociat	ion.						
A. D. Poole, President, .					Wilmington.					
E. G. Bradford, Jr., Secretar	ry and ?	re a sı	urer,		Wilmington.					
	Fre	. DID 1								
FLORIDA.										
	ary Fis									
John Y. Detwiler,	•	٠	•	•	New Smyrna.					

		GE	ORGIA.			
	Fist	h Cor	nmiss	ioner.		
A. T. Dallis,	•				•	LaGrange.
		ΙD	AHO.			
	Fish c	ınd G	lame I	Varde	n.	•
William N. Stephens,						Boisé.
B. T. Livingston, .	•	•		•		Boisé.
		Ĭī.ī.	INOIS.			
	State G				~	
John A. Wheeler, .						
	Board of	Fish	Com	nission	ners.	
Nat H. Cohen, Presid	lent, .					Urbana.
Nat H. Cohen, Presid S. P. Bartlett, Superi	intendent	and	Secre	tary,	•	Quincy.
Henry Kleine, .	•	•	•	•		Chicago.
		Υ				
7 T S-manus Comm		INI	MANA.			Columbus
Z. T. Sweeney, Comm E. E. Earle, Chief De	enutv.	•	•	•	•	Indianapolis
In In India, class 20	,puoj,	•	•	•	•	
		Ic	OWA.			
	Fish o	ınd G	fame V	Varder	r.	
George A. Lincoln, .	•	•	•	•	•	Cedar Rapids.
		К	NSAS.			
D. W. Travis,	•					Pratt.
		17				•
			AINE.			·
	Inland .					•
L. T. Carleton, Chair	man,				•	Winthrop.
J. W. Brackett, . Edgar E. Ring, .	•	•	•	•	•	Phillips.
Edgar E. Ring, .	•	:	•	•	•	Orono.
	Sea an	d Sh	ore Fi	sheries	t .	
James Donahue, Com	missioner	·,	•	•,		Rockland.
			YLANI			
	Fisher					
Samuel J. Twilley						Worcester County
Charles F. Brooke	•	•		•	•	Worcester County. Montgomery County.
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		Ga	me W	arden			
H. F. Harmonson,				•	•	•	Berlin.
		MA	SSACH	USETT	s.		
Co	ommissi	oner	on F	isheri	es and	Ga	ıme.
George W. Field, Ch	nairm a n	١,					Boston.
John W. Delano, George H. Garfield,							Marion.
George H. Garfield,			•	•	•		Brockton.
			Місні	GAN.			
		Fish	Comm	ission	ers.		
Charles D. Joselyn,	Preside	nt,					Detroit.
George M. Brown, V	Vice-Pre	side	nt,				Saginaw.
Delbert H. Power,				•	•		Suttons Bay.
	Game,	Fish	and F	orestr	u Wa	rdei	n.
Charles S. Pierce,							Lansing,
		_	IINNE				
			Fish (_			
O. J. Johnson, Presi	ident, .		•				
John H. Grill, First					•		Sherburn.
Joseph Vessel, Second							Crookston.
Robert Hannah, Se	cretary,	,	•	•	•	•	Fergus Falls.
Carlos Avery, Exec S. F. Fullerton, Sup	utive A	gent,	of U.	.tobow		•	nutchinson.
S. F. Funerton, Sup	ermen	aent	01 118	itener	ies,	•	St. Paul.
			Misso	URI.			
		Fish	Comn	iiss ior	ners.		
Richard Porter,					•		Paris.
John M. Shortal,							St. Louis.
W. H. Hughes,							St. Louis.
William Babb,.			•				St. Joseph.
John Gates, .			•	•	•	•	Browning.
	State	Gan	ie and	Fish	Ward	en.	
J. C. Bassford,.					-		Mexico.
			Mont	ANA.			
	State	Gan	ie and		Ward	en.	
Henry Avare, .							Helena.

		NEB	RASKA	٨.							
Gov. A. C. Shellanber	ger, Com	missi	ioner e	ex-officio	, Lincoln.						
Dan Geilus, Chief Der	outy,				. Lincoln.						
W. J. O'Brien, Superi	ntendent	of H	latche	ries,	. Gretna.						
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	D.		VADA. ommis								
Coome T. Wills					Comon City						
George T. Mills, .		٠.	•		. Carson City.						
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H. H. Coryell, .	•	•	•	•	. Carson City.						
	Ni	ew H	AMP81	HIRE.							
Nathaniel Wentworth	Nathaniel Wentworth, Chairman,										
Charles B. Clarke, .	-				. Concord.						
Frank P. Brown, .					. Whitefield.						
	1	New	Jersi	EY.							
B. C. Kuser, Presiden	ıt, .				. Trenton.						
William A. Logue, Tr	easurer,				. Bridgeton.						
Percival Christie, .					. High Bridge.						
Simeon H. Rollinson,					. West Orange.						
			Mexi								
	Game	and		Warden.							
W. E. Griffin, .	•		•	•	. Santa Fé.						
		New	Yor	к.							
Fa	rest, Fish	h and	Game	e Commi	ssion.						
James S. Whipple, Co	mmissio	ner,			. Salamanca.						
J. Duncan Lawrence,					. Bloomville.						
John D. Whish, Secre					. Albany.						
	•				-						
State	Superint	ender	it of A	Iarine F	isheries.						
B. Frank Wood, .					. New York.						
	3.7		73								

NORTH DAKOTA.

District Game Warden.

W. N. Smith, District No. 1,			Grafton.
Olaf Bjorke, District No. 2.			Abercrombie.

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	0	HIO.			
Commissio	ners	of Fis	h and	Gar	ne.
Paul North, President, .					Cleveland.
Thomas B. Paxton,			•		
					South Charleston.
J. F. Rankin, D. W. Greene,					Dayton.
George W. McCook, .					Steubenville.
George C. Blankner, Secretary	, .		•		Columbus.
J. C. Speaks, Chief Warden,		٠.			Columbus.
	OKL	AHOMA	۸.		
Game	and .	Fish 1	Warde	n.	
			•		Enid.
	Ori	EGON.			
Mas	ter F	ish W	arden		
H. C. McAllister,		•			Portland.
_					
		Ward	en.		Forest Grove.
it. O. Blevenson,	•	•	•	•	rolest Glove.
P	ENNS	YLVAN	VIA.		
Gam	e Con	nmiss	ioners		
James H. Worden, President,					Harrisburg.
C. K. Sober,	-			·	Lewisburg.
William H. Myers,					Williamsport.
Charles B. Penrose					Philadelphia.
John M. Phillips,					Pittsburg.
Arthur Chapman,					Doylestown.
Dr. Joseph Kalbfus, Secretary,		•		•	Harrisburg.
Depar	tment	of F	isherie	8.	
W. E. Meehan, Commissioner,					Harrisburg.
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Board of	Fishe	ry Co	mmis	sion.	•
John Hamberger, Henry C. Cox,	•	•	•	•	Erie.
Henry C. Cox,	•	•	•	٠	
Andrew R. Whitaker,	•			•	Phœnixville.
W. A. Leisenring,	•	٠	•	•	Mauch Chunk.
R	HODE	Isla	ND.		
Commission	iers o	f Inla	nd Fi	sher	ies.
Henry T. Root, President,					Providence.
William P. Morton, Secretary,					Providence.
J. M. K. Southwick, .					
•					-

Charles W. Willard,							Westerly.
Adelbert D. Robert							Woonsocket.
Albert Davis Mead,	•						Providence.
William H. Boardm	an,						Central Falls.
	•						
	Com	ımi881	ioners	of Sh	eUfish	eries	ı .
James M. Wright,		•	•	•	•		South Scituate.
Herbert M. Gardine							Barrington.
Philip H. Wilbour,			•				
George W. Hoxie,			•		•		Charlestown.
James H. Northup,							Warwick.
James C. Collins, Cl	erk,	•,	•	•	•	•	North Providence.
	(Comm	iissio	ners of	Bird	8.	
C. H. Remington, C	hairm	an,					East Providence.
W. Gordon Reed, 2	d,						Cowesset,
E. R. Lewis, .							Westerly.
William H. Thayer,							Bristol.
A. O'D. Taylor,							Newport.
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Joseph H. Acklen,	•	•	•	•	•	•	Nashville.
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(Game,	Fish	and (Oyster	Com	miss1	ion.
R. H. Wood, .		•			•	•	Rockport.
			IJ	TAH.			
H. B. Cromar,			, `				Salt Lake City.
•							-
T7 (2 mm			VER	RMONT			
H. G. Thomas,	•	•	•	•	•	•	Stowe.
			Vir	GINIA.			
	•	Bo	ard oj	f Fishe	eries.		
W. McDonald Lee,	Chair	man,					Irvington.
S. Wilkins Matthew	s, Sec	retar	v.				Oak Hall.
George B. Keezell,							Keezletown.
Bland Massie, .							Tyro.
J. Murray Hooker,							Stuart.
•							
		1	Wash	INGTO	N.		
Fish Co	ommis	ssione	r and	Game	War	den .	Ex Officio.
· · · · ·							

John L. Riseland, Bellingham.

		W	EST '	Virgi	NIA.		
		Game	and i	Fish V		n.	
James H. Marcum,	•	•	•	•			Huntington.
		S	pecia	l Depi	uty.		
F. H. Merrick,	•		•	•			Huntington.
			Wisc	ONSIN	۲.		
		S	State 1	Warde	en.		
J. W. Stone, .		•	•	•			Barron.
	C	ommis	sione	rs of I	Fisher	ies.	
The Governor, ex of	ficio.						
Calvert Spensley, Pr	reside	ent,					Mineral Point.
James J. Hogan, Vie	ce-Pr	esiden	ıt,				LaCrosse.
E. A. Birge, Secreta	ry,						Madison.
William J. Starr,							Eau Claire.
Henry D. Smith,							Appleton.
Jabe Alford, .							Madison.
A. A. Dye, .							Madison.
James Nevin, Super	inten	dent,				٠	Madison.
			Wyo	MING			

State Game Warden.

D. C. Nowlin, Lander.

[B.] DISTRIBUTION OF FOOD FISH.

TROUT FRY.

Distribution of Fry from the Adams Hatchery during April and May, 1908.

APPLICANT.	Town.	Name of Brook.	Number
Edward J. Spall	Pittsfield.	Duncan,	5.000
Luke J. Minahan,	Lanesborough,	A. A. C.	5,000
William H. Newton,		Daniels,	5,000
John W. Downes.	Pittafield,		5.000
William P. McMann.	Lanesborough,	Rice	E 000
Dr. Thomas F. Curtin, .			5,000
A. A. Dooley,	TITAL C 13	Milton	F 000
George S. Baker,	Pittsfield,	Milton, Jacoby,	5,000
C A Acla	Pittsfield,		
James M. Burns,		Shaker,	F 000
Walter G. Wood,	Zittouciu, .		5,000
	North Chester,		
C A C C	Chester,	Kinney,	
Frank E. Cone,	471		
Frank E. Cone,	Chester, .	Packard,	5,000
H. E. Day,	Chester,		5,000
Allie R. Fisk,	Chester,	Westfield River,	5,000
E. F. Goodwin,	Chester,	Winchell,	5,000
George F. Sayles,	Adams,	Hoosac River, Fisk,	10.000
George F. Sayles, John R. Parker,	Adams, Savoy, Savoy,	Fisk,	3
John R. Parker,	Savoy,	Westfield River,	5,000
L. E. Flanders,	Savoy,	Gulf.	5,000
L. E. Flanders, W. S. Hathaway, Harry J. Sheldon,	Savov	Gulf. Horton,	5,000
Harry J. Sheldon, John W. Downes,	Cheshire, Pittsfield,	Mitchen.	5,000
John W. Downes.	intianeid,		10,000
John McCormick,	Windsor,	McCormick,	5,000
W. H. Spear,	West Stockbridge, .	Stickles, Yokum,	5,000
C. A. Acly,	Lenox,	Yokum,	5.000
C. A. Acly, . Benjamin T. Henry, .	Rowe,	Shippee, Sweet,	5.000
Sanborn G. Tenney	Williamstown, .	Sweet,	. 10,000
James H. Krum, Jr.,	North Adams,	North Branch,	11 00000
James H. Krum, Jr., .	North Adams,	Tunnel,	15,000
James H. Krum, Jr.	North Adams,	Tunnel, Hudson,)
James M. Van Huyck, .	Lee,		10,000
			185.000

Fry distributed from the Hadley Hatchery during April and May, 1908.

Chester A. Hinds.	. Orange,	14	d.	Swift River	(Wes	t).	10	1	5,000
W. H. Gale.	. Orange,		100	Cheney,				31	200
J. N. Moure,	. Orange,			Goodell,				-	10,000
A. M. Lymen.	. Montague,	24		Shingle Swa	mp,				5,000
Fannie E. Hawks,	. Goshen,		4	Packard,	. 22			12	5,000
John Doherty, -	. Goshen.			Hampshire.	4			-	5,000
W. A. Smith,	. Goshen,		2	Highland,	121			-	5.000
M. W. Smith.	. Goshen,		4	Rogers,	4	2	16	3	5,000
J. B. Besudoin.	. Chicopee Fr	alls.	9	Cooley.		16	13	1.1	5,000
William II. Robert.	. Chicopee Fa		3.1	Poor		10	18		5,000
Francis H. Graves.		-	11	8.72	-	-			5,000
Jeseph II. Parker,	. Chicopee,			Cooley,					5,000
H. F. Moulton, -	. Hardwick.	-	4	Newton.	60	2	25	20	5,000
H. N. Fisherdick,	. Hardwick a	nd Wa	re.	Muddy.	200	4	- 3	2	5.000
Dennis V. Shen	. Ware, .		-	Flat.			36	- 1	5.000

Fry distributed from the Hadley Hatchery, etc. — Concluded.

Applicant.	Town.	Name of Brook.	Number
George Allard, George E. Smith, Fred E. Field, John W. Haigis, Frank E. Briggs, W. G. Bisbee, Fred LaValley, A. J. Polmatin, W. G. Bisbee, C. M. Drake, Titcomb, Duane Edwards, Frank W. Roberts, William G. Nicholl, Sumner L. Munson, George R. Turner,	Ware, Greenwich, Montague, Williamsburg, Williamsburg, Williamsburg, Williamsburg, Chesterfield, Chesterfield, Erving, Northampton, Northampton, Northampton, Northampton, Whately, Williamsburg,	Leonard, Manly, Cold, Saw Mill River, West Branch, East Stream, Goehen, West Branch, Page, Porter, Munson, Jack, Parsons, Roberts Meadow, Running Gutter, Broad, West, Grass Hill,	5,000 5,000

Fry distributed from the Sutton Hatchery during April and May, 1908.

Henry E. Dean, Northbridge, Northbridge, Northbridge, Northbridge, S. Sandard, S. South Market M. Dean, Oakham, Five Mile,							
Leon H. Bowers C. F. Bowers Edward G. Clark Alfred Read R. K. Andrews L. C. Coburn Harry Smith W. G. Bailey J. A. Barton Fitchburg Ashburnham \$30,00	O. O. Oliver)					ı	
Leon H. Bowers C. F. Bowers Edward G. Clark Alfred Read R. K. Andrews L. C. Coburn Lord Lord Lord J. A. Barton J. A. Barton Fitchburg Ashburnham J. A. Barton							
Edward G. Clark, Alfred Read, R. K. Andrews, L. C. Coburn, Harry Smith, W. G. Bailey, J. A. Barton, Fitchburg, Ashburnham, J. S. O.							
Edward G. Clark, Alfred Read, R. K. Andrews, L. C. Coburn, Harry Smith, W. G. Bailey, J. A. Barton, Fitchburg, Ashburnham, J. S. O.			Į.				
Alfred Read, R. K. Andrews, L. C. Coburn, Harry Smith, W. G. Bailey, J. A. Barton, Henry E. Dean, Henry E. Dean, Horry Courtemanche, Horry E. Dean, Horry E. Dean		1 277 .6.11	Munn's.	_		٦l	** ***
R. K. Andrews, L. C. Coburn, Harry Smith, W. G. Bailey, J. A. Barton, Henry E. Dean, Henry E. Dean, Norton Company, Gardner M. Dean, Oakham, D. H. Gates, L. G. McKnight, Gardner, Gardner, Gardner, Gardner, Gardner, Gardner, Gardner, Gardner, Bailey, South Free, South Street, South		Weetheld, .	Powder Mill.	-	-	7 !	60,000
L. C. Coburn, Harry Smith, W. G. Bailey, J. A. Barton, Henry E. Dean, Henry E. Dean, Henry E. Dean, Myron R. Goddard, D. H. Gates, L. G. McKnight, Gardner, Bailey, South Bailey, Ba		,		•	•	1	
Harry Smith, W. G. Bailey, J. A. Barton, Fitchburg, Ashburnham, S. 0.00			i			ı	
W. G. Bailey, J. A. Barton, Fitchburg, Ashburnham, J. A. Barton, Henry E. Dean, Henry E. Dean, Norton Company, Oakham, Five Mile, 5.00 Myron R. Goddard, Hubbardston, Otter River, 5.00 Myron R. Gardner, Gardner, Crow Hill, 5.00 Myron R. Gardner, Bailey, 5.00 Myron R. Gardner, Crow Hill, 5.00						- 1	
J. A. Barton	W. G. Bailey	1				- 1	
J. A. Barton		Townsend	Lord			1	
Henry E. Dean, Henry E. Dean, Norton Company, Gardner M. Dean, Oakham, Oakham, Otter River, 5.00 D. H. Gates, Gardner, Gardner, Gardner, Crow Hill, 5.00 F. W. Dinwiddie, Gardner, Gardner, Gardner, Gardner, Gardner, Gardner, Gardner, Sailey, 5.00 F. W. Dinwiddie, Gardner, Bailey, 5.00 Gardner, Convert Mill, 5.00 Gardner,	J A Barton			•	•	- } }	30,000
Henry E. Dean				<u>-</u>	٠_	1	5.000
Norton Company,				_	_	l	
Gardner M. Dean, Myron R. Goddard, Hubbardston, Otter River, 5.00 D. H. Gates, Gardner, Gardner, Perley, 5.00 F. A. Gravlin, Gardner, Bailey, 5.00 Gardner, 5.00 Gardner, Bailey, 5.00 Gardner, 5.00		Worcester	Rarber's			Į.	
Myron R. Goddard, D. H. Gates, L. G. McKnight. Hubbardston, Gardner, Perley. 5.00 D. H. Gates, L. G. McKnight. Gardner, Gardner, Crow Hill, 5.00 5.00 F. W. Dinwiddie, Gardner, Gardner, Bailey, S. Oliver K. Pierce, Oliver K. Pierce, Dudley, Potash, 5.00 5.00 Joseph P. Love, Charles B. Adams, W. F. Durgin, Mendon, W. F. Durgin, Mendon, Westminster, Moore, 5.00 Webster, Westminster, Moore, 5.00 Michael J. Shea, John F. Hayden, Charles B. Ballard, Henry H. Hallock, George L. Gill, M. H. Coffin, C. V. Dudley, Northbridge, M. H. Coffin, Northbridge, North Grafton, North Grafton, Bummit, South Stevenson, Henry W. Carter, 5.00 Joseph E. Werme, 5.00 T. B. Stevenson, Henry Courtemanche, A. D. Norcross, Charles E. Bass, Oliver K. Pierce, Littleton, Black Pond, 5.00 Keenan, 5.00 A. D. Norcross, Charles E. Bass, Oliver K. Pierce, Littleton, Black Pond, 5.00 Chency Mansion, 5.00 A. I. Hunting, Chency Mansion, 5.00	Gardner M Deen		Five Mile	•	•	٠,	
D. H. Gates, C. Gardner, C. Gardner, C. Gardner, C. Gardner, C. Gardner, F. W. Dinwiddie, F. A. Gravlin, G. Gardner, G. Bailey, S. 5.00 G. W. Pratt, G. Gardner, Bailey, S. 5.00 G. Maller, Black Pond, S. 5.00 G. Charles B. Adams, W. Gebster, W. F. Durgin, W. Mendon, W. Gestminster, M. G. Chickering, M. G. Chickering, M. G. Chickering, M. G. Chickering, M. Hayden, G. Charles B. Ballard, H. G. Hayden, G. Hampden, H. G. Hayden, H. G. Howard, H. H. Hallock, M. H. Coffin, Northbridge, W. L. Taft, M. H. Coffin, Northbridge, North Grafton, Henry Courtemanche, T. B. Stevenson, Henry Courtemanche, A. D. Norcosas, Charles E. Bass, Orange, Littleton, Gardner, Crow Hill, Scoub Heiley, Scoub Hords, South Street,				•	•	٠,۱	5,000
L. G. McKnight, Gardner, Gardner, Perley, 5.00 F. W. Dinwiddie, Gardner, Gardner, Bailey, 5.00 A. W. Pratt, Gardner, Bailey, 5.00 Oliver K. Pierce, Ayer, Black Pond, 5.00 Joseph P. Love, Dudley, Potash, 5.00 Charles B. Adams, Webster, Potash, 5.00 Windsor F. Neal, Mendon, Valley, 5.00 Windsor F. Neal, Westminster, Moore, 5.00 Michael J. Shea, Warren, South Street, 5.00 Michael J. Shea, Hampden, Palmer, Swift River, 5.00 H. G. Howard, Hampden, Scantic River, 5.00 Henry H. Hallock, George L. Gill, Northbridge, Northbridge, M. H. Coffin, Northbridge, Northbridg		C		•	•	٠,	
F. W. Dinwiddie, Gardner, Perley, 5.00 F. A. Gravlin, Gardner, Bailey, 5.00 A. W. Pratt. Gardner, Bailey, 5.00 Oliver K. Pierce, Ayer, Black Pond, 5.00 Joseph P. Love, Dudley, Potash, 5.00 Ky. F. Durgin, Webster, Potash, 5.00 Windsor F. Neal, Mendon, Valley, 5.00 Michael J. Shea, Westminster, Moore, 5.00 John F. Hayden, Lancaster, Pine Hill, 5.00 John F. Hayden, Swift River, 5.00 Charles S. Ballard, Hampden, Scantic River, 5.00 Henry H. Hallock, Hubbardston, Joe Pond, 5.00 M. H. Coffin, Northbridge, Northbridge, Northbridge, W. L. Taft, Northbridge, Brigham, 10,00 C. V. Dudley, North Grafton, Prentice, 10,00 Elmer A. Macker, North Grafton, Nonther, 5,00 <tr< td=""><td>I C Maknight</td><td></td><td></td><td>•</td><td>•</td><td>٠,</td><td></td></tr<>	I C Maknight			•	•	٠,	
F. A. Gravlin, Gardner, Bailey, 5,00 Oliver K. Pierce, Ayer, Black Pond, 5,00 Joseph P. Love, Dudley, Potash, 5,00 Charlee B. Adams, Webster, Potash, 5,00 W, F. Durgin, Mendon, Valley, 5,00 Windsor F. Neal, Meestminster, Moore, 5,00 Arthur G. Chickering, Lancaster, Pine Hill, 5,00 John F. Hayden, Lancaster, Pine Hill, 5,00 John F. Hayden, Palmer, Swift River, 5,00 Henry Charles, Hubbardston, Joe Pond, 5,00 Henry Charles, Northbridge, Prentice, 10,00 <td>F W Dinwiddia</td> <td></td> <td></td> <td>•</td> <td>•</td> <td>٠,</td> <td></td>	F W Dinwiddia			•	•	٠,	
A. W. Pratt. Oliver K. Pierce,			Reiloy	•	•	٠,	
Diver K. Pierce, Ayer, Dudley, Dotash, 5,00 Charles B. Adams, Webster, Potash, 5,00 Webster, Potash, 5,00 Webster, Potash, 5,00 Westminster, Moore, 5,00 Mendon, Valley, 5,00 Mendon, Moore, 5,00 Mestminster, Lancaster, Pine Hill, 5,00 Moore, 6,00				•	•	.	
Doseph P. Love, Dudley, Potash, 5,00			Black Pond	•	•	٠,	
Charles B. Adams, W. Ebster, Mendon, W. F. Durgin, W. F. Durgin, W. Mendon, Westminster, W. Valley, 5.00 Moore, 5.00 Moore, Moore, 5.00 Moore, Moore, 5.00 Moore				•	•	٠,	
W. F. Durgin, Westminster, Woore, S.00	Charles B. Adams	Waheter		•	•	٠,۱	
Windsor F. Neal, Arthur G. Chickering, Michael J. Shea. Westminster, Eancaster, Pine Hill, 5,00 5,00 Michael J. Shea. Warren, South Street, 5,00 5,00 John F. Hayden, Charles S. Ballard, Hampden, H. G. Howard, H. G. Howard, George L. Gill, Northbridge, W. L. Taft, Northbridge, M. H. Coffin, Northbridge, Brigham, C. V. Dudley, Northbridge, Northbridge, Northbridge, Prentice, Scantic River, Street, Stre	W F Durgin	Menden	Valley !	•	•	. [
Arthur G. Chickering, Michael J. Shea, Michael J. Shea, Warren, South Street, 5.00 John F. Hayden, Palmer, Swift River, 5.00 L. Ghoward, Hampden, Scantic River, 5.00 Henry H. Hallock, Hubbardston, Joe Pond, 5.00 Coeyne L. Gill, Northbridge, Northbridge, Northbridge, Brigham, 10,00 C. V. Dudley, Northbridge, Northbridge, Northbridge, Prentice, Since Millbury, North Grafton, Bummit, Joseph E. Werme, T. B. Stevenson, Henry Courtemanche, A. D. Norcosa, Charles E. Bass, Orange, Cheney Mansion, 5.00 A. I. Hunting, Swift River, 5.00 Sw		Westminster		•	•	٠,۱	
Michael J. Shea, Warren, South Street, 5.00		I appenditor		•	•	٠,١	
John F. Hayden, Palmer, Swift River, 5.00				•	•	٠,۱	
Charles S. Ballard, H. G. Howard, H. G. Howard, H. G. Howard, H. G. Howard, H. Henry H. Hallock, George L. Gill, W. L. Taft, Northbridge, M. H. Coffin, C. V. Dudley, Northbridge, Northbridge, Northbridge, Prentice, Scarroll's, Horthbridge, Northbridge, Northbridge, Northbridge, North Grafton, North Grafton, Henry W. Carter, Joseph E. Werme, T. B. Stevenson, Henry Courtemanche, A. D. Norcross, Charles E. Bass, Orange, Charles E. Bass, Orange, Littleton, Black Pond, 5,00 A. I. Hunting, Scantic River, 5,00 5,00 10,00 1		Palmer		•	•	٠,١	
H. G. Howard, Henry H. Hallock, George L. Gill, W. L. Taft, M. H. Coffin, C. V. Dudley, Elmer A. Macker, Northbridge, Northbridge, Northbridge, Northbridge, Northbridge, Northbridge, Northbridge, Northbridge, Northbridge, Prentice, Carroll's, Bummit, North Grafton, Bummit, No Name, Southbridge, T. B. Stevenson, Henry Courtemanche, A. D. Norcross, Charles E. Bass, Orange, Charles E. Bass, Oliver K. Pierce, Littleton, Bumanit, Southbridge, Keenan, Southbridge, Keenan, Southbridge, Cheney Mansion, Southbridge,	Charles & Rallard			•	•	.	
Henry H. Hallock, George L. Gill, Northbridge, Northbridge, M. L. Taft, Northbridge, Northbridge, Brigham, Sc. V. Dudley, Northbridge, Northbridge, Northbridge, Prentice, Carroll's, School C	H C Howard	Trampuen,	Scantic Idver,	<u>.</u>	٠_	٠,	
George L. Gill, Northbridge, Northbridge, Brigham,		Hubbandston	Ine Pond			- 1	
W. L. Taft, Northbridge, Brigham, 10,00					•	- 11	- •
M. H. Coffin, Northbridge, Prentice, 10,00 C. V. Dudley, Northbridge, Prentice, 10,00 Elmer A. Macker, North Grafton, Bummit, 10,00 Henry W. Carter, Millbury, No Name, 5,00 Joseph E. Werme, - - 5,00 T. B. Stevenson, Southbridge, Keenan, 5,00 A. D. Norcross, Orange, Chency Mansion, 5,00 Charles E. Bass, Orange, Cheney Mansion, 5,00 A. I. Hunting, Black Pond, 5,00				•	•	- }]	10,000
C. V. Dudley, Northbridge, Prentice, Carroll's, Bummit, Stone Ston		Manak Luddan	Dignam, .	<u>.</u>	٠_	- ()	
Elmer A. Macker. North Grafton, Bummit. 10,00 Elmer A. Macker. North Grafton, Bummit. 10,00 Henry W. Carter, Millbury, No Name, 5,00 T. B. Stevenson, Henry Courtemanche, A. D. Norcross, Charles E. Bass. Orange, Charles E. Bass. Orange, Littleton, Black Pond, 5,00 A. I. Hunting, 5,00			Prontice	_	_	- }]	10,000
Elmer A. Macker. North Grafton, Bummit. \$ 10,000		North Creston			•	- { }	
Henry W. Carter, Millbury, No Name, 5,00				•	•	-}	10,000
Joseph E. Werme,	Honer W. Conton			•	•	٠,1	5 000
T. B. Stevenson, Henry Courtemanche, A. D. Norcross, Charles E. Bass, Orange, Cherey Mansion, 5.00 A. I. Hunting, Black Pond, 5.00 A. I. Hunting, 5.00	Toron F Warms	Millioury,	No Name, .	_	٠	• 1	
Henry Courtemanche, A. D. Norcross, Charles E. Bass, Orange, Cheney Mansion, 5,00 Oliver K. Pierce, Littleton, Black Pond, 5,00 5,00	T D Stevenson	1 3 5 5	1 = =	_		- 1	
A. D. Norcross, Charles E. Bass, Orange, Cheney Mansion, S.00 S.00 A. I. Hunting, Diagram A. D. Norcross, S.00 S.00 S.00 S.00 S.00		Southbridge	Kaanan	_	_		
Charles E. Bass, Orange, Cheney Mansion, 5.00 liver K. Pierce, Littleton, Black Pond, 5.00 5.00 5.00	nenry Courtemanche, .	Southbridge,	Keenan, .	•	•	٠.	
Oliver K. Pierce, Littleton,		1 0	Change Mannion	_	_	- 1	
A. I. Hunting, 5,00	Oliver W. Dieses			•	•	•	
		Littleton,	Disck Fond,	•	• _	• 1	
270,00	A. I. Dunting,			_	_	- 1	0,000
270,00		1	ĺ			- 1	270 000
			ĺ			- 1	210,000
			<u> </u>				

Fry distributed from the Winchester Hatchery during April and May, 1908.

111

APPLICANT.	Town.	Name of Brook.	Numbe
Percy E. Varnum, .	Tyngsborough, .	Flint's,	4,000
Harry K. Noyes, F. W. Vaughn,			4,000
F. W. Vaughn,	Lowell,	Cowdry,	4,00
B. J. Bigelow,	North Chelmsford, .	Swain's,	4,00
William E. Badger,			4,00
George W. Alcott,	Chelmsford,	Black,	
Willis S. Holt,	Andover,	Hardy's,	4,00
H. E. Richardson, .	Westford,	Keyes,	. 4,00
Caleb L. Smith,	Chelmsford Center.	Blind,	4,00
F. A. Griffin.	Westford,	Nashoba.	4.00
Herbert E. Lord,	Burlington	Winn Street,	4.00
Dr. E. R. Chalmers	Woburn,	Cummings,	4.00
M. E. Siblev	Saugus,	Mansfield's,	4.00
M. F. Holt.	Wilmington,	Chemical	4.00
Arthur E. Roberts.	Reading,	Northwest and Burton.	4.00
South Acton Fish and	1	Rocky	4,00
Game Association.	Acton,	Taylor's,	4.00
Waltham Fish and	Waverly and Wal-	-	1
Game Association.	tham.	Beaver,	8,00
ohn J. Kennedy.	Stoughton.	Dead Meadow	4.00
Chomas S. Prouty.	Sharon.	Spring,	4.00
N. F. M. Wilson, .	East Foxborough,	Tecuanticut,	4.000
Richard L. Everit.	337 11 1	Cold Spring,	4.00
Richard Olney, 2d.	Dedham.	Com Spring,	4.00
George B. Treen.	37 0 11	Wilbur,	4,000
Edgar L. Freeman.	Mansheld, Medway,		4.00
Edgar L. Freeman,			1 7,00
		Turnpike,	
Clyde C. Hunt,	Medway,	Cress,	4,000
	D - 1.	n	
Game Protection As-	Brockton,	Beaver, Montello, Torrey, .	12,00
sociation		la	
harles S. Baker,	Falmouth, .	Coonamessett,	
ohn W. Delano,	Rochester,	Doggett's,	4,00
Philip Rogler,	New Bedford,	Bread and Cheese,	
C. E. Taylor,	Wobum,	Cummings,	4,00
C. C. Taylor,	Woburn,	Blanchard,	4,00
E. H. Ives,	Woburn,	Coleman,	4,000
D. F. McIntosh,	Woburn,	Cutter,	4,000
Wallace Penney,	Woburn.		4,000
R. H. Magee,	Woburn,	Johnson,	4,00
cominster,	Leominster.	Lunenburg,	20.00
Sportsmen's Association.	Lunenburg,	Houghton,	11
George H. White,	Randolph,	Cold Spring,	4,000
•	1	1	184,000

Fingerling Trout Plants during Fall of 1908.

I D. I	777.1	n	0.50
Joseph P. Love,			250
	Webster,		250
Henry W. Carter, .			500
	Grafton,		250
Elmer A. Macker	North Grafton.	Carroll's and Bummit,	500
W. R. Wallis,	The second second	Howell	250
W. L. Church	0 3 5	Parker.	250
T. B. Stevenson		1	250
John H. Stockman	01 1.	Aldrich, Davidson, McKinstry,	750
A. D. Norcross	Ob b '	1 *	250
D T D1-	TT7		
TT TO TO			250
		Lincoln and Beaver,	750
Norton Company, .			250
Peter Baker,			250
Jay Snell,			250
	Spencer,	Thompson,	250
H. H. Capen,	Spencer	Howes,	. 500
A. P. Morin.	North Brookfield.	Bigelow, Mad, Town Farm, .	1.000
Michael J. Shea	Warren,		250
William Wadsworth		77.11	250
Hiram J. Parent	TT 11 '	[17	250
Thomas H. Davis	TT-1.1	Domone	250
TILL T TO- CA	NY TIN TO I	D 73	250
O T O'N	M	Manakhadala	
			250
M. H. Coffin,	Northbridge, .	Devlin,	250

Fingerling Trout Plants during Fall of 1908 - Continued.

APPLICANT.	Town.	Name of Brook.	Numb
T. V. Dudley.	Northbridge, .	Prentice.	2
I. F. Cummings.	Shrewsbury,	Prentice,	2
leorge P. King.	Paxton.	Carruth,	2
S. Hubbard.	Sturbridge,	Long Pond,	2
S. Gallahan.	Stummeling	Clav	2.
olm Day, Jr.	Sturbridge,	Clay Bemis,	2
olm Day Jr.; olm L. Houde;	Sturbridge.	Hinman,	2
F. Dalan.	Southbridge,	McKinstry.	2
r. Dakin.	Southbridge,	McKinstry, . Side Hill Stream, .	2
bul E. Whitaker,	Southbridge,	McKinstry.	2
N. Strockwell	Auburn.	Stone's.	2
lufus E. Howe, ames M. Burns. Villiam H. Newton.	Sterling, Pittsfield,	Stone's, South Meadow,	5
ames M. Burns.	Pittafield.	Yokum and Sackett,	1,0
Villiam H. Newton.	Pittsfield,	Daniels and Sachem.	1,0
			5
corne S. Baker		2 2 2 2	5
ames R. Williams	Douglas,	Howell,	2
Jeorge F. Sayles.	Adams,	Dry,	1,0
Villiam P. Martin.	Adams, .	Palton and Tophet,	1,0
rancis O'Neill, Jr.,	Adams,	Fisk and Tophet	1.0
ageian B. Moore.	Tyringham	Hop	5
anborn G. Tenney	Tyringham,	Hop, Hemlock and Buxton,	1.0
iconge S. Baker, ames R. Williams, iconge F. Saylos, Vilham P. Martin, rancis O'Neill, Jr., acian B. Moore, andoorn G. Tsunsy, olm R. Parker, N. Healton		Tributary Westfield River	5
N. Haskins,	Savoy, Savoy, Cheshire, Cheshire,	Haskins	5
fighael Clangy	Cheshire,	Kitchen,	5
rancis O'Neill. Ienry Hosburgh,	Cheshire, .	Collina.	
tenry Hosburgh.	Dalton,	Cady,	1.0
	State Line,	Cady,	5
V. J. Ingram, J. M. Jacot, E. Hopkins, Jomer E. Foote, red W. Trursdell,	South Lee,	Powder Mill,	
M. Jacot,	Stockbridge,	Muddy,	1,0
E. Hopkins.			E
iomer E. Footy.	Great Barrington, Great Barrington, Great Barrington,	Alford, Williams River,	1.0
red W. Truesdell.	Great Barrington	Williams River	1,0
	Great Barrington, .	Green River,	1,0
E. Dav.	Chester,	Westfield River,	1
L.E. Day, rederick A. Moulton,	Chester,	Walker,	1,0
E. Curry.	Chicopee Falls, .	Cooley and Poor,	1,0
Tancis H. Graves.			1.0
ra J. Humes,	Holyoke,	Broad.	1.0
L. D. NOTETING.	Monson,	Conant and Gulf,	1,0
screw J. Shumway.	Holyoke,	Broad.	1,0
T. Strange,	Stoneham,	Broad, Willow,	5
harles E. Arnold,	Stoneham,	Aberjona	
A. Ponney:	Wilmington,	Richardson Pond.	
LE & Clement.	Wakefield,	Means, Saunders, Kittredge, .	5
Valtham Fish and)			
Game Protective As-	Waltham,	Cherry and others,	2,5
encuition.			100
A. Whiteomb,	South Billerica,	Greenwood and Meadow,	5
A. Whiteomb,	Ayer.	Shaker,	
larry G. Front.	Hudson,	Parmenter,	5
rank D. Cheney.	Dunstable, .	Unkety	5
rank D. Cheney, J. Whelton, H. Sinchir	South Peabody, .	Norris.	
H. Sinchir.	Middleton,	Poor's,	E
	Hamilton,	Miles,	1
T. Drew.	South Lawrence, .	Cold Spring,	1,0
E. Sibloy,	North Saugus,	Howlit,	
D. O'Brien,	Rowley,	Batchelder,	5
B. Tarkov,	Newbury,	Saw Mill and Courser.	1,0
trebburg Ride and)	Fitchburg, .	Sheldon, Lock, Lord, Mulpus,	2,5
I. T. Dres, I. E. Stbley, I. D. O'Brien, I. B. Taylox, Itchbugz Rifle and Jun Club.		Ashburnham,	-,0
r. E. F. Lincoln,	Leominster and	Fort, Lunenburg, Monoosnuck,	2.5
The second secon	Lunenburg,		100
red S. Casavant,	Gardner, .	Poor Farm,	5
W. Pratt,	Gardner,	Bailey,	5
alter Streeter,	CONTRACTOR OF THE CONTRACTOR		5
yron R. Goddard, lenry E. Dean, lenry L. Pierce, rthur G. Chickering, F. Durgin, ardner M. Dean,	Gardner,	Cook,	5
lenry E. Dean,	Oakham,	Pratt.	5
lenry L. Pierce,	Barre.	Prince River,	5
rthur G. Chickering,	Lancaster,	Pine Hill,	5
F. Durgin,	Mendon,	Muddy,	5
ardner M. Dean, .	Oakham,	Nigger,	5
L. Hager, I. G. Howard, Ienry H. Hallock,	Winchendon, Ashburnham,	Carter and Beaman's.	5
. G. Howard,	Ashburnham, .	Cooper,	5
	Hubbardston, .	Ton Vard	5

Fingerling Trout Plants during Fall of 1908. — Concluded.

W P		,	
W. Barney,	West Brimfield.	Quabog,	2,50
lfred Read,	Westfield,	Munn's Fowler Powder Mill.	2,50
harles S. Ballard, .	Hampden,	Scantic,	50
harles H. Sawver	Northampton, {	Scantic, Broad, Running Gutter, Roberts, Parsons.	2.50
eorge L. Harris, .	Sunderland,	Roberts, Parsons, S	50
S. Gabb.	Cummington, .	Nipping.	1,00
. S. Gabb, W. Pettingill,	. Cummington	Nipping,	1,00
.r.ones,	Ware,	Flat,	50
ewis Albertine	Ware,	Allard,	50 50
eorge E. Smith, . W. Jackson	Belchertown, .	Pudding Mill,	50
W. Jackson,	New Salem	West branch Swift River,	2,00
N. Moore,	Orange,	Jones,	2,00
reenfield Sportsmen's	Greenfield	Kelly, Fisk and others.	2.50
Club.	1	l ''	1,00
E. Briggs, M. Lyman, hn W. Haigis,	Montague, Montague,	Sawmill,	1,00 50
ohn W. Haigis.	Montague,	Pond,	50
L. Uraite,	Whately,	Glen,	50
rod E Field	Montague,	Cold,	50
W. Hanson,	Erving.	Jacks,	50
rank J. Knight,	Warwick, Townsend,	Mosquito Mill, Bixby and Barbery Mill,	50 50
harles N. Hargraves,	South Framingham.	Rattlesnake and Angelica,	2.00
Game Protective As-	South Acton, .	Taylor,	2,50
sociation, .	Danding.	B W J	
mes A. Baxter,	Reading, Reading,	Bear Meadow,	50 50
harles A. Damon, ufus B. Dodge,	Charlton,	Migget,	85
oses Gross,	Northborough.	Hows,	85
oseph E. Werme,	Worcester and \	Hull	88
•	Auburn, .	1 ==,	1
. H. Gabeler, . C. Needham,	Northborough, Coldbrook,	Hows,	1,00
. F. Earle,	Templeton,	Cook,	1,00
rank A. Gravlin, .	Hubbardston	Lovell,	1,00
. W. Buckley,	Ware	Flat	1,00
ichael J. Murray, .	Holyoke,	Broad,	85
Frank Stone, rank F. Bullard, .	East Brookfield, . East Brookfield, .	Walker Pond,	50 50
erbert C. Branch, .	Webster,	Great,	1,00
. Capen,	Spencer,	Meadow,	1,00
. E. Hallev	Methuen,	Barker's,	1,00
harles S. Baker,	Falmouth,	Coonamessett,	1,00
rockton Fish and Game Protective Association.	Brockton,	Torrey, Montello, Beaver, .	2,00
1	Abington and		ŀ
rank H. Shaw, .	South Wey-}	Grove Pond, Old Swamp, .	80
 	mouth, .)	Battlemales	. ~-
harles W. Davol, .	Freetown, Berkley,	Rattlesnake,	1,20
. F. Howard, . . H. Packard, .	Attleborough, .	Bungy,	1.00
lyde C. Hunt,	Medway,	Lone Star and Black Fly,	1,20
dgar L. Freeman	Medway,	Dewey,	80
ohn Kennedy,	Stoughton,	Dead Meadow.	80
ichard Olney, 2d,	Dedham,	Meadow,	80 80
eorge E. Bessom.	Mansfield,	Meadow,	40
arroll S. Cobb,	Mansfield,	Hersey,	40
alter F. Ellis, eorge E. Bessom, arroll S. Cobb, libert T. Hodges, D. Spaulding,	Mansfield	Town Farm,	40
D. Spaulding,	Mansfield, New Bedford,	Hersey.	40
hilip Rogler,	New Bedford,	Bread and Cheese,	1,00
oseph E. Grassie,	Norwell and Hing-	Norwell and Long Lane, .	80

Ponds stocked and closed in Accordance with Chapter 91, Section 19, Revised Laws, as amended by Chapter 274, Acts of 1903, and further amended by Chapter 306, Acts of 1907.

M		RAIN	BOW T	ROUT.	BROWN TROUT.			
NAME OF POND.	Town.	Finger- lings.	Year- lings.	Adults.	Finger- lings.	Year- lings.	Adulta.	
Robin's, Lake Dennison.	East Bridgewater, Winchendon,	1,500	- 62	3	2,000	-	-	
Boot,	Plymouth,	11000	-	=	1.500	-	-	
Eddy,	Auburn, Haverhill,	1.500	3	31	2,000	-	3	
Nagog Lake,	Acton and Littleton,	1,000	175	12	2	150	12	
		3,000	175	12	5,500	150	12	

PONDS RESTOCKED DURING THE YEAR 1908.

Name of Pond.	Town.	Brook Trout, Adults.	Rainbow Trout, Finger- lings.	Brown Trout, Finger- lings,	Land-looked Smelt Eggs
Stiles. Spectacle. Forge. Attitual Lake, Quinsignment. Bucks. Bridge Creek. White. Singleterry, Quinsignment River, Quinsignment Lake, Chebogagog.	Littleton, Littleton, Amesbury, Shrewsbury, Harwich, West Barnstable, Chatham, Millbury, Grafton,	230 100 210 400	1,500	1,500 2,000 1,500 2,000	5,000,000 2,000,000 2,000,000 2,000,000
		040	1,500	7,000	11,000,000

[C.]
DISTRIBUTION OF PHEASANTS.

Applicant.	Town.	Number.
Charles C. Church,	. Millbury,	8
Willard H. Bates.	. Millbury,	6
THE T CO.	. Auburn,	$\ddot{6}$
Charles B. Adams, H. Courtemanche,	. Webster,	6
H. Courtemanche.	. Southbridge,	6
Henry E. Dean, Gardner M. Dear	n, Worcester,	6
F. E. Hopkins,	. Becket	8
YF 73 YS *	. Huntington,	8
William E. Smith,	. North Chester,	$\check{8}$
J. M. Van Huyck,	. Lee	8
John R. Parker,	. Lee,	8
Sanborn G. Tenney,	. Williamstown,	8
F. H. Saunders,	Westfield.	8
George L. Rindge,	North Wilbraham,	8
Joseph P. Love	. Webster,	8
Joseph P. Love,	. Southbridge,	8
	. North Brookfield,	8
William T. Nesbitt,	. Chicopee.	8
E. W. Strecker.	Greenfield,	8
E. W. Strecker, J. H. Schoonmaker,	***	8
G. W. Wheelwright,	Hardwick,	8
J. H. Gafney,	Petersham,	8
Henry F. Rice.	. Sutton,	8
J. H. Gafney,	. West Millbury,	. 8
Charles H. Goodell.	. Worcester,	8
Elmer A. Macker,	North Grafton.	8
Frederick Saunders,	. Westfield,	8
Clyde C. Hunt.	. Medway,	8
Clyde C. Hunt,	Berlin	8
William G. Cummings.	Berlin,	8
M. C. Needham,	Coldbrook	8
Frank J. Knight,	. Townsend,	8
Walter F. Durgin.	. Hopedale,	8
George S. Potter,	. Southbridge,	8
	Southbridge,	8
George I Shumway	. Holyoke,	8
Sigmund Klaiber,	. Turners Falls,	8
John C. Stone,	. Athol,	8
D. W. Baker.	Phillipston,	8
Edward Miller,	. Northampton,	8

Distribution of Pheasants - Continued.

APPLICANT.		Town.	Number.
Edward J. Norman,		Lee,	. 8
Travers D. Carman,	. [Tolland,	8
Charles A. Church,		Millbury,	6
Walter J. Stone,		Auburn	6
T. B. Stevenson,		Manchaug,	6
George E. Brigham,	١.	Worcester,	6
W. H. Buck,	١:	Oxford,	6
M. E. Turner,	٠,	Chester,	6
George L. Brown,	•	Littleton,	6
J. G. Waters,	٠,	Salem,	4
B. Frank Smith,	•	A 1 '	4
Harrison G. Blake,	•	Woburn,	4
	•	Podford	4
Charles H. Wood,	•	Bedford,	4
Warren Beede,	.	Lynn,	4
LeRoy Parkhurst,	•	Chelmsford,	
Fred W. Cheney,	.	Rowley,	4
E. A. Carpenter,]	North Reading, .	4
South Acton Fish and Game A	78-	0 1 4 4	
sociation,	•	South Acton,	12
Paul O. Kable,	•	North Chelmsford,	6
George W. Alcott,	- 1	Lowell,	6
Henry L. Sawyer,		Fitchburg, .	6
J. A. Barton,	.	Fitchburg,	. 6
John W. Wheeler,	.	Orange,	6
Nathan F. Ives,	.	Rowley,	6
William T. Jeffrey,	.	Salem,	. 6
C. W. Hicks,	. [Waltham,	. 6
James Rourke,	٠, ١	Lynnfield Center,	6
R. F. Goddard,		Woburn,	6
M. F. Holt,	.	Wilmington,	. 6
Charles H. Wood,		Bedford,	6
W. H. Wickens,	.	Lawrence	6
Thomas Croswell,	: I	Lawrence, North Reading, .	6
Arthur Bliss, Jr.,		Andover,	6
L. W. Prouty and F. P. Hewins,		South Framingham,	6
Brockton Fish and Game Associ		Doddin I ramingham,	.
tion,		Brockton,	6
E. B. Nevin,	٠,	South Weymouth, .	6
	٠		8
James McGrady,	.	Lawrence,	8
William A. Thom,	.	Methuen,	8
Oliver K. Pierce,	•	Ayer,	8
Thomas H. Varnum, .	•	Lowell,	Ö
Charles E. Abare,	•	Dracut,	8
Albert T. Hodges,	.	mansheld,	. 8
Edgar L. Freeman,		Medway,	8
Harry G. Frost,		Waltham,	8
Fred F. Trull,	.	Hudson,	8
Richard P. Waters,	.	Wenham, .	8
J. C. Todd.	!	Newburyport, .	. 8

Distribution of Pheasants -- Concluded.

Applicant.		Town.	Number	
APPLICANT. W. B. Cross, Paul O. Kable, Albert W. Lewis, Charles W. Davol, Norman Barstow, L. H. Bartlett, Thomas A. McDonald, George B. Lord, Weldon H. Reynolds, L. D. Baker, Jr., Alexander Pope, John Cary Spring, Henry E. Garfield, W. M. Small, Henry O. Whiting, William T. Corey, Dexter E. Wadsworth, W. W. Bradbury, D. E. Halley, George H. Doty, Henry A. Barton, Rufus W. Page, M. E. S. Clemons, H. E. Guy, Harry E. Converse,		Brockton, . Tyngsborough, Fall River, . Taunton, . New Bedford, Boxford, . Gloucester, . Melrose, . Braintree, . Wellfleet, . Hingham, . Gloucester, . South Yarmouth, North Truro, Plymouth, . New Bedford, Quincy, . Lawrence, . Lawrence, . Lawrence, . Waltham, . Dalton, . Newburyport, Wakefield, . Brockton, . Marion, .		Number 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
Edward W. Grew, Fitchburg Rifle and Gun Club, Charles F. Cowdry, C. C. Puffer,	, .	Farm Street, Fitchburg, Fitchburg, Brockton.		8 6 6 3
o. o. runer,	•	Diockon, .	•	826

[D.]
DISTRIBUTION OF BELGIAN HARES.

APPLICANT.			Town.	Number.			
J. A. Barton, .			•	Fitchburg, .	•		7
James H. O'Hara,			•	Greenfield, .			7
John T. Montgomery,				Ware,	٠		7
Sanborn G. Tenney,				Williamstown,			7
James Coe, Jr., .				Taunton, .			7
							35

[E.]

ARRESTS AND CONVICTIONS.

Report upon Convictions, Fines, etc., for Violations of the Fish and Game Laws.

Town or City.	ity. Offence.	Court Decision.	Fine.	Remarks
New Bedford, Fairhaven, New Bedford, Fairhaven, New Bedford, Fairhaven, North Weymouth, Hull, Hull, Hull, Hull, Hull, Hull, North Weymouth, Quincy, Dorchester, Dorchester, Dorchester, Now Bedford, New Bedford,	Taking shellfish in violation of \$ 114 91, R. L., also c. 285, Acts of 1907,	Discharged, Convicted,	10 00 10 00 10 00 10 00 10 00 10 00 10 00 10 00 10 00 5 00 5	Filed. Filed. Filed.

Report upon Convictions, Fines, etc., for Violations of the Fish and Game Laws - Continued.

STATE v. —	Town or City.	Offence.	Court Decision.	Fine.	Remarks.
Jacob E. Martin, Mike Mack, Bolus Monte, Joseph Arsemult, Airne Breault, Jack Rose, Antone Avila, Fred Cormist, Michael Lellane, Frank Joseph, Amede Ganyon, Henry Marcotte, George Fisher, Marian Tavares, John Bisquit, Jules Gomes,	New Bedford, New Bedford, New Bedford, Fairhaven, Fairhaven, Fairhaven, New Bedford, New Bedford, Fairhaven, Fairhaven, Fairhaven, New Bedford, Fairhaven, New Bedford, Fairhaven, New Bedford,		Convicted.	\$50 00 10 00 10 00 10 00 10 00 10 00 10 00 10 00 15 00 15 00 10 00	Committed to jail; third offence
fanuel Fonseca, oseph Lavasurio, lenry Glader,	New Bedford, New Bedford, New Bedford, New Bedford, New Bedford, New Bedford,	91, R. L., REG C. 255, ACC OF 1907,	Convicted, . Convicted, . Convicted, . Convicted, .	10 00 10 00 10 00 10 00 10 00	Appealed.
Elmer E. Gifford, Joseph Manuel, . Manuel Mello, Antone Jaswan,	New Bedford, Fairhaven, New Bedford,		Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted,	10 00 10 00 10 00 10 00 10 00 10 00 10 00 10 00 10 00	House of correction.
Manuel Veira, . Marion de Silva, Frank Costa,	New Bedford, New Bedford, New Bedford,		Convicted, . Convicted, . Convicted, .	10 00 10 00 15 00	
Antone Grosse, Benjamin N. Chase, Albanu Ferreira,	New Bedford, New Bedford, Fairhaven,		Convicted, Convicted,	50 00 10 00	Filed. Second offence.

Victor Langleis. New Bedford. Antone Furtado. New Bedford. Antone Furtado. New Bedford. John Cawalho. New Bedford. John Brown. New Bedford. John Brown. New Bedford. Joseph Cabral. New Bedford. Manuel Amaral. New Bedford. Manuel Amaral. New Bedford. Manuel Conecia. New Bedford. Joseph Patrice. New Bedford. Joseph Patrice. New Bedford. Joseph Patrice. New Bedford. Joseph Saraquso. Framingham. John Stevens. Newburyport. Charles Richardson. Newburyport.	Taking shellfish in violation of \$ 114, c. 91, R. L., also c. 285, Acts of 1907,	Convicted, 50 00	Filed.
Pred Bush, Newburyport, William R. Pasnit, Brooklins, Leroy Slate. Nahant, Jamaica Plain, Sidney Christie, Jamaica Plain, Sidney Christie, Roxbury, Peter Sietarn, Lee, Lee, Geimini Bosilio, Lee, Dorchester, Harold P. Gurney, Whitman, George Raymond, John H. Parlis, Attleborough, Harry T. Pecidham, Attleborough, Joseph M. Carew, Boston, Walter C. Howard, Marlborough, Marlborough, Lee, Guy Howard, Marlborough, Albert D. Waterman, Rehoboth, Kenard Winsor, Boston, Charles A. Safford, Newburyport,	Hunting on Lord's Day in violation of \$1, c. 92, R. L., as amended by c. 176, Acts of 1904, .	Convicted, 10 00	Filed by request.
H. C. Noyes. Alfred Lorenzo, Clonesser, Cantun, Charles Church, Cantun, Charles Church, Cantun, Charles Church, East Saugus, Lynn, William H. Festerd, William B. Fester, Henry E. Johnson, Clonesser, Clonesser, Clonesser, Clonesser, Clonesser, Control	·	Discharged, Discharged, Discharged, Discharged, Convicted, Document of the Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Document of the Convicted, Discharged,	Probation six months. Filed. Filed. Filed.

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Report upon Convictions, Fines, etc., for Violations of the Fish and Game Laws - Continued.

STATE v	Town or City.	Offence.	Court Decision.	Fine.	Remarks.
Pred Martin, John Fritz, Jacob Koott, Fred Atkinson, James McGrady, James McGrady, Jimmie South, Camelo Camelo,	North Hanover, Greenfield, Greenfield, Greenfield, Lawrence, Lawrence, Lawrence, Waltham, Waltham,	Hunting on Lord's Day in violation of § 1, c. 92, R. L., as amended by c. 176, Acts of 1904,	Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted,	\$10 00 10 00 10 00 10 00 10 00 10 00 10 00 10 00	Filed.
Frank Gonselves, John Bararra, Paul Schmid,	Three Rivers, New Bedford, Pittsfield, Greenfield, Fitchburg,		Discharged, Convicted, Convicted, Convicted, Convicted,	10 00 10 00 10 00 20 00	Filed in Superior Court; paid \$56 fine for assault.
Victor Antonio,	Fitchburg,		Convicted, . Convicted, .	20 00 20 00	Filed in Superior Court; paid \$5 fine for assault.
Frank Castalann, Agabito Sango, Dominico Morgida, Salvato N. Terditte, Hajima Koyonu,	Fitchburg, Sharon, Becket, Revere, Randolph, Revere		Convicted, Convicted, Convicted, Discharged, Discharged, Convicted,	10 00 20 00 - 10 00	Filed; see killing song birds.
Alfonso Monaido, Joseph Purisi, Steve Usdaninis, Pasquaje Vilozi, Gandelis Rossilina, Rosario Campagnio, Tonsy Ross,	Whitneyelle. Pittafield. Pittafield, Brockton, Braintree, Randolph, Braintree, Braintree, Boston,	Hunting without license in violation of c. 317, Acts of 1905,	Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted,	10 00 15 00 10 00 10 00 10 00 10 00 10 00 10 00	
Joseph Kalowsky, John Gromoropoulos, Phonos Drokes,	Brockton, Lexington,		Convicted, . Convicted, .	10 00 15 00	Defaulted. Defaulted.
aul Spinachola, Ingene Lattoche, seorge Jeniska, rederico Paraboschi,	Framingham,		Convicted, . Convicted, . Convicted, . Convicted, .	10 00 15 00 10 00	Filed.

Convicted.

Discharged,

Discharged,

Discharged.

Discharged,

Convicted.

Convicted,

-

20 00

Filed.

10 00

-

-

.

George Turco,

William C. Long.

Frederick Higgins.

Thomas Thumbling

William H. Guinan.

Jonathan Ryder.

Boston.

Orleans, .

Orleans. .

Orleans. .

Southbridge, ..

Southbridge, .

Northampton.

Report upon Convictions, Fines, etc., for Violations of the Fish and Game Laws - Continued.

STATE V.	Town or City.	Offence.	Court Decision.	Fine.	Hemarks,
Walter D. Fisher. George F. Manning. Michael Banish Joseph Brouthers. Henry Moro. Thomas Guerra. George E. Ramsdell. John Trucott. John B. Ouilette. Morton Robbins. Lindley W. Mayhew. George Robbins. Herbert O. Bacon.	Hopkinton, Hopkinton, Palmer, Palmer, Mansfield, Mansfield, Reading, Haverhill, Tiverton, R. I. Plymouth, West Tiabury, Hyannis, Hyannis,	Fishing in great ponds in violation of \$26, c. 91, R. L., as amended by c. 308, Acts of 1904,	Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted,	\$20 00 20 00 20 00 20 00 20 00 20 00 	Case pending. Filed. Filed.
Demeters Jeanes, John L. Olkel, Manuel Silva, Clayton F. Baker, William H. Stewart, Albert White, Daniel S. Webber, Gabriel J. Erickson, Rodney A. Douglass, Manuel C. Mitchell, Benjamin Hodges, Emil Hanson, George C. Hollister, Horsee Plue, Patrick Kelley,	New Bedford, Lynn New Bedford, Brockton, Nahant, Onset, Gloucester, Rockport, Swampscott, Gloucester, Chiltonville, Cambridge, Granville, Adams, East Walpole,	Having short lobsters in violation of § 88, c. 91, R. L., as amended by c. 303, Acts of 1907,	Convicted, Convicted,	10 00 5 00 50 00 28 00 15 00 17 50 7 00 5 00 15 00 10 00 10 00 40 00	Filed. House of correction for non-pay-
H. H. Fogg, Russell F. Phelps, Nathat W. Willis, Crawford Linton, Frank Greer, George H. St. John, Louis C. Hathaway, Horace B. Balley,	Dorebester, North Adams, Foxborough, Boston, Charlemont, Hartford, Conn, Gill,	Having short trout in possession in violation of § 64, c. 91, R. L., as amended by c. 190, Acts of 1905,	Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted,	10 00 10 00 10 00 40 00 10 00 30 00 30 00 10 00	ment. Appealed.

Louis Siano, Frank Castalano, Harry Cull, Thomas P. Collins, Charles McGrath, Frank G. Cool, Patrick Albano,	Springfield,	Killing song birds in violation of § 7, c. 92, R. L., as amended by c. 250, Acts of	Convicted, . 10 Convicted, . 10 Convicted, . 10 Convicted, . 10 Convicted, . 2 Convicted, . 2 Convicted,	00 00 00 00 00 00
John Massiul, Alfonso Monaldo, Joseph Parisi, Steve Undaninis, Stave Undaninis, Rosario Campagnio, Frederick I. Carpenter, Charles A. Mitchell, Samuel Goldenburg, Charles F. Underwood, Estella A. Dwinnell, Estella A. Dwinnell, William P. Thayer,	Buckland, Pittsfield, Pittsfield, Bookton, Randolph, Braintres, Boston, Lowell, Lowell, Haverbill, Haverbill, Haverbill,	1907,	Convicted, . 2 Convicted, . 3 Convicted, . 3 Discharged.	00 00 00 00 00 00 00 00 00 00 00
Sman P. Imayer, Asso Kisene, enny A. Arnold, Emma B. Fellows, Atrick B. Magrane, f. B. Allen and Gertrude Cousens, Herbert P. Russell, ohn C. MacInnis, osenh F. Sherer.	Haverhill, Haverhill, Lynn, Lynn, Lynn, Lynn, Worcenter, Worcenter, Worcester,	Possession of feathers of certain birds for		00 00 00 00 00
ila Bjork, stherine Gallagher, bert S. Lowell, ec Hirsh, reston W. Johnson, herees Fitzpatrick, atherine Morrill and Eliza- beth Price, ary A. Murphy,	Worcester, Worcester, Worcester, Boston, Lynn, Lynn, Malden,	millinery purposes in violation of c. 329, Acts of 1903,	Convicted, 10 Convicted, 10 Discharged, 10 Convicted, 10 Convicted, 10 Convicted, 10 Convicted, 10	00 00 00 Filed.
ary A. Murphy, ances Cass. roline A. Finneran, ary Murphy, atoinette Moyser, mest Manahan, nea T. Thompson, sisse B. MoDermott, bu W. Maelanis,	Quincy, Boston, Boston, Boston, South Boston, Boston, Boston, Boston, Boston,	=	Convicted, 10	00 00 00 Filed.

Report upon Convictions, Fines, etc., for Violations of the Fish and Game Laws - Continued.

STATE P	Town or City.	Offenox	Court Decision.	Fine.	Remarks.
Samuel Callis. Catherine McCunn, Samuel Robinson, Samuel Dudgeon, Samuel Dudgeon, Samuel Dudgeon, Mrs. B. Grimshaw, Mrs. B. Grimshaw, Mrs. B. Grimshaw, Mrs. Lealty, Alice Classvant, K. L. Geodwin, M. L. Beucher, Mrs. Anelin Byrne, Mrs. Anelin Byrne, Mrs. Anelin Byrne, Mrs. Mary L. Renaud, Mrs. Louise Croisetiere, Pullin Genmaky, Allen Benausag, Oalvin P. Sanger, Joseph E. Paris, Homma Forman, Samuel Macaroisky, Silisabeth Allaire, Angelino Gaudreau,	Fall River, Fall River, Fall River, Fall River, New Bedford, New Bedford, New Bedford, New Bedford, New Bedford, New Bedford, Fall River,	Possession of feathers of certain birds for millinery purposes in violation of c. 329, Acts of 1903,	Convicted,	\$10 00 10 00 5 00 10 00 5 00 10 00 1	Two counts. Two counts. Filed; paid \$3.80 costs of court.
John Small. Arthur Townsend.	Webster	Dogs chasing deer in violation of § 18, c. 92, R. L., as amended by c. 245, Acts of 1905,	Convicted, Discharged,	10 00	
John Small, Arthur Townsend, Martin Lonergan, William Barton, William Moore, Andrew Kennedy, Francisco Roberto, Charles F. Williams, Manuel Silvia, Hornce Sampson,	Webster, Webster, Otis, Ayer, Leominater, Palmer, Laverett, Frectawn, Shirlsy,	Killing deer in violation of § 17, c. 92, R. L., as amended by c. 307, Acts of 1907, and c. 377, Acts of 1908,	Discharged, Discharged, Discharged, Convicted, Discharged, Discharged, Convicted, Convicted, Convicted, Convicted, Convicted,	100 00	Filed. Fined \$100 each, which court afterwards revoked. Filed; paid \$3.70 costs of court. Filed. Committed to house of correction on non-payment.
Giuseppe Demario, Saturni Borelli, Charles Rich, Allie R. Fisk, Lawrence Sorenson,	Deerfield, Deerfield, Ludlow, Chester, Clinton,		Convicted, Convicted, Discharged, Discharged, Convicted,	100 00	on non-payment.

Levi Wright, William L. Smart, Archive Coulomb, Charles Jaques, Walter Harnes, Allem Whoolders, Allem Whoolders, Allem W. Whitmore, David W. Whitmore,	Fn Fn Ly Ly Ly	anklin, anklin, anklin, anklin, anklin, and,	Setting forcet fires in violation of c. 299, Acts of 1907,	Convicted,		Filed. Filed. Filed. Filed. Filed. Filed. Filed.
Henry Coburn, Dollis Elker, Tullis Duby, Henry LaMountain, Wilford Giroux, Gideon Monett, Emil Roth, Paul Schmid, Fred Martin,	Inv	Irain, dian Oreland, dian Oreland, dian Oreland, dian Oreland, dian Oreland, dian Oreland, eonfield, eonfield, eonfield,	Hunting with ferret in violation of § 11, c. 92, R. L., as amended by c. 241, Acts of 1906,	Discharged, Discharged, Discharged, Discharged, Discharged, Convicted, Convicted, Convicted,	20 00	Filed.
John Fritz, Jacob Hoch, Jakeb Hoch, Max Hamm, John Hucker, Charles Follett, Stanley Caseck, John Mastarowski, John E. Nugle, Lewis Goff, Lesac C. Chase, John Patten,	Gr. Ho No No No No No Att	senfield, slyoke, styles, orth Attleborough, orth Attleborough, orth Attleborough, slyoke, tleborough, schury, ama,	Having short pickerel in violation of § 67, c. 91, R. L., as amended by c. 329, Acts of 1904,	Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted,	3 00 3 00 1 00 1 00 1 00 2 00 2 00	Filed. Filed.
Joseph Lavois, Joseph Bennett, Arthur Bellvenu, Jerry Parent, Decar Henickson, Emost Devaney, Berger Lasson, Samuel Wilkinson, Lucie Real, Isune C. Chiase, Gilbert, E. Golding,	Fa Fa Fa Pr Fa Fa Fa Fa Fa Ro	Il River, Il River, Il River, Il River, ovidence, R. L. Il River, ovidence, R. L. Il River, ovidence, R. L. Il River, Il River, oxbury, anklin.	Having short bass in violation of § 70, c., 91, R. L.,	Convicted,	10 00 10 00 10 00 10 00 10 00 10 00 10 00 10 00	
Charles H. Yale, A. J. Allen, Marshall F. Stevens, Charles J. Cook.	Fa Ea	Il River, Il River, est Weymouth, prosster,	Seining smelts in violation of §§ 72 and 74, c. 91, R. L.,	Convicted, . 1	10 00	Given one month to pay; filed. Filed; paid \$20 costs of court.

Report upon Convictions, Fines, etc., for Violations of the Fish and Game Laws - Continued.

STATE D	Town or City.	Offence.	Court Decision.	Fine.	Remarks.
Marshall P. Stovens,	East Weymouth, Brockton,		Convicted,	\$13 00 590 00	Appealed; paid \$20 Superior Court
John W. Curtis.	. East Weymouth, . East Weymouth, .		Convicted,	579 00 1,017 00	Appealed; paid \$20 Superior Court Appealed; still pending.
Impen Pitts.	. Weymouth,	Taking smelts in close season in violation of § 71, c. 91, R. L.,	Convicted, Convicted,	20 00 53 00	Appealed; still pending. Filed.
farry Bowers,	East Braintree.		Convicted, .	10 00 10 00	r iiou.
rank T. Stewart,	East Braintree, . Fall River,	1	Convicted, .	3 00	Filed; paid \$3.30 costs of court.
W. A. Rend.	Fall River, Fall River, Fall River,	Violation of c. 401, Acts of 1855,	Convicted, . Convicted, . Convicted, .	3	Filed; paid \$4.76 costs of court. Filed; paid \$3.38 costs of court. Filed; paid \$3.80 costs of court.
W. E. Read, Scorpe C. Hallister, John Broke,	Granville, West Springfield,	Having trout out of season,	Convicted,	10 00	rited, paid \$5.00 costs of court.
Owight Cooley,	. Dana Center,	Taking trout with net in violation of § 62, c. 91, R. L., as amended by c. 314, Acts	Convicted, .	25 00	
George F. Homan,	. Suffield, Conn.,	Setting net in pond in violation of § 26, c. 91, R. L., as amended by c. 308, Acts	Convicted, .	20 00 20 00	
John D. Jordan,	. Springfield,	of 1904,	Convicted, .	20 00	
Marles E. Gardner,	. Fall River,	Seining in violation of \$ 42, c. 91, R. L.,	Convicted, .	20 00	Filed.
nhn A. Carrer.	. Petersham,	Sawdust pollution, Spearing fish,	Convicted, .	10 00 30 00	Filed; paid \$7.11 costs of court. Fine suspended on good behavior
andley W. Mayhaw. , Seymour Patterion, Undford N. Bloomer.	. West Tisbury, . Chatham,	Having egg-bearing lobsters for sale in violation of \$ 86, c. 91, R. L.,	Convicted, . Convicted, . Convicted, .	20 00	
forms Plower,	Boston, Boston		Convicted, .	50 00	Filed.
Luguetino Guiliano, .	Boston,		Convicted,	2	Filed. Filed.
lugane W. Gravar.	Boston,	Torching herring in violation of c. 298, Acts of 1908,	Convicted, .	50 00	Filed.
manie Mentanio,	Boston,		Convicted,	=	Filed. Filed.
Ierbert Waheliam, Vilber Wakeham,	Boston,		Convicted, .	50 00	Filed.

Steven S. Borden, John Reynolds, Walter Moran,	Springfield, Springfield, Southwick,		Convicted, Convicted, Discharged,	20 00 20 00	
Charles Ashton, Alfred Ashton, E. Hammond, John O'Brien,	Springfield, Springfield, Haverhill, Haverhill,		Convicted, Convicted, Convicted, Convicted,	5 00 5 00	Filed. Filed,
George Kittredge, H. L. Laurie, H. Robert Kaufmann, Ralph Cole,	Haverhill, Bostou, Halifax, Attleborough,	Using over one hook on stocked pond, .	Convicted, Convicted, Convicted, Convicted,	5 00	Filed. Filed. Filed.
James E. Holmes, John Campbell, Charles H. Rice, John Thompson,	Norwood, North Cambridge, Weymouth, North Attleborough,		Convicted, Convicted, Convicted, Convicted,	5 00 5 00 5 00	Filed.
William Bailey, John H. Parker, John C. Knowles, James Carrigan,	Sharon, Boston, Lowell, Lowell,		Convicted, Convicted, Convicted, Convicted,	10 00 1 00 10 00 10 00	
John Kostos,		Trapping fish in violation of § 132, c. 91,	Convicted, .	10 00	
George M. Besse, Ansell C. Bloomer,	. East Wareham,	Having unmarked lobster car in violation of § 119, c. 91, R. L.	Convicted, Discharged,	-	Filed.
Clifford H. White.	Onset	Capturing engle in violation of c. 118, Acts	Convicted, Discharged,	20 00	
Roscoe Gibson, Orville W. Crosby,	. Orleans,	Setting net in miolation of \$ 132, c. 91.	Discharged, .	10 00	
elix Gelinski, gnatius Kaminiski,	Brockton,	R.L. 1012101 or 8 132, C. 91.	Convicted.	25 00 20 00	Appealed.
William H. Stewart.	Nahant,		Convicted, Discharged,	-	
Gardner Cunningham. Angus Smith.	Nahant.	Setting lobater pots in violation of § 92,	Convicted, . Discharged, .	20 00	
James S. Cunningham, Waitsell Goodwin,	Nahant,	c. 9f, R. L.,	Convicted, .	20 00 20 00	
William Atwood,	Nahant.		Convicted,	20 00	
William R. McDowell, Frank J. McDowell,	. Pasque Island, Pasque Island,	Setting nets in Buzzard's Bay in violation of \$ 122, c. 91, R. L.	Convicted,	25 00 25 00	
Harry B. Eldridge, .	. Harwich,	of § 122, c. 91, R. L., Taking birds eggs in violation of § 7, c. 92, R. L., as amended by c. 250, Acts of 1907.	Convicted, .	-	Filed.
Andrew Harvey, .	. Easton,	Refusing to show game, c. 255, Acts of 1908.	Convicted, .	- 7	Filed.
Joel Downing	. South Hadley Falls, .	Killing bittern or beron in violation of	Convicted, .	6 00	
Truman W. Douglass, Albert F. Wales,	. Kingston	c. 244, Acts of 1903,	Convicted, .	5 00	Filed; paid \$12 costs of court.

Report upon Convictions, Fines, etc., for Violations of the Fish and Game Laws - Concluded.

STATE v	Town or City.	Offence.	Court Decision. Fine		Remarks.
Henry C. Hallett, John A. Carlson, Charles Mahn, Inim Hube, Hormodas Vorgitte, Fred Patinesus Althur Frattise, Anthony Boner, Arthur Prattise, William F. Winleu, Elward T. Concolly, Walter F. Balcom, Henry I. Curtis. William King, Levi Dobson, Ernest Goodwin, Frederick B. Burke, Frank G. Goodwin, William H, Goodwin, William H, Goodwin, Peter Stamotokos, Everett Descumpyille Livery B. Markette, John Descutate, William B. Macket, John Descutate, William B. Resulton, John Descutate, William B. Resulton, John Descutate, William B. Goodwin, William B. Goodwin, William B. Goodwin, William B. Macket, John Descutate, William B. Goodwin, William B. Goodwin, William B. Goodwin, William B. Goodwin, William B. Macket, John Descutate, William B. Goodwin, William B. Goodwin	Hyannis, Worcester, Worcester, Worcester, Springfield, Springfield, Springfield, Springfield, Boston, North Weymouth, Attleborough, Boston, Rockport, Rockport, New York, N. Y., Acushnet, Beverly, Fairhaven, Fairhave	Having scallops in close season, Using set line in violation of § 132, c. 91, R. L., as amended by c. 492, Acts of 1908, Taking fish with sweep seine in violation of § 132, c. 91, R. L., as amended by c. 492, Acts of 1908, Pursuing wild fowl with power boat in violation of § 11, c. 92, R. L. as amend- ed by c. 241, Acts of 1906, Sending game birds out of State in viola- tion of § 21, c. 92, R. L., Hunting out of season in violation of c. 441, Acts of 1908, Setting 1½ inch mesh seine in Plum Island Sound in violation of § 48, c. 91, R. L., Nonresident hunting without license in violation of § 1, c. 198, Acts of 1907, Snaring game, Hunting pheasants, Having seed scallops in violation of c. 297, Acts of 1907.	Convicted,	\$20 00 20 00 20 00 20 00 15 00 20 00 20 00 20 00 20 00 20 00 20 00 20 00 20 00 20 00 5 00 5	Filed. Continued from day to day. Filed. Filed. Filed. Filed. Filed.

Apparatus employed.

Proprietor.				To		1	Number of Men.	Boats.	Value.	Pounds.	Value.	Nets.	Value.	
Edward Holway, J. Eldridge & Son, Gilbert E. Ellis,		1	:	Bournedale,		•		2	5	\$350 00	1	\$1,500 00	-	-
lilbert E. Ellis, t. S. Hall, ames F. Higgins, D. A. Newcomb, red Young.		:	9	Brewster, .			+	20	12	505 00	19	4,935 00	3	\$60 00
corge W. Crowell, A. Nickerson & Co., J. H. Patterson, Ibert W. Smith,				Chatham, .			4	1	4	595 00	7	2,575 00	14	95 00
C. Flanders & Co., landers & Look, laniel W. West,			-	Chilmark, .				15	16	1,260 00	11	9,500 00	-	-
enns H. Baker. rowell Cold Storage Compa	ny,	9	-	Dennis, .		4		15	10	1,015 00	5	3,500 00	-	-
harles Gardner, dbertis F. Simmons,		0.0	1	Dighton, .		4		17	10	585 00	-	-	10	680 00

Apparatus employed - Concluded.

PROPRIETOR.	Tow	n.			Number of Men.	Boats.	Value.	Pounds.	Value.	Nets.	Value.
David B. Pease and Allen Mayhew, E. R. Durkee, D. D. Diamond & Co.	Edgartown,				4	5	\$65 00	1	\$200 00	-	-
Linus S. Jeffers & Co., A. H. Vanderhoop Company, L. L. Vanderhoop & Co., Fuller A. Andrews. Jeorge W. Douglass.	Gay Head,				6	18	3,105 00	14	9,400 00	1	\$15 00
homas Douglass, L. W. Nelson, Jexander Sargent,	Gloucester,		•		17	17	4,960 00	1	1,500 00	11	2,150 0
rin S. Crosby,	. Hyannis, .				9	7	2,025 00	-	2	87	745 0
aylor Bros., dw. Heath Company, L. D. Powell,	Manchester,				3	5	350 00	1	1,500 00	-	4
F. H. Johnson and others), vard L. Smith. L. A. Atwood and others), J. Barrett & Co., dward L. Fisher.	Nahant, .	*	*	4	12	7	1,400 00	4	6,000 00	-	-
S. Glidden, corge H. Hamblin, 	Nantucket,	٠	٠	7	21	24	6,485 00	6	3,000 00	221	3,490 0
A. Caswell & Co.,	. Newburyport,				10	12	3,200 00		-	6	1,040 0
tkins Hughes & Co., red C. Bich (agent),	North Truro,	,			26	14	3,690 00	10	21,240 00	-	-
Den H. Norion, agent, Farren Cove Weir Company,	Oak Bluffs, Plymouth,			d	7 3	- 3	520 00	ī	1.000 00	ī	800 0

309

280

\$53,328 00

\$83,200 00

116

975

\$16,162 00

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Totals for State.

James F. Atkins, Manuel Carter, R. W. Cook, A. L. Daggett, Eastern Weir Company

Number of Pounds of Fish taken

Town.			Alewives.	Bluefish.	Flounders.	Mackerel.	Menhaden.	Pollock.	Salmon.
Bournedale, .			<u> </u>		4	290	74	μ.	- 25
Brewster, .	•	•	63,140	324	34,242	850	_	_	
Chatham, .	•		500	320	20,900	1.751	_	_	
Chilmark, .	•	•	25	-	15,572	9.193	_	40	_
Dennis.			19.500	484	3,400	929	_	_	_
Dighton, .			124,452	_	_	_	_	_ '	_
Edgartown, .			_	_	2,300	4,400	_ !	_	_
Gay Head, .			40,000	_	5,500	11.070	_	_	_
Gloucester.			196,415	1,015	_	2,693	_	246,337	_
Hyannis, .			_	834	9,000	5,500	_	_	_
Manchester, .			10,600	_	_	755	_	41,967	_
Nahant, .			_	_	_	_	100	2,400	_
Nantucket, .			_ !	20,793	6,556	61,883	_	156,570	-
Newburyport,			-	-	-	_ :	_	160,168	_
North Truro,			418,600	850	68,770	13,262	_	130,520	_
Oak Bluffs, .			- 1	_	_	-	-	-	_
Plymouth, .			-	200	_ '	200	_	-	23
Provincetown,			10,000	1,430	482,278	186,178	_	29,430	_
Raynham, .			226,400	-	-	_	-	- }	-
Rockport, .		•	-	_ '	-	-	_	1,620	-
Sandwich, .			-	-	-	1,180	-	-	-
Segregansett,		٠.	55,000	-	-	- '	-	-	-
Somerset, .			72,000	-	-	-	_ '	-	-
Tisbury, .			19,500	4,120	12,350	1,525	- 1	4,650	-
Vineyard Haven,			20,000	26	6,660	450	200	-	-
Yarmouthport,					400			1,000	-
Totals for St	ate,		1,276,132	30,396	667,928	302,109	300	774,702	23

in Nets, Pounds, Traps, etc.

Sea Bass. Sea Herring.	Squetengue.	Striped Bass.	Squid.	Tautog.	Other Edible or Balt Species.	Value.
	- -	-	41,625	1,941	_	\$404 39
- 120,079	0 5,064	23	6,870	696	30,830	2,952 67
- 6,000	3,000	20	150,000	-	-	2,352 51
1,667 450	- 89,677	- !	7,595	54	126,875	9,695 46
- 21,650 1	1,685	-	218,500	_	99,900	3,972 82
3,5	.9 -	_	-	_	5,898	2,153 92
- -	- 7,700	-	6,600	_	1,100	709 00
9,300 -	- 64,750	-	6,250	_	1,240	10,973 20
10 257,902 25,6	7 -	-	42,335	82	649,634	6,753 83
	- 5,828	-	'		-	1,349 00
- 72,400 2	34 -	-	7,000	180	224,422	2,285 97
- 608,150		-	1,200	-	338,582	12,751 57
1,000 3,400 2,6	00 54,143	-	2,250	-	39,908	22,508 44
- 39,500		-	_	-	151,617	3,462 94
- 988,620 2,8	26 1,250	-	799,100	-	1,582,146	27,557 01
	- -	_	-	-	1,000	160 00
		-	6,400	100	1,000	110 00
- 501,300 8,0	00 1,900	-	540,315	-	710,859	38,611 72
1,2	10 -	-	_	-	_	2,332 50
- -	- -	-	2,500	-	16,959	489 27
- - 3	90 15	-	23,513	-	165	283 42
4,5	00 -	-	-	_	12,000	1,120 00
- - 3	54 -	-	-	-	_	1,010 80
600 -	50 119,890	_	3,225	9,245	500	8,612 52
250 -	- 39,982	-	7,800	-	1,590	3,309 85
- -		_	_	_	3,175	199 06
12,827 2,619,451 49,4	94 394,904	42	1,873,078	12,298	3,999,400	\$166,121 86

PROPRIETOR.	Town.		Number of Men.	Number of Boats.	Value.	Number of Pots.	Value.	Number of Lobsters.	Value.	Numbe of Egg- bearing Lobster
M. W. Springer, Charles Neil.	1	: :	1	1 3	\$30 00 455 00	21 75	\$30 00 200 00	553 5,088	\$125 00 1,017 60	11
Frank C. Leonard, Perry H. Marsh, Albert Nightingale, L. I., Nightingale, H. M. Greene,	Bournedale,		5	7	450 00	255	295 00	11,117	1,369 98	63
Josequin Perry, Manuel Serrilla, Antonio P. Silva, Tony Perry,	Boston, .		8	11	925 00	735	735 00	21,820	4,286 30	362
John Pinto, A. L. Manter, George Pardy, II. W. Tolman, Julius E. White, Fred W. Baker,	Brant Rock,		5	7	462 00	290	580 00	11,117	1,331 24	42
smued Dill. Francis Hutchings, ames E. Jones. L. A. Nickerson & Co., Vilbur F. Patterson, senjamin F. Rich, Ubert W. Smith.			14	16	1,962 00	44	383 50	7,306	1,929 02	280
leorge W. Bloomer, toy E. Cattle. leyery Look. William S. Mayhew. Sverent A. Foola. Albert E. Reed. larry G. Reed. larry G. Reed. Justies W. Kyan, Austin E. Smith. Justies F. Smith.	Chilmark,		13	16	2,666 00	576	800 00	37,367	4,539 59	50

Returns from the Lobster Fisheries.

Joseph Boutta, Ernest Johns. Honry A. Jordan. Whituman Nickerson, Charles H. Pierce. Charles Rogers. H. S. Sampson, John W. Sampson, R. L. Swift.	Chiltonville,			10	21	982 00	544	947 00	27,510	3,457 15	114	1908.]
L. S. Thurston, John Eliman, Antone Grasse, Patrick Grasse, John W. Hunt, Andrew Peterson, Orne Peterson, Manuel S. Trombas, Levi Cadose, J. F. Cornell, Matthew R. Goulett,	Cohasset,			8	14	2,199 00	1,050	1,435 00	37,307	6,988 51	705	PUBLIC D
Issue Gregory. Irvin Hall & Co., Alton Harrison. Samuel Jackson, George C. King. Frank Peters, Russell W. Rotch, Roland S. Snow, Oscar H. Steison, J. H. Tilton, Chester F. Veeder, E. G. and H. S. Veeder,	Cuttybunk,			26	37	12,133 00	1,862	2,192 50	140,146	14,552 35	1,330	DOCUMENT - No.
John Wall, Samuel P, Burgess, Lamist Reynolds, Frank E, Wadsworth,	Duxbury,.			4	8	70 00	350	540 00	20,448	3,002 50	124	0. 25
S. G. T. Wadaworth, Edwin H. Burnham, Manuel Deloura,	Essex, Edgartown,		:	1 1	1	100 00 15 00	20 5	20 00 5 00	1,625 85	247 00 12 75	- 2	
Harry M. Berry. Alvin F. Bourne, F. J. Dénamore, Mayhew C. Stuart.	Falmouth,	1		4	6	280 00	59	87 00	674	193 25	22	

Returns from the Lobster Fisheries - Continued.

PROPRIETOR.	Town.	Number of Men.	Number of Boats.	Value.	Number of Pots.	Value.	Number of Lobsters.	Value.	Number of Egg- bearing Lobsters.
Moses P. Cooper, T. E. Haskins, Joseph A. Lang, C. H. Ryan, Edward L. Ashley, Carl A. Dixon, Joseph Douglass, William Gallagher,	Gay Head,	4	7	\$540 00	170	\$170 00	6,815	\$579 80	378
Peter Knutson, D. E. Mehimann, Jarry Phillips, Henry W. Pitzold, E. D. Rust, E. L. Small, Arthur Stevena, Manuel Vintor, Daniel S. Webber, Manuel Cardozo, Nelson F. King,	Gloucester,	19	30	2,010 00	1,008	1,087 75	28,828	5,094 59	149
J. N. Christensen, Walter E. Marctiant, Ansell P. Howes,	Dennis,	4	4	70 00	83	70 50	1,708	370 17	90
Charles E. Peterson, Charles R. Peterson, Lyman Sears, A. I. Shaw, W. H. Telman, George Delege,	Green Harbor,	13	25	5,531 00	1,274	2,582 00	82,632	12,588 16	467

Huiver M. Gillerson. Walter F. Kelley and H. Atwood, Malter F. Kelley and H. Atwood, Ambrose B. Mitchell, Fred C. Mauneh, R. M. Cleverly, Elmer W. Phinney, George W. Stirges, O. S. Crasby, Allen R. Gorham, Edward M. Palond	Hull, .		4	7	9	776 00	535	850 00	29,140	5,310 91	67
Elmer W. Phinney, George W. Sturges	Hyannis, .			2	3	130 00	56	36 00	1,206	242 44	15
O. S. Grosby, Allen R. Gorham,	Kingston,			1	1	500 00	65	100 00	3,330	626 73	11
Allen R. Gornam, Edward M. Poland, Alfred W. Riley, George H. Woodbury, Addison H. Woodbury, D. C. Jones, L. O. Sargent, Walter E. Bowman, James Anderson,	Lanesville,		-	4	5	180 00	175	155 00	7,250	1,199 30	31
Addison H. Woodbury, D. C. Jones,	Manchester,			2	2	120 00	75	75 00	1,529	268 44	60
Walter E. Bowman,	Mattapoisett,			1	2	215 00	110	137 00	5,082	591 62	302
Samnel H. Benson, G. L. Binney, G. A. Bouvier, Laban B. Briggs, Iamas E. Burke, Joseph E. Cook, Charles A. Dixon, C. H. Dixon, Archie Fenton, Emil A. Hammerquist, Clarence A. Holmes, Raiph B. Holmes, G. A. Manter, W. J. Nightingale, Austin E. Parris, F. R. Feterson, Charles W. Raymond, J. E. Raymond, Robert Richardson A. C. Sampson, Allen R. Swift, Guy D. Thomas, C. A. Washfeld,	Manomet,	*		30	45	3,835 00	1,715	2,796 00	93,626	12,077 95	442

Returns from the Lobster Fisheries - Continued.

PROPRIETOR.	Town.	Number of Men.	Number of Boats.	Value.	Number of Pots.	Value.	Number of Lobsters.	Value.	Number of Egg- bearing Lobsters.
Clinton F. Adams W. F. Allen. U. F. Brown, Ernest E. Gronk, W. F. Deanis. William Dixey, B. F. Doliber. Arthur D. Frost. William T. Gardner. Thomas P. Gilbert. John W. Giles, Everett S. Hamson, George K. Hamson, George K. Hamson, F. R. C. Hiller, David P. Howe, P. H. Keenan. Thomas P. Lyons. John W. Mace. James H. Magre, George W. Mason, William F. Merritt. Harry A. Oliver. Everett P. Peach, Joseph S. Phillips, Augustus K. Roundy, Richard F. Russell, S. Q. Smith, William T. Smith, C. H. Smithurst. Ebenezer E. Snow, Clarence K. Stone, Samuel A. Stone, Samuel A. Stone, Benjamin H. Swett, Richard F. Farry, John F. Trefry, William H. Tutt,	Marblehead,	41	53	\$8,377 50	1,717	\$2,153 65	133,890	\$23,064 21	587

K. Gannett, Jr., H. Pratt, ugene Pratt, mes J. Leary, arten Atwood,	Minot,	*	1	4	5	365	00	170	275	00	16,288	1,768	86	127	
H. Crowell, N. Gurley, H. Lamphier, A. Smith, uarles Taylor,	Nahant, .			8	12	900	00	344	356	50	15,234	3,030	22	136	
sorge L. Hatch, mry E. Hatch, mnk Leman, muel McDonald, chraim Onderkirk, mon Rogers, dand S. Tonburg	Nantasket,	÷	1	7	9	1,070	00	370	505	00	23,574	4,831	82	90	
H. Blount, H. Dennis, iliam H. Hamblin, G. Norcross, seph H. Ray, nuel Thomas, im S. Watkins,	Nantucket,			7	8	1,227	00	219	236	75	3,340	939	32	378	
omas B. Dowling, rtholomew Silva,	New Bedford,			4	4	1,335	00	225	312	50	14,853	1,971	82	191	
ph C. Allen,	North Tisbury			2	3	337	00	75	75	00	4,055	516	60	27	
iel B. Gould, . b Hayden, d. Pierce,	 Orleans, .			4	4	738	00	133	155	00	1,806	854	00	35	
C. Goodspeed, liam Thompson, rge Atwell, I. Bagnall,	Onset,	*		2	3	1,020	00	75	35	00	1,577	355	18	10	
A. Brigga, J. Caswell, J. Caswell, J. Graffam, J. Graffam, on R. Harlow, F. Hodges, nk Simmona, eph P. Thurston	Plymouth,			12	23	2,180	00	648	1,132	00	37,409	5,270	50	188	

Returns from the Lobster Fisheries - Concluded.

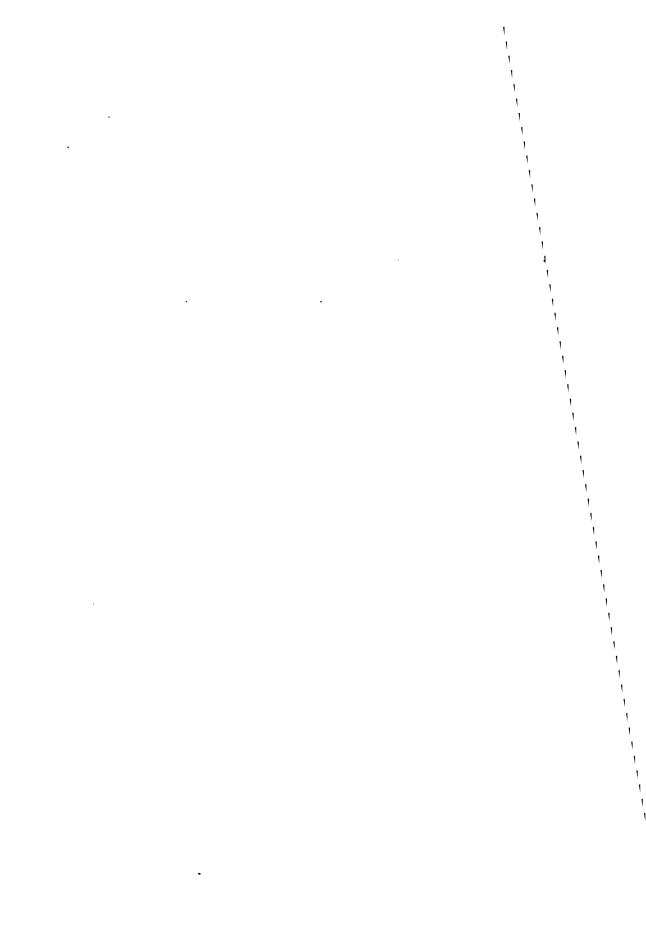
PROPRIETOR.	Town.	Number of Men.	Number of Boats.	Value.	Number of Pots.	Value.	Number of Lobsters.	Value.	Number of Egg- bearing Lobsters.
Martin Nelson. Joseph G. Perry John W. Savage, C. H. Rmery,	Provincetown, .	. 4	5	\$ 521 00	256	\$247 00	2,927	\$1,038 42	165
Manuel Marshall, Antone Vera, C. F. Green,	Robinson's Hole,	. 2	5	345 00	210	188 00	5,011	624 94	80
John F. Lawson. A. Rich. Ernest M. Rich. G. E. Wendell, John Bowman, Martin Bowman, Arthur Norwood, William E. Norwood,	Rockport, .	. 12	14	1,255 00	790	1,088 00	45,556	5,507 91	211
S. D. Thurston, Jr., Charles Upham, Arthur Gibbs.	Sagamore,	. 1	1	25 00	75	50 00	1,247	258 99	36
Jharles S. Brown, John A. Dunn.	Salem,	. 4	4	675 00	290	290 00	23,379	3,524 49	183
Charles L. Wales, John Elvander, John F Mahoney, Jesur Anderson,	Sandwich, .	. 2	3	254 00	47	77 00	2,369	398 50	30
J. Frank Cushman Charles DeCoste, George F. Edson, Charles A. Foster, Ebjah P. Pratt, Thomas Tomer,	Scituate,	. 8	13	1,715 00	600	1,105 00	37,796	5,538 59	139
Daniel Ward. William A. Blanchard. James H. Burra, Benjamin T. Smith,	South Dartmouth,	. 4	4	1,615 00	165	175 00	4,160	512 39	118

George W. Manier, J. A. Maybew & Co., James F. Luce,	1	1		Tisbury,		1	1	20 00	36	46 00	1,759	165 70	6
William L. Pesse. Edward H. Smith, L. E. Smith, James R. Tilton, J. W. West, George E. Whitney.	1		***	Vineyard Haven,		8	8	615 00	145	206 25	3,075	567 60	30
George A, Gifford, William A, Hammond William B, Head, Fred W, Palmer, Harry G, Sowle, Charles Valentine, William B, Whalen,				Westport Point,		9	10	2,585 00	404	538 50	20,541	3,083 07	307
Lester D. Mayhew, Lindley W. Mayhew,	3	1	:	West Tisbury		3	6	990 00	186	320 00	19,742	2,557 87	15
George A. Rogers, Francis J. Calm. Hartley L. Wells, L. L. Adams, James F. Cook,				Weymouth, Winthrop,	;	1	1 2	250 00 250 00	150 50	200 00 75 00	10,196 2,677	2,476 67 535 40	61
Charles R. Grinnell, Oscar R. Hilton, Thomas Hinckley, Alfred Nickerson, Walter E. Nickerson, Prince M. Stuart,				Woods Hole, .	-	12	19	5,423 00	315	402 50	18,452	2,510 32	308
A. H. Vedeler, John J. Veeder, Shirley D. Lavell,	:	:	2	Yarmouthport,		1	1	250 00	50	50 00	903	225 00	53
Totals for State.						349	503	\$70.973 50	19,294	\$26,603 90	1.035,123	\$154,130 74	9,081

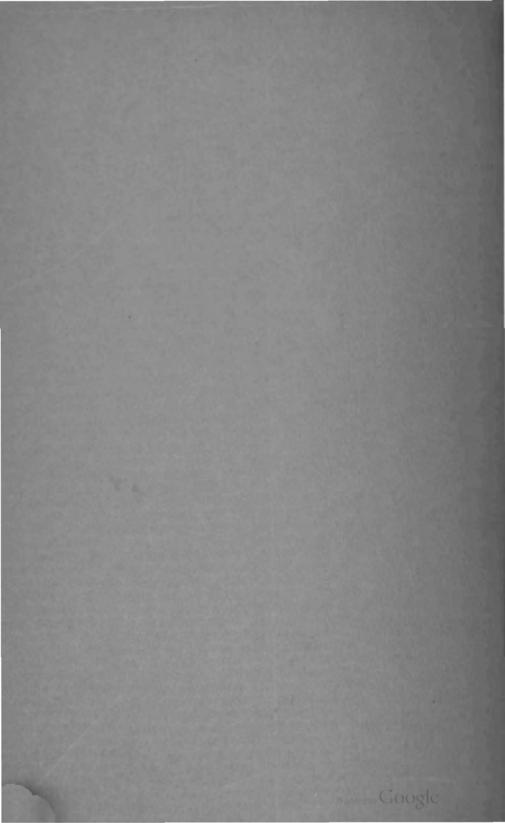
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1908.]

PUBLIC DOCUMENT -







REPORT

OF THE

COMMISSIONERS

ON

FISHERIES AND GAME

FOR THE

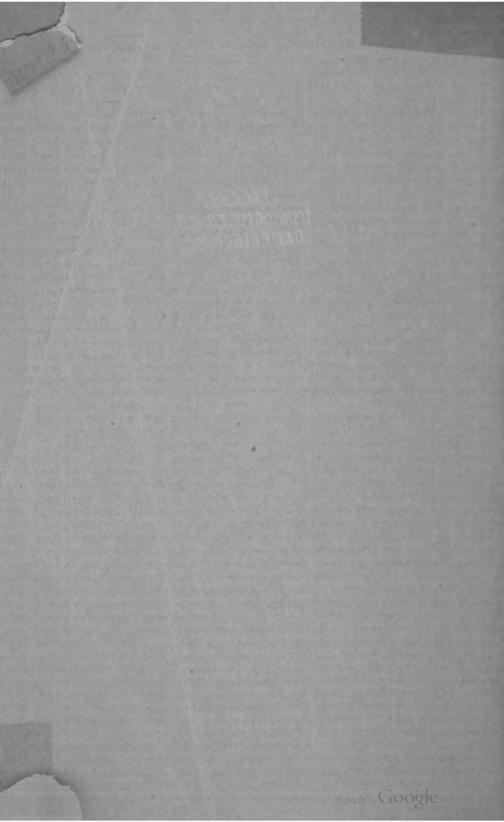
YEAR ENDING DECEMBER 31, 1909.



BOSTON:

WRIGHT & POTTER PRINTING CO., STATE PRINTERS, 18 Post Office Square. 1910.

MINISTER STORY



REPORT

OF THE

COMMISSIONERS

ON

FISHERIES AND GAME

FOR THE

YEAR ENDING DECEMBER 31, 1909.



BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 Post Office Square.
1910.



APPROVED BY THE STATE BOARD OF PUBLICATION.

COMMISSIONERS ON FISHERIES AND GAME.

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JOHN W. DELANO, MARION.
GEORGE H. GARFIELD, BROCKTON.

Chief Deputy Commissioner.
WILLIAM W. NIXON, CAMBRIDGE.

Clerk.

W. RAYMOND COLLINS, BOSTON.

DAVID L. BELDING, CHATHAM, Biologist.

FERDINAND C. LANE, WELLFLEET, Assistant Biologist.

ARTHUR MERRILL, SUTTON, Superintendent.

Office: Room 158, State House, Boston.

Telephone: Haymarket 2700.

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The Commonwealth of Massachusetts.

To His Excellency the Governor and the Honorable Council.

The Commissioners on Fisheries and Game respectfully submit this their forty-fourth annual report.

GENERAL CONSIDERATIONS.

It is no longer necessary to discuss the fact that the fisheries, the game and the insectivorous birds are worthy of every effort not alone for their conservation, but for their extension as well. Similarly, the unwise introduction and the still more deplorable extinction of various useful species is a matter of grave moment from the biological aspect in its widest and in its most intimate complications. Even the State of Massachusetts has not been above criticism in this policy of depletion. most important factor of this depletion doubtless has been public ownership of fish, game and birds. This necessarily tends to a laissez faire doctrine, and to the widespread belief that the most rapid possible private appropriation of such public property is a criterion of business ability and shrewdness. There has been a noticeable lack of biological knowledge in the general attitude of the people and in the policies of the various legislatures. In spite of all the laws both for protection and for the exploiting and maintenance of such public property, the destruction has been general and lamentable. Even under our restrictive laws the wild pigeon and the wild turkev have been exterminated within the State; the heath hen, woodcock, wood duck, upland plover, piping plover and other birds naturally breeding here are on the very verge of local extinction. natural supply of ruffed grouse, quail and woodcock has shown alarming depreciation, largely due to the destruction of breeding grounds, and owing to the introduction of species which have brought infectious diseases; in part, perhaps, to development of more deadly methods of hunting, both by the employment of improved firearms and more skilfully trained dogs; but above all these to the feral cat, which is increasingly infesting the covers. The decimation of these birds has made it possible for various species of destructive insects to secure a foothold. Further, the introduction of the English sparrow has, in addition to the destruction of the small insectivorous birds, laid a heavy tax upon owners of grain fields, barns and poultry yards. So, if the commissioners were asked what line of work within the province of their activities requires the most urgent attention, the answer would doubtless be that the birds at the present time require most careful consideration: through (1) a study of the diseases and the extent to which these diseases are transmitted by various species of birds to other species, and what remedies may be applied; (2) development and application of the most approved methods for increasing the bird population per square mile, in order that the birds may co-operate as an effective check to prevent the increase of insect enemies to cultivated crops, to shade trees and to all other types of vegetation. These methods would doubtless take the line of a greater number of "bird sanctuaries," i.e., places from which the general public is excluded, where special preparations are made for furnishing food and suitable nesting places to useful birds of all types. In addition to this, some restrictive legislation is necessary, but the time has passed when restrictive legislation alone can meet the full measure of the situation. Some positive methods must be developed for increasing the number of our native birds. Every encouragement should be given to intelligent efforts looking towards the breeding of various species, with a provision for the greatest possible number and diversity of sanctuaries. Increased attention should be paid to preventing the damage done by those greatest enemies of the wild game and song birds, - the domestic cat, and the dog which is allowed habitually to run at large in the woods. Along with these there should be a more efficient enforcement of the constantly multiplying laws. The people must be educated towards a wider and more accurate knowledge of the natural laws which govern the species of birds and mammals.

Investigations by competently trained persons must be undertaken for the purpose of securing a definite basis of fact for legislation. Thus we may hope ultimately to reduce the excessive amount of inconsequential demands for legislation.

Finally, all the territorial resources of the State must be fully utilized for the purpose of furnishing food and business opportunities for Massachusetts people. The most conspicuous among these is the area between high and low water mark, which at present is practically unutilized. Under certain restrictions oysters and quahaugs may be cultivated by individuals. This opportunity should be extended so as to include also the soft clam (Mya arenaria).

The law passed by the last Legislature, prohibiting spring shooting (chapter 421, Acts of 1909), is expected to increase the number of birds breeding within the State, and ultimately to result in a large number of ducks breeding in all sections of the Commonwealth, with improvement of the duck shooting in the middle and western section of the State, instead of being practically restricted to a thin line of migrants passing only through the eastern counties.

Expenditures. — The details of all expenditures are published in the annual report of the Auditor of the Commonwealth. In general, \$4,958.99 was expended for the benefit of the sea and shore fisheries; \$6,950.49 for maintenance of inland resources by the purchase and propagation of trout, quail, grouse and pheasants; \$32,971.63 for the enforcement of the fish, game and bird laws on land and sea; \$4,420.90 for the protection of adult female lobsters by purchase of those caught when carrying eggs; \$11,421.25 for the salaries for the commissioners, printing, postage, travelling expenses of the commissioners and for clerical and office expenses. The total amount of fines was \$5,804.50; and of all other additional moneys received and turned into the treasury of the Commonwealth, \$1,799.24.

For the reason that several of our recommendations were referred last year to the next General Court, we repeat the statements made in our forty-third annual report relative to the mollusk fisheries, to the inland fisheries, to the game birds and to deer:—

Mollusk Fisheries. — In 1905 the Legislature ordered a biological survey of the coastal areas below high-water mark, in order to ascertain: —

- (1) The present and past conditions of the mollusk fisheries.
- (2) The possibilities of increasing the annual production by (a) increasing the annual yield per acre; (b) suitable methods of securing an annual yield from areas at present unproductive.
- (3) Ascertaining definite methods of increasing production by study of: —
- (a) Life histories of the economic mollusks, particularly the oyster, clam, quahaug and scallop.
 - (b) Methods of feeding and rate of growth.
 - (c) Effects of unfavorable conditions; e.g., pollution.
- (d) Methods of checking ravages of enemies; e.g., starfish, "drills," "winkles," etc.

A report to the Legislature upon this work states, in general, that of upwards of 60,000 acres of shellfish ground only about 3,552 acres are to-day yielding anything approximating the natural yield, i.e., from \$100 to \$800 profit per annum; while upwards of 40,000 acres are producing at least 90 per cent less than normal production; and about 15,000 acres at present unsuitable could at an expense of \$50 to \$300 per acre be made to yield from \$100 to \$500 profit annually. Under such development and utilization employment would be furnished to about 20,000 skilled and unskilled laborers, as compared with 2,184 in 1907; and a total production valued in the hands of the producers at \$6,000,000 annually, instead of \$752,000 as in 1907.

The results from more than 300 experimental plots prove conclusively that clams (Mya arenaria) and quahaugs (Venus mercenaria) can by appropriate methods be as successfully cultivated as are oysters to-day, or as any farm crop; that the value of a quahaug crop upon arrival at a marketable size often exceeds \$1,800 per acre; and that the annual profit should average not less than \$200 per acre.

These fisheries are prosecuted upon what is now in the east the last remnant of the public domain, viz., between high and low tide marks. The titles to the uplands have been acquired by individuals, and are subject to individual control and responsibility; and the title of the riparian owner extends to mean low-water mark, or to 100 rods beyond the mean high-water mark in cases where more than 100 rods of tidal flats are exposed by the average tide, but the riparian owner does not have an exclusive control of the fishing, fowling and boating. He may participate in these only on equal terms with the public, and subject to the disposing right of the General Court. Similarly, State laws have been enacted by which areas below high-water mark may be leased for oyster cultivation, but the lease holder can claim as his property only the oysters grown thereon. Curiously enough, present laws permit the cultivation of oysters in the waters below low-tide mark, but not

clams or scallops, either below or above low-water mark. It would be quite as logical for the State to permit the farmer to grow only corn.

The fisheries (which include the mollusk fisheries) are still public, and subject to the disposing action of the Legislature. If the Legislature should by appropriate laws make possible intensive cultivation of shellfish, e.g., the oyster, clam, quahaug, scallop and lobster, in the area below high-water mark, under proper safeguards devised to secure public and private rights, there would follow:—

- (1) Increased opportunities for skilled and unskilled labor.
- (2) Increased yield per acre above the natural productiveness.
- (3) Increased daily profits in proportion to the time and labor of the fishermen.
- (4) Increased definiteness of supply, thus permitting the fishermen to take advantage of market conditions.
- (5) Increased income to town from taxable property on the shell-fish beds.
 - (6) Increased subsidiary industries.
- (7) Increased revenue to citizens, communities and State, from leases of public domain.

An extended discussion is to be found in a special report to the General Court upon the mollusk fisheries of Massachusetts.

Inland Fisheries.—As a result of drought, directly traceable in very considerable measure to unwise methods of deforestation of our hills, many of the smaller brooks and the upper reaches of larger brooks, which are the nurseries of brook trout, have been entirely depopulated. In addition, we again repeat the statements given in the previous reports, that we should not be longer compelled to maintain unwise, inadequate and unbusiness-like methods of stocking public waters. We respectfully urge consideration of an improved system of stocking, whereby certain well-known and suitable waters, definitely designated as public waters under the control of the Commonwealth, and adequately protected and stocked, are maintained at their highest productive capacity.

Our present system of propagating, rearing and distributing fish is antiquated, and, while entirely adequate to meet the conditions under which it was developed, was not planned with a view to future extension of facilities, and has become entirely incapable of meeting the present demands. Greater results can be obtained from one model hatchery, having a sufficient water supply to maintain a stock of selected brood fish, and with hatching house, trays and rearing pools sufficient to turn out annually 5,000,000 fry, at least 500,000 fingerling trout, and at least 1,000,000 white perch.

Many inquiries have been made relative to the State hatcheries, which were established by special acts of the Legislature, as follows: resolve 114, Acts of 1896, appropriating \$3,000 for the establishment of a hatchery at Hadley; resolve 74, Acts of 1897, appropriating \$3,000 for

the establishment of a hatchery at Winchester; resolve 60, Acts of 1898, appropriating \$2,500 for the establishment of a hatchery at Adams.

From 1880 to 1894 inclusive trout fry to a number of not less than 43,000 or more than 600,000 in any one year, and an average of 316,000 annually, were received from the hatchery at Plymouth, N. H., the cost of maintenance of which the State of Massachusetts shared equally with New Hampshire. Since the establishment of the hatcheries at Winchester, Hadley and Adams the annual output from each has averaged about 200,000 trout fry. At the time of the establishment of those hatcheries there were practically no commercial hatcheries in the State, and the price at which the fish could be bought was at least five times that at which they may be bought at present. The total cost of maintaining the three small hatcheries for the rearing of fry only is less than \$1,100 annually. The average aggregate output for the three hatcheries is about 600,000 fry, which at \$1.50 per thousand would make the total yield valued at \$900. The cost of distribution from these three hatcheries, situated respectively in the eastern, the middle western and western part of the State, is very much less than if the entire distribution were made from the eastern part of the State. as might be necessary if the fish were purchased; so that, in our opinion, there is practically no difference in the cost of buying the fish and the cost of hatching by the State.

We are informed by the Massachusetts Bureau of Statistics of Labor that wild trout are taken in this State to the value of \$66,000 per annum, at a total cost to the Commonwealth of about \$5,000 in the maintenance of the above three hatcheries and of the Sutton hatchery, which latter annually produces about 200,000 fry and from 70,000 to 155,000 fingerlings, or a total for the State of 800,000 to 900,000 fry and 70,000 to 115,000 fingerlings.

The chief difficulties in the maintenance of fish in Massachusetts waters are connected with the excessive pollution of the larger streams and the deforestation of the mountain slopes, resulting in the drying up of the nursery brooks. There is absolutely no question that a larger plant of cultivated fish would be more economical to the State, and is beyond question necessary in order to secure proper results.

In reference to the abandonment of the hatcheries at Winchester, Adams and Hadley, the commissioners are of the opinion that it is not expedient at present to discontinue these hatcheries, for the reasons stated above; and we are further of the opinion that we would have no right to abandon them until ordered to do so by legislative act.

On account of the need of extensive repairs to the water supply, we have thought it unwise this year to attempt to use the Winchester hatchery until the general policy has been definitely settled. Game Birds.—In the pioneering work of devising methods of rearing game birds in captivity much progress has been made. The area available for rearing the birds has been so circumscribed and so subject to infectious diseases, from long occupation, that many untoward losses have been experienced which would not have occurred in a location suitable for breeding quail and ruffed grouse, where the ground and air were uncontaminated by disease germs from domestic poultry and the birds safe from the abandoned cat. A movement to establish "sanctuaries," wherein native birds may breed in safety, is under way. The State reservations should be multiplied and utilized, particularly for breeding and feeding refuges for native birds.

There is a mistaken opinion abroad that the State reservations are in themselves sufficient sanctuaries for breeding and feeding refuges for birds. Nothing could be farther from the truth, for the reason that from their very size they are difficult to control, not alone in respect to human poachers, but also against the numerous enemies of nesting birds; and especially from the fact that it is well known that birds, particularly game birds, are not likely to resort to and breed in places which are freely open to the public, and which are daily visited by hundreds and even thousands of people.

We again express the opinion that the breeding of pheasants perhaps may ultimately be safely left to private individuals.

Deer.—While it is certainly a fact that the wild lands of the State are well adapted for producing an annual crop of wild deer, an undue increase will without doubt entail hardship upon farmers and property owners. Every possible safeguard should be adopted to protect property and the rights of property owners. In the near future it may be necessary to control the increase of deer. A general open season, even for a very few days, would bring out an indiscriminate rush of inexperienced and irresponsible hunters. To prevent untoward results it may be necessary to issue a special license for deer hunting, with a fee sufficient to limit it to persons of responsibility, and to ensure to the State reimbursement for moneys paid to land owners for damage to crops by deer.

MARINE FISHERIES.

The dominant tone of the industry is that of a return to the normal, — an average catch, a living wage for the fishermen, a fair profit for the vessel owners and distributor, and improved quality and service for the public. All of this reacted to furnish employment to an increased number of workers in the allied in-

dustries, so that on the whole the year has been a reasonably prosperous one to Massachusetts' fundamental industry.

There are those who ascribe to the visit to Massachusetts of the delegates to the International Fisheries Congress, in 1908, a stimulus to co-operation and augmented activity on the part of fishermen, dealers and manufacturers, which has resulted in convincing the best minds in the fisheries of Gloucester, Boston, Cape Cod, and, indeed, the entire shore, that the fishing interests of Massachusetts are State-wide, rather than local; that sectional jealousies should be eliminated; and that broad-gauge methods of legitimate, keen and generous business competition should displace invidious, narrow business methods, and, by the stimulus of active, scientific constructive competition, maintain unrivalled the reputation of Massachusetts fish and fisheries products in the markets of the world. During the past season a special advance was made in a method of getting the fish to the curers in better condition, which has shown marked results; the shack fishermen have successfully inaugurated the practice of salting the catch of the first baiting and bringing in fresh the catch from the second baiting.

The total receipt of fresh fish at Boston was nearly 2,000,000 pounds greater than in 1908.

Y	EAR.	Haddock.	Cod.	Hake.	Cusk.	Pollock.	Halibut.	Totals.
1909,		38,485,250	25,840,700	11,469,400	1,962,700	7,968,850	1,204,950	86,931,850
1908,		37,581,600	27,502,000	11,365,800	1,668,100	6,617,400	300,550	85,036,450

The fleet numbered 291 sailing vessels, 1 steam otter trawler ("Spray"), 2 gasolene steamers and 150 boats of various kinds,
— a total of 444.

Great consideration on the part of the State is due to fishermen and dealers who, under the exceedingly unfavorable conditions which have long obtained at T wharf, have developed here the second largest fresh-fish mart in the world (exceeded only by Grimsby, Eng.), by sheer force of business capacity, ability for persistent hard work, and a determination to furnish for the consuming public a cheap and wholesome food supply in the best sanitary condition possible under existing circumstances. It is

certainly to be expected that the State should recognize the immense value of the fisheries trade to Boston and to Massachusetts, and by providing a suitable location upon the Commonwealth flats, remove the handicap under which the fishermen and dealers have long been working, and speedily permit an extension of the business, that a still more rapid growth may ensue from which the public will derive immediate benefits. The State should see to it that our "original industry" should be fostered, and should recognize that it deserves adequate quarters equal or better than the Commonwealth dock at South Boston.

The Gloucester Fisheries. — Many vessels in the various branches of the fisheries made remarkable stocks. Records of many years' standing were excelled by some craft, while others established new marks in certain special lines. The fishermen, the skippers and vessel owners participated in the general prosperity which came to the sea toilers of Gloucester.

The leader of the record-breakers was the schooner "Arkona," Capt. Newman Wharton, which established a new high-water mark for a season's stock and for the amount of fish landed in one season in the salt bank cod fishery. This craft made three trips, one trawling and two dory handlining, landing the enormous amount of 835,470 pounds of salt cod, and stocking, on the three trips, \$24,949.28. The crew's share was \$546.50 per man.

Another record breaker was the dory handline trip of the schooner "Tattler," Capt. Alden Geel. This craft made a late summer trip, fishing on Quero bank, and as autumn came continued on to the grounds at the Virgin Rocks, coming home with nearly all the fish the big craft could carry. The fare weighed off 479,433 pounds,—the largest salt cod fare ever landed at this port, also the largest ever recorded on the Atlantic coast by a two-masted schooner. On the big catch the fine stock of \$15,277.31 was made, the high line of the crew taking \$342.93 for his share, while the average share was \$263. Captain Geel has held many records in the salt fishing line, and this is another one to his credit.

Another record was made by the schooner "Onato," Capt. J. Henry Larkin. This craft, during the spring and summer, was engaged in cod shacking on Quero bank, and one of her

fares exceeded all previous records in this branch of the fisheries, both for amount of fish brought home and for stock and share. The vessel weighed off 139,800 pounds of fresh cod, 113,000 pounds of salt cod, stocking \$5,550, the crew sharing \$138 clear.

During 1909 among the other noteworthy performances in the big trip and stock line were the following:—

Schooner "Aloha," Capt. John McInnis, on a dory handline salt cod fishing trip to the Virgin Rocks, weighed off 356,000 pounds of salt cod, stocking \$11,084.39, the high line of the crew sharing \$288.38. Twelve of the crew on the trip made over \$200 each.

Schooner "John Hays Hammond" had a big year in command of Capt. Lemuel E. Spinney, her owner. She made seven fresh halibut trips, his stock being \$21,473.82, thus averaging over \$3,000 for each trip. During the balance of the year the craft went haddocking under command of Capt. Horace Wildes, who also did well in her. Her year's stock reached the fine total of \$30,352.64.

One of the most brilliant performances of the year was that of Capt. James D. Goodwin. On Nov. 1, 1908, he took command of the big gasolene auxiliary knockabout "Benjamin A. Smith," and engaged in the winter haddock fishery until spring, when he fitted out his own schooner, "Ella M. Goodwin," for a salt bank trawl cod fishing trip, following this up with a dory handline trip in the same vessel, and ending his year Sept. 12, 1909, thus having been in commission a little less than ten and one-half months. In that time he stocked \$34,925.85. The haddock season gave him a stock of \$15,925.85, while the remaining \$19,000 was the stock of the trawl and dory handline bank cod fishing trips.

Another big year's work was that of Capt. Clayton Morrissey, in the big knockabout schooner "Arethusa." He made two salt trawl bank cod fishing trips, weighing off 770,040 pounds of salt cod, stocking \$21,063.65. The crew's share was \$410.12 per man.

Schooner "Maxine Elliott," Capt. Thomas Benham, made three dory handline cod fishing trips during the season, landing 700,200 pounds of salt cod, making the fine stock of \$21,200, the high line of the crew taking down \$537, while the average share was about \$415.

Schooner "J. J. Flaherty," Capt. Fred LeBlanc, made two dory handline cod fishing trips to the banks during the season, and brought home 682,000 pounds of salt cod. On this a stock of \$20,808.19 was made, the high line share being \$516 and the average share \$377.

Schooner "Hazel R. Hines," Capt. Fred Morrissey, of the salt trawl bank fleet, made two trips, weighing off 597,206 pounds of salt cod, stocking \$16,215.43. The sharesmen profited to the extent of \$527.18 each.

Our fishermen are ever alert for new methods and for information which enables them to "follow the fish" more closely. The deck handline salt cod fishing fleet could in previous years generally be divided into three sections, drifters or "Rippers," "Georges" and "Eastern." But last season almost the entire fleet fished to the eastward, on Quero and Western banks; and, as almost all combined both deck and dory handlining, it is therefore hard to draw any distinguishing lines. A few of the regular "Rip" or drift fleet stuck to straight deck drifting, and some of the old Georgesmen did the same; but the great majority went after the codfish to the eastward, and got them any way they could catch them, from deck drifting or at anchor, or with double dories. In this "combined" branch of the fisheries some fine fares were secured.

Schooner "Hattie A. Heckman," Capt. Israel Bellevue, one of the eastern deck handline anchor fleet, with double dorics, weighed off as the result of one trip 122,000 pounds of salt cod, making the big stock of \$4,002.10, the high line of the crew taking down \$142.56. Several others of the crew also made over \$100.

Schooner "Gladiator," Capt. Nelson Thorburn, going the same as did the "Hattie A. Heckman," weighed off on one trip 123,000 pounds of salt cod, stocking the fine amount of \$3,763.50, while the high liner of the crew made \$110.17.

Schooner "Mina Swim," Capt. William Forbes, one of the Rips or drift fleet, fishing to the eastward and carrying double

dories, weighed off, as the result of one trip, 122,000 pounds of salt cod, stocking \$3,761.23, the high line of the crew making \$153.37.

Similarly, the schooner "Eugenia," Capt. John Williams, made two of these big trips, weighing off 106,000 pounds of salt cod on one and 112,000 pounds on the other. On the latter trip the stock of \$3,295 was made, the high line getting \$137 and 15 out of the 18 men of the crew receiving \$100 or more each.

Schooner "Gertrude," Capt. James Vanamberg, fitted like the "Swim" and "Eugenia," weighed off 106,000 pounds of salt cod on one trip, the stock being \$3,200; while the schooner "E. C. Hussey," Capt. Clifford Hopkins, fitted likewise, weighed off 100,554 pounds of salt cod on one trip, stocking \$3,082.

The Mackerel Seining Flect. — The mackerel seining fleet, as a whole, had a poor season last year; but in spite of this, several vessels made a good year's work.

Schooner "Mary E. Harty," Capt. Reuben Cameron, was high line of the fleet, with the fine stock of \$22,200. Beside carrying off the high line honor, Captain Cameron placed a record to his credit by landing the most remunerative trip in the history of the southern mackerel fishing season. He struck the fish off the back side of Long Island, and ran to market at Newport, R. I. The fare counted out 48,808 mackerel, and the stock was \$6,571, — the record for a single "out south" mackerel trip.

Among the others who made good stocks in the mackerel seining fishery were the following: —

Schooner "Pontiac," Capt. Enos Nickerson, \$16,700.

Schooner "Priscilla Smith," Capt. William J. Corkum, \$13,000.

Schooner "Constellation," Capt. Thaddeus Morgan, \$12,600. Schooner "Victor," Capt. John W. McFarland, \$12,200.

Schooner "Benjamin A. Smith," Capt. Solomon Jacobs, \$12,200.

Schooner "Oriole," Capt. Charles H. Harty, \$11,400.

Schooner "Effie M. Prior," Capt. Elroy Prior, \$11,300.

Schooner "Judique," Capt. Gourley Anderson, \$11,000.

Halibut Fleet. - The so-called "Georges" halibuters had a

fine season almost without exception, and a number of them did remarkably well. The high liner of the fleet was the schooner "Dictator," Capt. Fred Thompson, and this craft was also the leader of all the fresh halibut vessels for the year 1909. The stock was \$26,312.98 and the crew's share \$635.22 per man.

Other highly satisfactory stocks were also made: -

Schooner "Teaser," Capt. Peter Dunsky, stock \$24,922.87 and share \$651.68.

Schooner "Kineo," Capt. John G. Stream, stock \$22,904.66, the crew sharing \$617.98.

Schooner "Selma," Capt. Charles Colson, stock \$22,489.18, the crew sharing \$611.36.

Some of the crafts in this Georges halibuting fleet, mentioned above, made their stocks in from nine and one-half to eleven months.

Of the straight halibuters, the schooner "Mooween," Capt. Daniel McDonald, made a phenomenal record. From Nov. 20, 1908, to Dec. 20, 1909, the craft made the splendid stock of \$28,600, the crew sharing just \$700. The loss of six of his crew in a terrible squall last spring so affected Captain McDonald that he stayed ashore for a while, and late this fall decided to haul up until the beginning of the year, when he fitted out again and made another trip. But for these occurrences the chances are that the season's work of the craft would have been very remarkable. On one trip Captain McDonald stocked \$5,289, the crew sharing \$138.20, — the largest stock and share on a halibut trip for many seasons.

Some of the vessels of the flitched halibut fleet did finely last season.

Schooner "Oregon," Capt. Albert Flygore, was high line, weighing off 135,000 pounds of flitches, stocking \$10,783.27, the crew sharing \$274.48.

Schooner "Admiral Dewey," Capt. James Hayes, weighed off 122,948 pounds of flitches, stocking \$10,195, the crew sharing \$258.14.

Schooner "Fannie A. Smith," Capt. Joseph V. Bonia, stocked \$9,220 on her flitching trip, the crew sharing \$221.48.

The Pacific halibut fishery owes much to Massachusetts brains, enterprise and capital.

For the first time in the history of the halibut fisheries of the British Columbia coast fish have been taken on banks in the ocean to the west of Graham Island, the most northerly of the Queen Charlotte Islands.

These banks, lying from two to eight miles off the coast, were discovered recently by Captain Rorvick of the Canadian fishing steamer "Celestial Empire," owned by the New England Fishing Company, according to the statement of a member of the ship's crew. On this virgin ground the "Celestial Empire" made a catch of 140,000 pounds of fish in three days. In one instance 900 fish were caught by three dories at one set of gear. The fish are declared to have been all large, averaging in the vicinity of 250 pounds apiece. ("Fishing Gazette," Jan. 15, 1910.)

Schooners "Francis P. Mesquita," "Maud F. Silva," "Mary DeCosta," "Edith Silveira" and "Belbina P. Domingoes" and others of the market fleet from this port have made a big year's work. The crew of the "Frances P. Mesquita," Capt. Joseph P. Mesquita, from November 1 to November 16, just fifteen days, shared \$117.50 per man; while the schooner "Maud F. Silva," Capt. John Silva, stocked \$7,000 from August 7 to September 29, — big work for fifty-three days. The "Mary E. Cooney" and the "Maud F. Silva" each stocked \$1,700 in one week last fall; and the crew of the schooner "Edith Silveira," Capt. King Silveira, shared \$124 in two weeks. Several of these boats made crew shares of over \$70 in one week.

The high line of the shack and haddock fleet from Gloucester in 1909 was the schooner "Thomas S. Gorton," Capt. William H. Thomas, with a stock of \$36,000. Captain Thomas always makes a big year's work, and is one of the biggest fishermen on the Atlantic coast, being exceeded only by the schooner "Mary C. Santos," Capt. Manuel C. Santos of Provincetown, stocking 339,900.

Schooner "Raymah," Capt. Felix Hogan, stocked \$24,632.85 last year in the haddock and shack fisheries, the crew sharing \$550.

Schooner "James W. Parker," Capt. George Tufts, was another vessel which did well haddocking and shacking, stocking \$22.840.10 for 1909.

Swordfish. — The swordfishing fleet consisted of 66 vessels, nearly all having gasolene motors.

Schooner "Rose Standish," Capt. James O'Neil, was high line of the swordfish fleet, with a stock of \$7,333.33 and a crew share of \$425.90.

Schooner "Valentinna," Capt. Charles O'Neil, stocked \$6,200, the crew sharing \$360.

The cod shack fishing last summer was very profitable to the vessels engaged. The fleet fished on Quero bank, and most of them made three and four trips. Schooner "Thomas S. Gorton," Capt. Wm. H. Thomas, stocked nearly \$15,000 on four trips, the crew sharing \$316.93. Schooner "Onato," Capt. J. Henry Larkin, got about \$14,000 on her three big fares. Many of the fleet made trips which netted over \$100 shares to the men of the crews.

Schooner "Corona," Capt. Horace Wildes, in this fishery weighed off 170,000 pounds of salt cod on one trip, stocking \$4,555, the crew sharing \$114 clear.

Schooner "Susan and Mary," Capt. Albert Hubbard, had two big salt shack fares in succession, weighing off the big total of 306,000 pounds of salt cod as the result of the two trips.

Details of the catch of the Gloucester fleet follow. Although there was a decrease in the total catch, the increased price obtained more than covered the deficiency to the fishermen.

	1909.		1908.		1907.	
Г івн.	Barrels.	Pounds.	Barrels.	Pounds.	Barrels.	Pounds.
Salt cod	_	33,107,085	_	23,115,705	_	15,712,700
Fresh cod	_	12,299,259	l –	13,130,700	l' -	16,167,400
Halibut	_	2,868,582	_	2,816,050	- 1	3,081,765
Haddock	-	4,402,100	- '	8,409,100	ll –	6,063,800
Hake,	-	1,805,590	li -	7,868,400	-	9,801,950
Cusk	-	1,362,960	-	3,405,800	i -	4,805,300
Pollock,	_	5,901,125	- :	7,133,200	li –	16,754,400
Flitched halibut	i -	800,109	- 1	880.542	-	826,210
Fresh mackerel.	3,348	669,600	4,365	873,000	3.067	613,400
Salt mackerel	14,805	2,961,000	17,450	3,490,000	29,725	5,945,000
Fresh herring	5,288	1,057,600	20,537	4,107,400	13,091	2,618,200
Salt herring	46,420	10,583,760	36,737	8,376,036	71,561	16,315,908
Frozen herring	17,635	4,408,750	26,450	6,612,500	21,565	4,313,000
Swordfish,	- "	6,184	l ´-	11,954		8,250
Cured fish		4,091,100	-	3,404,800	_	2,004,800
Porgies,	817	163,400	_	-	_	
Halibut fins.	298	59 ,600	358	71,600	413	82,600
Whiting,	500	100,000	4,000	800,000	16,000	8,200,000
Shad,	749	159,800	1,653	330,600	355	71,000
Fresh fish from boate	-	800,000	1 -	600,000	i -	750,000
Miscellaneous,	-	1,743,800	-	1,285,200	-	744,176
Total landed at Gloucester,		88,351,404		96,722,587	_	109,879,859
Total by Gloucester vessels			!		1	
at other ports direct (es-			1			
timated),		36,359,800		32,601,850	-	39,100,000
Total at Gloucester and						
by Gloucester vessels at						* 40 0=0 0**
other ports,	_	124,711,204	- 1	129,324,437	-	148,979,85

THE LOBSTER FISHERY.

Your special attention is directed to the deplorable conditions which exist in the lobster fisheries of this State. On account of the organization of the trade in live lobsters from Nova Scotia and Maine, the real conditions are effectively masked to the public eve. The actual status, however, is evident only to those who attempt to catch lobsters in waters where they were formerly abundant. The public waters of our coasts, except in certain regions where the pollution is obvious, are as well suited for producing an annual crop as formerly. The actual catch, however, is vastly reduced, as a result of unwise legislation, whereby the reproductive capacity of the race is disastrously impaired by killing the best breeders through a long series of years. Without adequate knowledge of biological conditions, the Legislature in the early '70's was led to believe that if the lobster had a chance to breed at least once, sufficient young would be annually produced to meet the market demand. Although experience has proved the contrary, the Legislature of 1907 was hoodwinked and cajoled by the "special interests" to carry still further this mistaken manner of "protection" (?), and has made a bad matter worse by permitting the capture of any lobster above 9 inches, instead of above 101/2 inches, as formerly, so that at present the only practical protection in any degree adapted for maintaining the future supply is that exceedingly small measure afforded by the prohibition of killing the egg-bearing females, the purchase of such by the State, and the liberation of the young by the United States Bureau of Fisheries.

Our lobster laws as to-day existing are capable of such facile evasion that they can be enforced only by the constant presence of an officer in the boat of every dishonest fisherman, — a condition obviously impracticable.

The disastrous effects of these laws are notoriously evident in (1) the decreased average size of lobsters taken in Massachusetts waters; (2) the diminishing number taken, even by an increased number of men and traps; (3) and the diminishing ratio of eggbearing lobsters, — facts which are now too well known to require further proof.

The chief argument against a law which would at least tend in

a small measure to check the unwise and selfish destruction of the breeding lobsters, and thereby insure the production of a greater number of eggs, is the cry from the fishermen, that many poor and honest people would by a change in the present law be deprived of a means of livelihood; and from the trade, that their business arrangements would be inconvenienced.

However, evidence is accumulating that the public will not long permit the present destructive methods of fishing to be continued, and will demand a law which can be enforced without excessive cost to the public. As tending towards such a desirable condition, we are urgently recommending that every one who fishes for lobsters should be required to take out a license, thus making an effective enforcement of law possible by providing that all persons who are convicted of violation of the lobster laws shall be refused a license for one year from date of conviction. Such a license law would disarrange the organization at present existing, whereby there is a pooling of interests, so that the fines incurred through violations of the lobster laws are assessed pro rata among members of the combination.

Further, we recommend that the measurements be made according to the Maine method, upon the "body shell" (carapace), instead of upon the whole lobster, as the law reads at present, — "from the extremity of the bone protruding from the head to the end of the bone of the middle flipper of the tail."

The intelligent fishermen already recognize the importance of maintaining a sufficient number of adults to produce eggs, and are not misled by assertions that if a law were passed to place a perpetual close season upon the large lobsters, all the small lobsters would be caught, and none left to reach the period where they would be immune to capture; or the other, even more specious, which appeals most strongly to the merely commercial tendency,—that a 9-inch lobster at the next moult becomes a $10\frac{1}{2}$ or 11 inch, worth twice as much on the market. This argument entirely ignores the biological fact, of utmost importance, that the larger lobster is worth even still more as an egg producer, and that the maintenance of the market supply depends entirely upon the large lobsters; e.g., a 16-inch lobster produces 80,000 to 100,000 eggs, whereas a 9 to 11-inch lobster averages 5,000 to 10,000. But, most important, a 12-inch lobster

has practically no enemies except man, and, having passed successfully through all the innumerable vicissitudes of early life, is probably the sole survivor of at least 15,000 (very probably many thousands more) who began life together, and is practically certain to continue as a breeding individual for at least ten or twenty years longer, producing in that time an aggregate of approximately 500,000 young, or probably more. On the other hand, the 9 or 10 inch lobsters are destroyed in enormous quantities by codfish, sharks and other bottom-feeding fish; and therefore a considerable proportion of all the lobsters below 12 inches used as food by man would have been destroyed by natural enemies had man not intervened. Therefore, if man is content to use only lobsters below 12 inches, he is, as it were, only competing with other animals who use lobsters as food; whereas, if man insists upon destroying those which have escaped, viz., those above 12 inches, he is slowly but surely reducing the breeding stock, and the ultimate depletion is as certain as if he daily ate the laying pullets from his flock. the case of the lobster, the vastness of the flock, spread over 130,000 square miles, and the fact that we therefore cannot actually, but only indirectly, and after decades or even generations, see the results of such a destructive policy, conceals the actual facts from the public. The public is after all most interested in and responsible for the maintenance of the State and national fisheries, and the people must emphatically demand consideration.

Summary of Statistics relative to Lobster Fisheries.

	Year	•		Men.	Traps.	Lobsters.	Average per Pot.	Egg Lobsters.	Ratio of Egg Lobsters to Total Catch
1890, .				479	19,544	1,612,129	82	70,907	1:22
1905, .				287	13,829	426,471	81	9,865	1:42
1907, .				379	21,342	1,039,886	49	10,348	1:100
1908, .			.	349	19,294	1,035,123	54	9,081	1:115
1909, .				522	29,996	1,326,219	45	11,656	1:115

The above statistics indicate the status both of the lobster catch and of the source of supply. Previous to 1890 there had

been a progressive decline, but the results became most conspicuous later, when from 1890 to 1905 the catch declined 75 per cent., and the egg-bearing lobsters dropped from 70,000 to about 10,000, or a decrease of about 84 per cent.

In 1907 the passage of the 9-inch law made legal the catching of all above 9 inches. Note that in 1907 the number of men increased over 1905 32 per cent.; the number of traps increased 54.32 per cent. The number of legal lobsters reported increased 144 per cent., but the total number of egg-bearing lobsters increased only 4.9 per cent. The price to the consumer has increased since 1890 200 to 300 per cent. The change in the law has temporarily masked the decline formerly shown by statistics. But this decline will soon again become obvious.

We predict that within five years the decreased marketable supply will become still more reduced, and that commercial extinction of the lobster in Massachusetts waters is certainly imminent, unless effective measures are immediately taken.

The Purchasing of Egg-bearing Lobsters (Acts of 1904, chapter 408). — The method of collecting egg-bearing lobsters by the launch "Egret" has proved costly and unsatisfactory. Next year an attempt will be made to furnish better service at less expense. This branch of the work has been productive of so much bad feeling among the fishermen that the wisdom of the law is frequently questioned. The total number of egg-bearing lobsters collected by the "Egret" was 2,725; by Deputy Mecarta, 1,732.

THE MOLLUSK FISHERIES.

Reference has already been made to the generally unsatisfactory condition of the mollusk fisheries. Vast areas are now unproductive, awaiting fair and intelligent legislative action.

Our investigations this year have continued upon the determination of the potential food productivity of the seashores.

A report upon the scallop fisheries is in press.

A brief report follows upon the sea clam (Mactra), so-called, in distinction from the soft clam (Mya) and the hard clam (Venus).

THE GROWTH AND HABITS OF THE SEA CLAM (Mactra solidissima).

Dr. George W. Field, Chairman, Massachusetts Department of Fisheries and Game, State House, Boston, Mass.

Sir: — I herewith submit the following report upon the growth and habits of the sea clam (*Mactra solidissima*), one of the valuable bait mollusks of Massachusetts. The material was collected in connection with the mollusk investigations conducted by this department from 1905 to 1910.

. Respectfully submitted,

DAVID L. BELDING, Biologist.

Presentation of the Report.

The following notes are compiled from observations made at various localities along the Massachusetts coast, principally at Monomoy Point and at Wellfleet on Cape Cod, during the years from 1905 to 1910, in connection with experimental work on other mollusks. Although no definite plan of experiments was outlined, these observations are sufficient to add to the popular knowledge of the growth and habits of this important food and bait mollusk.

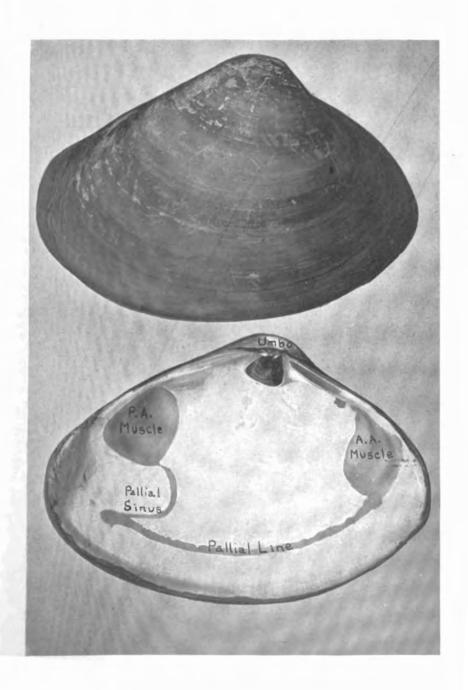
The primary object of this report is to show, by a description of the life and habits of the sea clam, what means, if any, can be employed for the future conservation of the fishery. For this reason the investigation was conducted along the following lines: (1) a survey of the present distribution in the waters of the Commonwealth; (2) a study of the habits, including the method of life, enemies and spawning; (3) the rate of growth and adaptability for culture. For securing brevity, the subject matter is presented in the form of answers to such questions as are propounded by the practical fisherman.

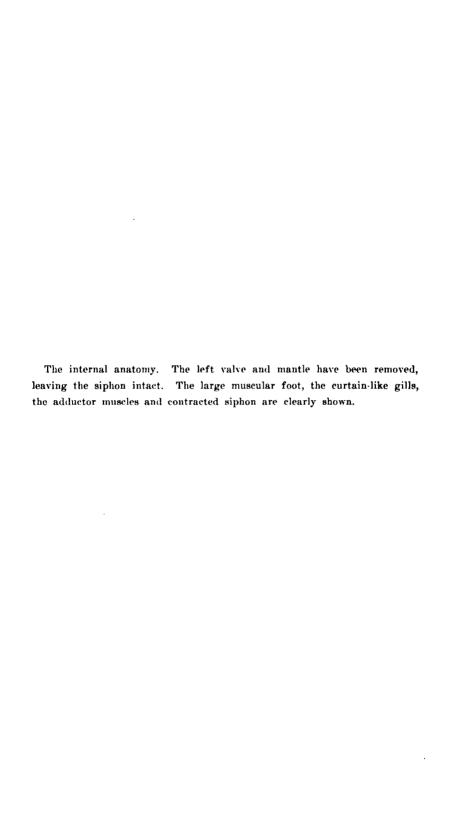
Methods of Investigation.

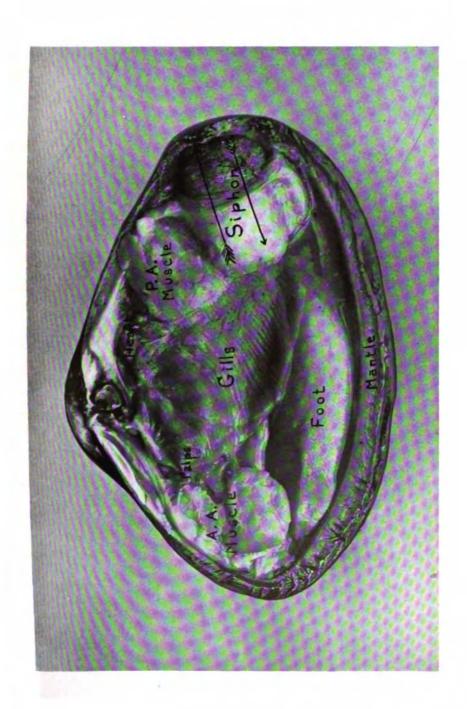
As the migratory habits of the sea clam rendered confinement necessary, the growth experiments were conducted in pens and boxes at Monomoy Point, Chatham, one of the few localities where sea clams are found in abundance at the present time. The actual planting was carried on in the Powder Hole, an enclosed body of water connected with the ocean by a shifting channel in the vicinity of the natural sea clam beds. The pens, usually one one-thousandth of an acre in area, were constructed of boards projecting three to four inches above the surface of the sand, in order to confine the sea clams. The pens were planted below low-water mark and between the tide lines. Also, ordinary dry goods boxes were partly filled with sand, the projecting sides making them comparable to the raised pens. Part of these boxes were placed in shallow water, two to three feet in depth, on the south side of the Powder Hole; while the remainder were suspended from a



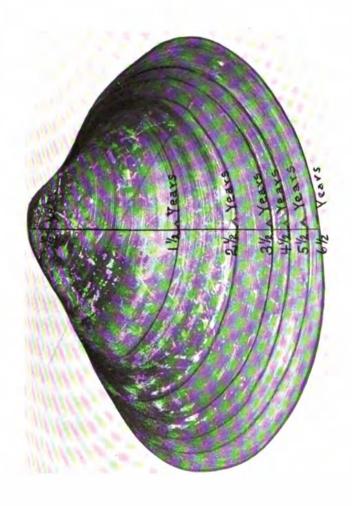
The upper figure shows an external view of the right valve of a five-yearold sea clam; the lower, the interior of the left valve. The exterior of the shell is covered by a thin yellow epidermis, except at the umbo or beak, where this "skin" is worn off. The interior of the valve shows the hinge, with the horizontal teeth and the elastic pad, the scars of the adductor muscles, and the pallial line and sinus of the mantle and siphon.



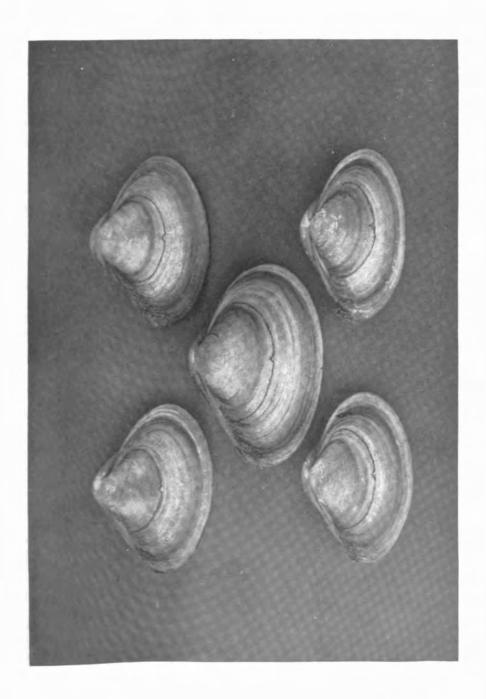


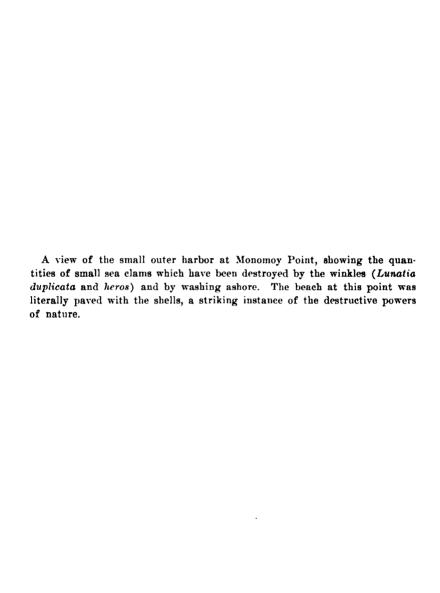


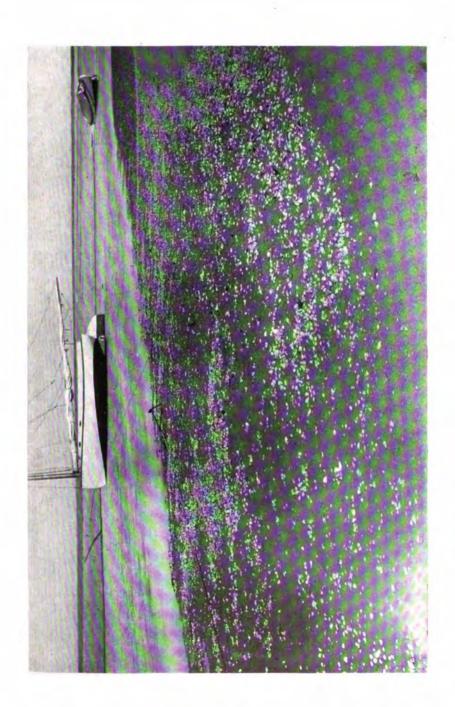
The stages of growth for the average sea clam six and one-half years old are here represented by concentric lines, which show the actual size at yearly intervals from the age of one-half year to six and one-half years. The actual lengths are: one-half year, 1 inch; one and one-half years, 13/5 inches; two and one-half years, 31/5 inches; three and one-half years, 41/2 inches; six and one-half years, 41/2 inches; six and one-half years, 41/2 inches.



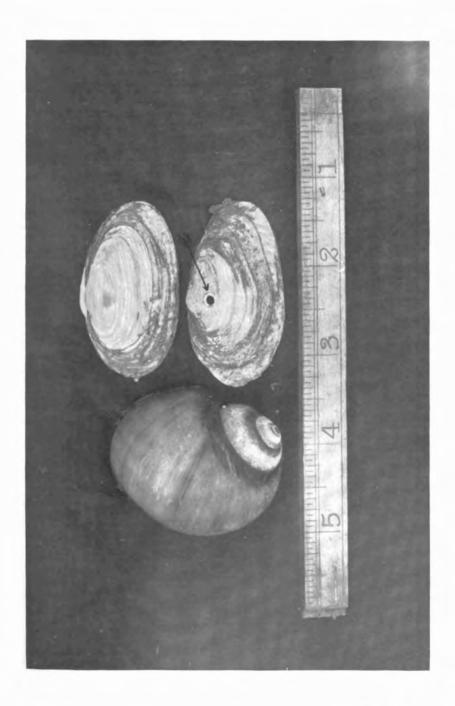
		•	
The size when	from the raft boxe a planted is shown b ken place in one yo	by the growth line	oint, five-eighths life size. and notch. The increase







The winkle or cockle (Lunatia heros), an enemy of the quahaug, clam and sea clam, with a soft clam (Mya), which it has bored. The winkle attacks the sea clam by boring a similar hole through the umbo, usually slightly higher, in the case of the sea clam, than is shown in the photograph, and sucks out the contents. Notice the countersunk rim, which is characteristic of the work of the winkle. Large quantities of sea clams are annually killed by this enemy.





raft in the center of the harbor, where the best circulation was obtainable.

The main difficulty in conducting growth experiments was the inability to simulate the natural conditions under which the sea clam lives. The habitat of this mollusk is the shifting sand bars of exposed coasts. Attempts at planting in such an environment proved failures, as the sea clams all escaped, and it became necessary to conduct the growth experiments in quieter waters. The sea clam in its natural habitat receives a good circulation of water,—the essential factor in shellfish growth. Although the experimental beds were not under absolutely natural conditions, it is nevertheless reasonable to assume that the growth in beds receiving a like circulation of water should be approximately the same as on the natural flats.

In recording the growth experiments, the measurements were made with the triangular measuring instruments described in the report on "The Scallop Fishery of Massachusetts," 1910. The different periods of growth were checked by notching the edge of the shell with a file, in the same manner as used in the quahaug and clam experiments, which rendered identification and recording easy. The habits and enemies of the sea clam were observed at Monomoy Point, the spawning season at Monomoy Point and Wellfleet, and the data for the survey collected at different localities along the coast.

1. What are the names of the sea clam?

Mactra solidissima has several names, the most common being "sea clam," as it is styled in southern Massachusetts, while in the northern part of the Commonwealth it frequently goes by the name of "hen clam." In other parts of the country, because of its habitat upon the open coasts, it is called "surf clam" and "beach clam," while from the use of its shell it has acquired the local names of "dipper" and "skimmer."

2. To what family does the sea clam belong?

The sea clam belongs to the class of mollusks called the Lamelli-branchia, which are characterized by an internal and external symmetry. According to the classification given by Pelseneer in his work on the "Mollusca," Mactra solidissima is of the order Eulamellibranchia, sub-order Tellinacea, family Mactrida. Geologically, the family of the Mactrida extends from the cretaceous age to the present day. According to Verrill's "Invertebrates of Vineyard Sound," Mactra solidissima is found fossil in the Post-Pliocene at Point Shirley, Chelsea, Mass.; and apparently in the Miocene of North and South Carolina. Smaller bivalves, which by some authors have been given the names of Mactra lateralis, Mactra tellinoides and Mactra arctata,

¹ A Treatise on Zoölogy, Part V., Mollusca, by Paul Pelseneer, D. Sc., London, 1906.

² A Report upon the Invertebrate Animals of Vineyard Sound, by A. E. Verrill, United States Fish Commissioner's Report, 1871-72.

are found in Massachusetts; while from Hatterss to Brazil is found a southern variety, Mactra similis.

3. Distribution: what is the range of the sea clam?

The range of the sea clam comprises the Atlantic coast, from the Gulf of Mexico to Labrador. It is found on the sandy bars of exposed coasts below low-water mark, and occasionally on flats exposed during the low-course tides. It is found from low-water mark to a depth of ten fathoms (Verrill).

4. What is the present extent of the sea clam beds in Massachusetts? No large beds, as formerly existed at Dennis, Nantucket and Chatham, are known to the fishermen, although sea clams are found in more or less abundance at several places along the Massachusetts coast. The largest bed at the present time is at Monomoy Point, Chatham. In Plum Island Sound and Ipswich Bay sea clams are found on the low flats, but the fishing is limited to the low-course tides. Off Nahant, Hull and Winthrop are scattering beds of these large clams, which are occasionally washed ashore after storms. Sea clams are gathered off Plymouth by the fishermen. The numerous bars off Barnstable, Yarmouth and Dennis on the north side of the Cape furnish an extensive territory, while along the inner side of the Cape small beds are located at Wellfleet, Truro and Brewster. At Provincetown the fishermen thoroughly dredge the beds at Wood End in their search for bait.

On the outside of the Cape many shells are found on the beaches, showing that beds exist on the ocean side. At Chatham there is a fine bed at the present time. The south shore of Dennis formerly was a great locality for this mollusk, but few are now found. At Nantucket sea clams are now gathered in many parts of the harbor, principally from a large bed on Hussey shoal. Sea clams are also found near Cape Poge and on the shores of Martha's Vineyard. In certain waters of the Commonwealth the shells of this mollusk form the greater part of the shell deposits on the ocean bed. The principal fisheries are at Chatham, Provincetown and Plymouth.

5. What are the commercial uses of this mollusk?

The sea clam is used both for food and as fish bait. As a food it is not generally in favor, principally because its edible qualities, owing to its tough appearance, are not commonly known. It is prepared for the table in the form of sea clam pie, stew or chowder. Any diminution of the future supply of quahaugs will increase the popularity of the small sea clam, as there is no reason why this mollusk should not prove a valuable shellfish for the market. At the present time the chief demand for the sea clam is as bait, especially during the winter, when other forms of fish bait are hard to obtain.

6. What is the method of fishing?

The former method of gathering sea clams was by raking. Various kinds of rakes similar to the implements employed in the quahaug fishery were used, the style depending upon the depth of water. Now

these mollusks are taken by dredging, as it is possible to scrape sea clams from a sandy bottom with a dredge which will fail to extract quahaugs from a tenacious soil.

7. Has there been a decline during the last thirty years?

If reliance can be placed on historical writings, the present generation perhaps is witnessing the passing of the sea clam. While it is indeed true that the large beds, which once made Chatham, Dennis and Nantucket famous for their bait fishery, have passed away, the lack of authentic statistical figures for the past years, and the erratic nature of the fishery, large beds appearing first in one locality and then in another, lasting only a few years before they become exhausted, render any conclusions indefinite. Comparing the yield of 1907 and 1877 for Cape Cod, as given by E. Ingersoll, we would find a decrease from three thousand barrels to a few hundred, which would imply a serious decline, were it not known that in 1877 the large bed at Dennis was in a flourishing condition. Nevertheless, it has been clearly demonstrated that whenever a large bed in any locality has been discovered it has been depleted in the course of seven years by overfishing. There are several specific examples of the depletion of large natural beds by ill-advised methods of fishing, which have contributed to the decline of the fishery.

8. What is the remedy for the depleted beds?

Usually, when a bed has been raked clean, nothing can be done; the remedy lies rather in preventive measures. By proper restrictions as to raking, the beds can be made to last longer, perhaps indefinitely, if a certain amount of "spawners" are saved and the young sea clams protected by a size limit. The sea clam furnishes the instance of a shellfish which it is advisable to protect by means of a size limit, in order to insure a greater return to the fisherman. But a size limit will only increase the yield of one particular set, and in order to successfully provide for future generations, it is necessary to leave part of the larger sea clams for "spawners" by setting aside certain portions of the beds.

Another remedy is the transplanting from outside areas of adult sea clams, which will act as "spawners" and possibly restock the depleted areas. This form of sea clam culture is worthy of trial in some of our waters. A similar method is artificial culture by private individuals, which will be considered in another part of this paper.

9. Anatomy.

The anatomy is described only in brief terms, to give the reader a general idea of the principal organs and their relation to the life and habits of the animal.

The Shell. — The shell is a smooth, calcareous structure, covered with a yellowish-brown epidermis, except at the umbones, where it is worn

¹ The Clam Fisheries, by Ernest Ingersoll, Section V., Vol. II., The Fisheries and Fishing Industries of the United States, 1887.

off, showing the white lime. The sea clam attains a large size, shells from five to six inches in length often being found on the beaches. Usually the size taken for market is between four and six inches. the size depending upon the length of time the bed has escaped the notice of the fisherman. The shape of the shell varies greatly, the usual form being eliptical, but occasionally they almost approximate a triangular shape. Fine concentric lines of growth are found over the exterior of the shell, with here and there one more prominent than the others. The shell consists of two equal valves, joined together dorsally by a hinge and ligament. A dark-colored elastic pad, similar to that of the scallop, is placed between two triangular depressions, one in each valve at the hinge line, and acts as a spring to force the valves apart in contra-action to the adductor muscles. The interior of the shell has a smooth, glistening appearance, due to the secretion of the mantle. On the hinge, extending horizontally from the triangular depression for the elastic pad, are two ridges, which interlock with the corresponding ridges of the opposite valve to form a strong hinge. Below the hinge line is a deep concavity passing outward to the umbo. Toward each end of the shell are two oval scars, corresponding to the attachment of the anterior and posterior adductor muscles. Connecting their lower margins is the pallial line, which marks the attachment of the mantle to the shell. Posteriorly this line takes an inward curve to form the pallial sinus, which corresponds to the attachment of the siphon.

The Internal Anatomy. — The sea clam should prove an excellent specimen for class room demonstration, as with the simplest dissection the different organs are clearly demonstrated to the pupil, possessing in this way an advantage over the more specialized clam, oyster and scallop.

- (a) The Mantle. On removing one valve a thin, transparent covering, the mantle, is noticed, closely lining the interior of the shell and enclosing the animal in a fleshy case when the thick yellow edges of the mantle lobes meet. The two mantle flaps are joined together except at the ventral (lower) edge for the extrusion of the foot. At the posterior end the mantle is joined in the form of two fleshy tubes, the siphons, corresponding to the "little neck" of the quahaug. The lower tube is the incurrent, through which the water enters the mantle chamber; the upper the excurrent, through which the water leaves the shell. When expanded these tubes, tipped with delicate tentacles, form a short "neck," projecting above the sand, through which food and water are sucked down to the buried sea clam. The chief function of the mantle is the formation of the shell, by the secretions of the cells on its edge and outer surface, which become impregnated with lime salts.
- (b) The Muscles. The two principal muscles are the anterior and posterior adductors, commonly known as the "eyes." They are situated a little distance from each end of the shell, and by their contraction

offset the action of the elastic pad on the hinge and thus keep the shell closed. When the action of the muscles ceases, as in a dead sea clam, the shell gapes open. In its burrow the shell gapes slightly as the muscles partially relax. Just dorsal to the attachments of the adductor muscles are the points of attachment of the foot retractors, which are useful in regulating the action of the muscular foot. The other important muscles of the body are the retractors of the mantle and internal fibers of the foot.

- (c) The Foot. The chief characteristic of the sea clam is its large, muscular foot, which has the shape of a broad dagger or arrow head. It is situated on the lower side of the visceral mass. The foot itself is a tough, flexible organ, composed internally of many cross bands of muscle running longitudinally and transversely, on the same plan as the minute structure of the mammalian tongue. In the upper portion, between the intervening bands, lie the sexual organs. The method of life of the sea clam on the exposed beaches has necessitated this strong and useful organ for locomotion.
- (d) The Gills. On removing the mantle, two delicate flaps, lined with vertical furrows, are observed hanging like the leaves of a book on each side of the foot and visceral mass. These lamellated structures are the inner and outer gills, the two inner uniting dorsally, the two outer being attached to the mantle, so that they hang down as four folds in the mantle chamber, separating it into an upper compartment directly connected with the excurrent siphon, and a lower connected with the incurrent siphon. Water passes into the lower chamber, bathing the gill bars, thus bringing oxygen to the blood inside the gills by diffusion, and receiving carbon monoxide. It then passes through an opening lined with cilia into the upper chamber, and thence out the excurrent siphon. The second function of the gills is the collection of the microscopic food, which is strained from the water by the cilia of the gills, and is carried in definite channels to the tip of the palps and thence to the mouth. The gills also assist in the removal of silt and other matter which may flow in with the water, thus evidencing a selective power in procuring food.
- (e) The Digestive Tract.—The digestive system consists of the palps, which are exceedingly long and slender in the sea clam, and are situated in the form of a moustache on the upper and lower sides of the mouth. Their function is to receive the food from the gills and guide it into the mouth. A short esophagus opens into a broad stomach, surrounded by a digestive gland, the liver, which is in communication with the stomach by two ducts. A long coiled intestine, containing in its upper part a large gelatinous rod, the crystaline style, leads from the posterior part of the stomach, and after passing through the heart ends near the posterior adductor muscle.
- (f) The Blood System. The circulatory system consists of a heart, situated in the upper part of the body posterior to the stomach, the

ventricle of which is pierced by the intestine. From this extend blood vessels anteriorly and posteriorly to the various parts of the body.

(g) The Reproductive Organs. — These glands are located in the visceral mass, just above the foot, and are spread around the coils of the intestine. In the female they contain the eggs; in the male, the spermatozoa in various stages of development, according to the season of the year. Considerable variation in size and color is noticeable.

10. When is the spawning season?

The spawning season comprises the two months of June and July, and attains its height during the last week in June and the first week in July. At Wellfleet in 1908 spawn was obtained from sea clams in the aquaria on the 10th of June. The season varies in different localities, according to temperature, spawning taking place earlier in the warmer waters.

11. How do sea clams spawn?

The sexual products are developed in glands situated in the visceral mass above the foot, the eggs in the female, the spermatozoa in the male clam. In either case the ripe spawn passes through a narrow opening into the mantle chamber, and is from there shot out of the excurrent siphon as a fine cloud into the water, where, after fertilization, the young sea clam enters upon an independent embryonic existence. In the aquaria the sea clams extruded the spawn in small quantities at successive intervals; but under natural conditions it may be possible for the entire contents of the glands to be liberated at once.

12. At what age does the sea clam spawn?

It is possible for the sea clam to produce mature spawn at the age of one year, but the first important spawning season occurs in its second year. Each succeeding summer the sea clam reproduces, the quantity of spawn increasing in proportion to the size.

13. The early life history.

The Egg. — The eggs are extruded in white clouds or in masses held together by brown connective tissue. The size of the sea clam egg is slightly smaller than the egg of the scallop, measuring one five-hundredth of an inch in diameter.

The Spermatozoa.— The spermatozoa pass out in a white cloud, which, on diffusion, gives a milky appearance to the water. The "milk" from the female clam has a granular appearance, due to the individual eggs, while that of the male has a homogeneous consistency. The individual spermatozoön consists principally of a head, which contains the important male cellular elements and a long cytoplasmic tail for locomotion.

Embryology. — Fertilization is accomplished by the union of the spermatozoon and the egg in the water external to both parents, the active male cell seeking the floating egg. In nature fertilization is largely a matter of chance, and, owing to the currents, winds and tides, a great percentage of the eggs never become impregnated.

The subsequent development of the embryo is by the process of unequal cell division, similar in all lamellibranch mollusks. The first polar cell is given off twenty minutes after fertilization, fifteen minutes before the first division into two cells. The four-cell stage is reached in the next thirty-three minutes. Repeated divisions give eight, sixteen, thirty-two, sixty-four, etc., cells, until the embryo reaches what is commonly known as the mulberry stage, where it consists of a compact mass of small cells surrounding a few large cells, which are to form the inner or endodermal layer. The surface cells acquire cilia, hair-like processes, in the course of nine to ten hours, and the embryo is able to swim aimlessly through the water. By the time it is twelve to fourteen hours old it has attained definite motion, has a primitive mouth, and traces of a shell gland are beginning to appear. A few hours later a shell gradually envelops the animal, which now enters upon the so-called veliger stage.

The Veliger Stage. — Between thirty and forty hours after fertilization the embryo is completely enveloped by a transparent shell, which has gradually extended over the soft parts. The animal is still a swimming form, locomotion being effected by an organ called the velum, which is a circular pad lined with a fringe of strong cilia, a direct modification of the anterior ciliated area of the previous stage. During the spawning season the water is full of swimming shellfish veligers. In about five days the velum gradually disappears, giving place to a slender, active foot, which functions first as a swimming and later as a crawling organ. The young sea clam is now ready to settle to the bottom and take up its life in the sand.

The Set. — Observations are lacking on the early set of sea clams. No byssal attachment, such as is found with the young clam and quahaug, has been observed in this form; but, as the nature of its early life would indicate the need of such an organ, there is reason to believe that a byssus may be present at an early stage. The set consists in the animal leaving its free-swimming existence in the water and taking up its life in the sand. At this time the young sea clam measures about one one hundred and twenty-fifth of an inch, and has most of the characteristics of the adult.

14. Locomotion.

Anatomically, the shape and size of the foot suggest an active crawling existence, such as the animal's method of life would indicate. The muscular foot is capable of great activity, and can push the shell along the sand by its forceful thrusts,—a frequent means of travelling.

Crawling. — In a similar manner to the quahaug, crawling is accomplished by working the extended foot into the sand, and by its contraction bringing the shell after it with a tipping movement. In this movement the siphon brings up the rear. No observations have been made on the rate of crawling, except that the sea clam can travel faster than the quahaug. Another method was observed in young sea clams,

one-quarter of an inch in length, in water six inches deep; the young animals apparently hopped along, moving nearly an inch at each kick of the muscular foot.

Jumping.—A curious instance was recorded at Monomoy Point on sea clams, one and four-fifths inches in length, which were lying on the sand in a box at a depth of two to three inches from the surface of the water. A sea clam at one end of the box suddenly extended its foot, and by a twisting kick sent its body in one leap through the water and air in a beautiful arch, covering a distance of eight inches. This performance was repeated several times by the other clams in the box. By such a means it is possible for the clam to travel much faster than by crawling, and accounts for the ease in surmounting enclosures less than three inches above the sand.

Swimming. — The sea clam, like the razor clam, by a kicking movement of the foot can glide for a short distance through the water, — a method of locomotion which might possibly be styled swimming. Rarely more than one kick is taken in these flights, which are not of common occurrence.

Burrowing.— The sea clam, when exposed, can burrow within a few minutes, either when the water is over it, the easier and more natural way, or when exposed on the damp soil. It is also capable of crawling when exposed between the tide lines. Burrowing, like crawling, is accomplished by the extension of the foot and the resultant downward pull on the shell by its contraction.

12. Do sea clams migrate?

The escape of the sea clams planted in the first bed, a pen with sides only one inch above the sand, definitely settled all question of their ability to move, but gave no information as to the rate and length of their migrations. Later observations were made on the movement of the sea clam in the following manner: stakes, three by two inches, were driven in the sand, sea clams placed around with end of shell touching stake, so that the slighest change in position could be determined. Observations were made both between the tide lines and below low-water mark. (1) Stakes were driven between the tide lines in the channel connecting the Powder Hole and the ocean at Monomoy Point, and sea clams one and four-fifths inches in length placed around them. After twenty days only four out of the twenty-nine originally planted were found in a radius of eight feet. (2) Similarly, at a depth of two feet at low water seven were planted. In three days five were found, in fourteen days three, and in thirty-eight none. The sea clams between the tide lines showed a greater tendency to move than below low-water mark, possibly being less satisfied with their environment.

There seems no question that the sea clam can move from one part of the flat to another. The writer has seen small sea clams (two inches in length) work across a sand flat partly by their own exertion, partly by tidal action. They are well equipped for travelling, but apparently have little sense of direction. For this reason it is doubtful if extended migrations occur, as the sea clam would have no reason for leaving a favorable environment. The idea that whole beds of sea clams migrate hither and thither is probably erroneous, and the depletion of a bed can only come from overfishing or through the destructive powers of nature.

16. What are the feeding habits?

The mantle lobes unite posteriorly to form two short tubes, the excurrent and incurrent siphons. Through the lower or incurrent siphon water is sucked into the mantle chamber, as the sea clam lies under the sand with the tip of the siphon reaching the surface. By the action of the cilia on the gills, which hang as four perpendicular flaps in the mantle chamber, the food is strained from the water, which passes into the upper mantle chamber and thence out through the excurrent siphon, bearing the waste products. The food is taken by definite channels to the ventral part of the gills, and from there to the edge of the long palps, where it is caught up by other ciliary currents and transferred to the mouth. In its normal position in the sand the sea clam feeds continually, a constant stream of water entering and leaving the shell.

The food of the sea clam, like other bivalved mollusks, consists chiefly of microscopic plant forms, called *diatoms*, tiny forms, found in more or less abundance in all waters. These minute plants have a wondrous variety of shapes, but are identified by their silicious covering.

17. What are its natural enemies?

The enemies of the adult sea clam can be classified in two groups: (1) adverse physical agencies; (2) living forms. The second group can be subdivided into (a) active enemies, which prey directly upon the sea clam; and (b) passive enemies, which indirectly injure or affect its life. This last group, while large, is of relatively little importance, and contains the forms which partake of the same food or affect the sea clam in any way.

Besides man, the chief active enemy is the common winkle or cockle (Lunatia heros and L. duplicata), which perforates the shell at the umbo by a beautifully countersunk hole by means of a rasping tongue, and sucks out the contents. The sea clam appears to be the special prey of this gastropod mollusk, which likewise attacks the clam and quahaug, though to a less extent. Nearly all the sea clam beds are infested with them, as the numbers of bored shells on the beaches testify, great quantities being destroyed annually by this enemy. The following observations were made on one hundred and fifty-nine shells taken from the beach at Monomoy Point: (1) the perforation is made either on the right or left valve, according to chance; (2) the usual location of the hole was one to three millimeters from the beak; (3) the size of the hole varied from a fraction of a millimeter to five milli-

meters, according to the size of the winkle; (4) often the shell was not completely perforated, showing that the enemy sometimes had to abandon the attack; (5) the perforation is not always at the umbo, but may be found along the median line, even within two millimeters of the edge of the shell. Various sea fowl also prey upon the small clams.

The natural elements play an important part in the destruction of the sea clams, particularly in regard to the young larvæ, which perish in large numbers during the cold rains, changes in temperature, winds, currents, storms, etc. The adult sea clam itself does not escape the ravages of the elements, as quantities are annually washed ashore in gales, to perish on the exposed beaches.

18. How long does it take to furnish a marketable sea clam?

Rate of growth varies according to the location, in respect to current, tide and other physical conditions; therefore, the following answer will not apply in all cases. However, there is more uniformity in the growth of sea clams in their exposed beds than with the other shellfish, as the location on the sandy bars swept by the tides and current are favorable for rapid growth. Unfortunately, it proved impossible to obtain the rate of growth on the natural beds, owing to their exposed conditions, and the experiments on the rate of growth were made in more sheltered places. The results from the beds situated in the "current" should most nearly approximate the growth under natural conditions, and the rate of growth of the sea clams is given from the favorably situated beds.

Considering a three and one-quarter inch sea clam as of marketable size, such can be obtained two and one-half years from the time it is spawned; i.e., by the third winter be ready for market. By the second winter, one and one-half years old, the sea clam should measure two and five-eighths inches, as it acquires its largest growth the second summer of its life. It is therefore recommended that a growth period of not less than two and one-half years be given before capture, as the two and five-eighths inch clam is scarcely of sufficient size for marketing, and a substantial gain in volume is obtained by waiting an additional year. Beds of sea clams will be found where the rate of growth may be less than the above citations, as all beds cannot be favorably situated in respect to the natural conditions.

19. What is the average annual growth?

Starting with a twenty-five millimeter sea clam, the size it attains at the age of six months (January 1), the average annual growth will be twenty-two millimeters (seven-eighths of an inch) for the next three years. Naturally the growth during the first year is greater than the second, and the second greater than the third, as the sea clam grows more slowly as it increases in size. These figures were obtained under favorable conditions for growth.

20. What is the growth of the sea clam for the first five years of its life?

The sea clam hatched July 1, 1905, by Jan. 1, 1906, would measure twenty-five millimeters (one inch) in length; Jan. 1, 1907, it would measure sixty-five millimeters (two and five-eights inches), showing a gain of forty millimeters (one and three-fifths inches); Jan. 1, 1908, eighty millimeters (three and one-fifth inches), a gain of fifteen millimeters (three-fifths of an inch); Jan. 1, 1909, ninety millimeters (two-fifths of an inch); Jan. 1, 1910, ninety-eight millimeters (three and seven-eighths inches), a gain of eight millimeters (one-third of an inch); and July 1, 1910, one hundred millimeters (nearly four inches).

21. What are the growing months?

The sea clams in the raft boxes at Monomoy Point in 1906 were measured at monthly intervals, to determine the relative value of the different months. The greater part of the shell formation takes place during the summer months; but the sea clam, unlike the quahaug and the scallop shows a slight growth during the warmer winter months. which is only noteworthy as illustrating the fact that the clam (Mya arenaria) and sea clam, as cold water species, are able to keep in an active feeding state longer than the two former. In the following table each month is given a number representing the gain per cent. for that month, the entire year being considered as one hundred per cent. The table is made on the basis of the growth of a forty-millimeter (one and three-fifths inches) sea clam, starting January 1. No allowance for slowing of growth in regard to size is made. On examination of the table, it will be noted that the two best months are August and September, while the growth during April, November and December is of slight consequence.

	Mo	NTHS	•		Per Cent.	-	Мo	NTHS	•		Per Cent.
January,					-	July, .					16.75
February,	•				-	August,					24.00
March, .	•				_	September,					23.00
April, .	•				8.75	October,					10.00
May, .					6.00	November,					2.50
June, .					12.75	December,					1.25

22. How old are the large sea clams?

The answer to this question is at best but a calculation, as sea clams have been under observation for only five years, which but rarely carries them beyond four and one-half inches. The large, heavy specimens, measuring from five to six inches, must be at least ten years old and possibly more, as the larger clams grow more slowly. Growth varies according to the environment, and if the sea clam is unfavorably situated it will take longer than ten years to reach the maximum size.

23. How does the growth of the sea clam compare with the clam and the quahaug?

Under similar conditions, the growth of the sea clam is between the growth of the quahaug and the clam, but more nearly approximates the growth of the clam. In fact, a series corresponding to the weight of the shell would read, in order of rapidity of growth: clam, sea clam, and quahaug,—the heavier-shelled animals showing the slowest increase. In amount of gain per year for the same sized specimens (one inch) the figures would be roughly: clam, two inches; sea clam, one and five-eighths inches; quahaug, seven-eighths inch, under excellent growing conditions.

24. Can sea clams grow out of sand? If so, can it be made of economic importance?

As sea clams obtain their nourishment from the water, the exact relation of soil to growth is problematical. In conducting experiments upon this subject it was found that sea clams, when suspended in wire baskets (one and one-quarter inch mesh) at a depth of five feet from a raft in the Powder Hole, Monomoy Point, increased in size, proving that a covering of sand, their natural environment, was not necessary for growth. The method of growing out of sand did not prove as efficient as in the natural environment; the gain for the year only totalling 12.25 millimeters, as compared with 40.45 millimeters for the sea clams in the boxes with sand. The growth for the first month proved much less than the average for the following months, being 4.14 times smaller than it should have been. This check was due to the change in environment, as the sea clams required some time to adjust their feeding powers to the changed method of life. The same observations have been made on quahaugs confined in wire baskets. When taken up the shells were covered with a mass of barnacles, silver shells (Anomia), crepidula, etc. From a practical standpoint, while it is worth while to know that sea clams can be successfully kept in wire baskets out of the sand and held this way for the market without serious loss, it is not recommended as a method of culture, as the slow growth of the sea clams would render any basket culture unprofitable.

25. Do sea clams grow between the tide lines?

The sandy bars inhabited by the sea clams are frequently exposed at the low-running tides, when these mollusks are gathered for market as in Plum Island Sound. Often sea clams are found wandering between the tide lines. So not infrequently the sea clam is left exposed by the water, and is accustomed to life between the tide lines. Growth, however, is not so rapid as when the water is constantly over the bed, as the feeding time is limited. At Monomoy Point a bed was tried between the tide lines near a channel connecting the Powder Hole with the ocean at high tide. The bed received a good circulation of water, but was only covered a few hours a day. The growth for the year amounted to 11.5 millimeters, which is poor compared with the more

favorable growth, 40.45 millimeters, on the raft, where, besides having good circulation, water was constantly over the clams. For every quart planted in between the tide lines 2.15 quarts were obtained, as compared with 8.15 quarts for the sea clams on the raft.

26. What are the conditions influencing the growth of the sea clam?

The rate of growth of the sea clam depends upon two factors: (a) the amount of food; (b) the amount of lime salts in the water for shell formation. The growth in wire baskets shows that the mineral matter of the shell is derived from the water. The quantity of lime determines the weight and rapidity of shell formation. The question of food is even more important than that of lime, as the soft parts must increase in bulk before the shell can enlarge. The greater part of the food of the sea clam consists of microscopic plant forms, called diatoms, which are more or less abundant in all waters. The sea clam sucks these little forms through its siphon, as is described under the feeding habits.

- (a) Current. The natural habitat of the sea clam places it where it can get good circulation of water. The chief office of the current, in addition to sweeping away pollution, is that of food carrier. Therefore, as growth depends on food, the fastest-growing localities would be where a good current brought more food to the sea clams. A rapid current is not necessary, as merely a good flow of water is essential for the growth of all shellfish. As experimental evidence of the effect of current, the following examples are cited. In 1906 boxes containing sea clams were under observation on the raft and near the shore at Monomov Point. On the raft was a good circulation of water; near the shore only the rise and fall of the tide caused any flow of water. The result for sea clams 40 millimeters in size was as follows: in one year's time the shore sea clams gave an increase of 12.04 millimeters, or 2.2 quarts for every quart planted. On the raft a gain of 40.45 millimeters was recorded, or a gain in volume of 8.15 quarts for every quart planted. The only difference was in the circulation of water. The two places were only 100 yards apart.
- (b) Tide. The effect of tide, in exposing the animals, is injurious to growth in two ways: (1) in the severe winters the exposed sea clams may perish; (2) it limits the feeding time. The effect of exposure has already been cited, in considering the subject of growth between the tide lines.
- (c) Soil.—Sea clams are invariably found in sand, especially on the bars rippled by the action of the waves. Probably the clean sand affects the sea clam only as a resting place. There is little chemical action on the shell such as has been noted on clams in muddy organic soils; and the smooth sand is less prolific in diatoms than are the numerous mud flats, which furnish the breeding grounds of this microscopic food.

27. Additional facts derived from the growth experiments?

(1) Variation in the Different Years. — In growth in the raft boxes from 1906 to 1910 the average of each year gave the following results, showing considerable variation in 1908 and 1910. Owing to the few boxes in use each year, the variation may be due wholly to the boxes themselves; but it is also believed that these two years showed less growth than the other three, although the difference may possibly be exaggerated by the peculiarities of the boxes and their position.

								Mm.
1906	, .		•					40.45
1907	, .							37.00
1908	3, .			•				27.00
1909), .							42.81
1910	, .	•		•				32.92
	Aver	age,						36.04

(2) Box Growth compared with Pen Growth.—In 1906 experiments were made in three places: (1) between the tide lines, which gave an average of 11.49 mm.; (2) on the raft, which gave an average of 40.45 mm.; (3) on the south side of the Powder Hole near the shore, in about two feet of water at low tide. Here sea clams were planted both in boxes and in beds made by driving boards into the sand. The average for the pens was 4.57 mm., practically but little growth; while the boxes situated exactly under the same conditions but raised slightly above the sand with projecting sides gave a gain of 12.04 mm., or over two and one-half times as much. No explanation is offered for this fact, which has been likewise recorded for clams and quahaugs in other experiments in which the box growth exceeded the bed growth.

28. Can the sea clam be cultivated?

As an edible shellfish, the sea clam may some day become important, and it is not an impossibility that the small sea clam may replace the "little neck" as a table delicacy, if the diminution in the supply of quahaugs cannot soon be checked by cultural methods. The sea clam has a strong, sweetish flavor; but there is no reason to believe that the public taste could not be educated to "sea clams on the half shell" if "little neck" prices become prohibitive. At the present time there is little call for sea clams except for use as fish bait. Until the demand for this mollusk is sufficient to render the returns from sea clam culture as remunerative as those from clam and quahaug farming, little attention will be given to sea clam planting. At the present time artificial culture is impossible, owing to the legal difficulties which stand in the way, as described at length in our "Report upon the Mollusk Fisheries of Massachusetts," 1909.

Two methods of culture can be employed with the sea clam: (1) individual planting on private grants. This has been shown impractical

at the present time, both from a legal and a financial standpoint. Sea clam culture is possible, as the growth experiments have demonstrated the rapid growth under cultural conditions. Planting will have to be done in pens made either of netting or boards projecting one foot above the sand, in order to confine the active sea clams. To manufacture such pens will cost but little, and when the legal difficulties are removed and the demand for sea clams has increased, there is no reason why sea clam farming cannot be made a profitable business. (2) Communal culture offers a satisfactory means of protecting the fishery, as by the importation of "spawners" the flats and waters which have been raked clean can once more be made productive. Often attempts, such as the bedding of quantities of large sea clams upon the depleted flats. will fail, as there is no positive assurance that the spawn will catch on these flats, only the chances are greatly increased of its "setting" in the immediate vicinity. In this speculative way the towns may restock their waters by local action.

29. Recommendations.

Until the shellfisheries are put on a cultural basis under the proper laws, nothing remunerative in artificial propagation can be done for the sea clam. The question at the present time is the protection and conservation of the natural supply by careful regulation. Such legislation naturally comes under the control of the towns, whose duty it is to see that proper regulations are imposed for the maintenance of the fishery within their borders. The regulation should be along the following lines:—

- (1) The protection of the small sea clams, by the proper enforcement of a size limit. In this way larger returns would be insured by the growth of the small sea clams, and the fishery would last longer.
- (2) Preservation of "spawners," by setting aside certain portions, thus protecting the large sea clams, which furnish the greater part of the spawn. In this way the bed could never be depleted by overfishing, as has been the case in past years, when all the "spawners" were taken, without regard to the future welfare of the fishery.
- (3) Restrictive legislation by the town, to insure the best market returns and the prevention of overfishing.
- (4) Restock the barren areas by the transplanting of adult sea clams as "spawners."

Utilization of Public Waters as a Source of Food Supply.

No one can doubt that the food supply is a fundamental basis of existence, or that a straitened food supply may lead to social, political and economic chaos. Long ago Lord Macaulay made this prediction to an American friend: "The day will come when the multitude of people, none of whom has had more

than half a breakfast or expects to have more than half a dinner, will choose a legislature. Is it possible to doubt what sort of a legislature will be chosen?... There will be, I fear, spoliation. The spoliation will increase the distress; the distress will produce fresh spoliation... Either civilization or liberty will perish."

In proportion to our area, Massachusetts has relatively little farm land, and what we have is peculiarly liable, from the configuration of the surface, to loss from erosion of plant food (chiefly in the forms of nitrates and nitrites) from the soil. But this loss is in some measure offset by the peculiar configuration of our seashores. When under natural conditions. before the advent of civilization, this waste of nitrates and nitrites was so utilized in the tidal waters as to result in a very large production of mollusks and crustacea, which are a very valuable food for man. Thus did nature conserve this natural resource, by utilizing along the shore the normal waste of the uplands. But, now, as a result of unwise legislation, the people are not permitted to utilize this source of food and wealth. Neglecting the waters, we farm the land solely, and only there strive to assist nature to an increased yield of human food per acre. By our farming operations we increase in an approximately corresponding degree the flow of nitrates and nitrites into the waters, where under proper economic conditions it should indirectly produce an increased yield of crustacea (lobsters and edible crabs) and mollusks (oysters, clams, quahaugs, scallops, etc.) in the shallow waters of the coast. Instead of utilizing these conditions, however, we make the tidal areas a desert by killing as many as possible of the lobsters before they have reached the breeding age; by unsystematic digging we destroy a large proportion of the growing clams, in order to get a few large ones "before some one else does;" we sell at a low price the breeding quahaugs, and the growing quahaugs under the breeding age at a higher price. Instead of planting our "seed" clams and quahaugs we ship them for planting in other states. These planters reap large profits from which our short-sighted policy precludes our own citizens. We either destroy the scallops before they have laid their single litter of eggs, or we waste a considerable proportion of the normal market supply by delaying until late autumn the capture of the

large ones which have already spawned and therefore are of no further use in increasing the number of young, until such a time in the winter as unnecessarily high prices may be obtained; or. worst of all, and as completing the unwise existing trend of public and private ignorance and negligence, we destructively inundate these tidal flats, valuable above any farming land in the potential food productive capacity, with a flood of unspeakable refuse and detritus of civilization. Not alone is it a wellrecognized municipal practice to turn sewage, garbage and manufacturing wastes without let or hindrance into such public waters, in violation of decency, of sanitary and economic laws, but we permit the relatively few clams and quahaugs which may survive to be eaten by the very class which can least afford to meet unnecessary illness and expense. The State can better support in idleness the ignorant fisherman who digs clams ostensibly for bait but in fact for food than permit these clams to become available for food. We speak whereof we know, when we say that a large majority of the clams and quahaugs dug "for bait," under permits of the local boards of health in Boston, Lynn and New Bedford harbors, are ultimately used for food. This practice exists in spite of 355 arrests and convictions in the past six years, since the practice was forbidden by law. We have said in another report ("Report upon the Mollusk Fisheries of Massachusetts," 1909) that the dumping of the metropolitan sewage into Boston harbor destroys annually more than \$400,000 worth of food which should be received from that area for the benefit of the citizens of Massachusetts. The figures relative to Lynn and New Bedford harbors are even proportionally greater. A considerable proportion of the pollution is unnecessary, in the sense that the polluting material could be disposed of on land at equal or less expense and with greater economic results.

Pollution of Streams. — Attention has been called many times to the inadequacy of the present laws relative to pollution in its effect upon fish life. Under the law the commission acts only upon cases of pollution by sawdust, but as the law reads at present, shavings and wood-manufacturing refuse of various kinds, which are equally as destructive as sawdust, can be put in with impunity. In a smaller way, many manufacturers unnecessarily turn into our streams materials which could

more efficiently and cheaply be cared for on land. It is a curious fact that the Commonwealth forbids such polluting material to be turned upon land of an individual, but it may be put upon the public lands and waters with absolute impunity, resulting in a waste of material which with a little more care could often without additional expense be profitably utilized on land, instead of resulting in the destruction of public property and public rights.

The aspect of this most conspicuous to the public is the pollution of certain rivers and streams which empty into the sea near clam and quahaug beds. The resulting pollution of the shellfish grounds constitutes a most insidious danger to the public health. In spite of our remonstrance, passage was secured of a law (Acts of 1907, chapter 285) by which shellfish in certain polluted areas, from which the taking of shellfish is prohibited by the State Board of Health, may be used for bait, provided they are not sold. This law is absolutely impossible of enforcement, for the reason that the officer is compelled, in the nature of the case, to keep those same shellfish under observation from the time they are dug until the time they are used as bait. Biological examination indicates that clams and quahaugs from these areas are dangerous as conveyers of typhoid fever germs. Certain evidence has come to our attention of typhoid fever cases in the families of poor fishermen who are known to be violators of this law. We repeat our recommendation that the digging of shellfish from this area should be absolutely prohibited, until such time as the danger of contagion is removed. If, however, some arrangements can be made whereby the mollusks from polluted regions can be placed for at least a month in uncontaminated waters, it would render them safe for use as food, though the danger to the diggers, and through them to their families and the public, would not be entirely eliminated. Such arrangements would be possible under an adequate system of leases for mollusk cultivation.

Recreational Fishing. — With the increase of population of our cities, the demand becomes more important for a sane type of recreation such as is furnished by fishing. Many of the best streams of the Commonwealth are passing into private ownership, by which the public are excluded. The time is not far

distant when it will be necessary for the Commonwealth to consider the advisability of securing for the benefit of the public the most important streams in various sections of the State, and keeping those streams stocked in such a manner that reasonably good fishing can be maintained, instead of sending out a large number of trout the greater majority of which are wasted by being improperly liberated or placed in unsuitable streams.

In this connection we again respectfully call attention to our recommendations that an investigation can be made of the productive capacity of the various types of public waters in the State, with a view to determining the quantity of food fish which could be annually produced. This work has been successfully carried on in Switzerland, in Germany and in other European countries, where the problem of food supply is more urgent than in the United States. The extent and methods of stocking the streams of the State with food and game fish have long been notoriously inadequate. Legislative action is necessary to meet the requirements.

INLAND FISHERIES.

Distribution	oŢ	r isn	ana	Eggs	auring	1909.
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			•			•	~			
Fry distribut	ted,									802,000
Fingerlings of	listrib	uted,								152,200
Adult fish pu	t out,	, .								2,823
Fish eggs dis	stribu	ted,								1,000,000
Number of b	rooks	stocl	ced w	rith	fry,					137
Applications	filled	for	fry,							145
Number of b	rooks	stocl	ked v	vith	finger	lings	s, .			255
Applications	\mathbf{filled}	for f	inger	ling	s, .					246
Great ponds	stock	ed,								19
Rivers stocke	ed,	•	•	٠	•	•	•		•	3
		Hate	hery	Ex_{i}	penses	dui	r in g .	1909.		
Adams, .										\$204 47
Hadley, .										261 24
Sutton, .										15,171 74
Winchester,	•						•			142 38
									_	\$5,779 83

¹ Including trout eggs purchased (400,000 at 50 cents per 1,000), \$200.

Drack	IPT:	OM.		Fry.	Fingerlings.	Adults.	Eggs.	Pheasants
Brook trout,				802,000	130,900	1,073	_	-
Brown trout,				-	17,800	75	-	-
Rainbow trout,				_	8,500	_	-	-
White perch,			.	-	-	1,675	-	_
Smelt eggs,				-	-	-	1,000,000	_
Pheasants, .				-	-	-	-	668
Totals, .			. [102,000	152,200	2,823	1,000,000	668

Summary of Output of Fish and Pheasants during 1909.

That part of the report of the superintendent of the Sutton Hatchery relating to the propagation of trout follows:—

To the Commissioners on Fisheries and Game.

GENTLEMEN: — I herewith submit a report on fish cultural work and other work connected with the same.

Though natural conditions were somewhat adverse, the present season has shown much better results in fish cultural work through the improvements carried out in the past two years. The production of eggs was increased to 900,000 and the fingerlings to 155,000, — over twice the average for the past three or four years, and there is ample assurance that further increase is practical and safe.

The season of 1908 ended with a severe drought, and, while this did not interfere with carrying a much larger stock of breeders and fingerlings than usual, or in any way affect the quality or yield of eggs, it caused considerable loss during the winter as the eggs developed, and by weakening the embryos endangered the whole stock through greater liability to disease. This condition was brought about through shrinkage of the only available water supply for the hatchery, for the reason that another pipe drawing from a more abundant source has become so clogged as to be useless. The supply of water through December and January was less than one gallon per minute for 100,000 eggs; but the shipment of 200,000 eggs to Winchester gave some relief, and soon after our increased flow made it possible to carry the eggs and fry until the outside troughs could be used. These troughs, placed at the springs and operated under conditions similar to what is proposed for the new hatchery, developed the fry rapidly, and supplied so vigorous a stock for the rearing ponds that the early loss was the least experienced, and many thousand fry intended for rearing were not required and were distributed as advanced fry. These fry, that at the first to the middle of May were shipped 5,000 to the ten-gallon can, could not by the middle of May be shipped more than 500 to the can.

The eggs collected in 1908 for hatching in 1909 amounted to 750,000, 57,000 of these being brown trout.

The stock of brown trout that yielded these eggs was kept in the pool below the dam formerly used only for keeping large fish for exhibition purposes, the restricted space seemingly making it impracticable to keep a considerable number of breeders. In 1908 this pool was enlarged and partly concreted, and during the two succeeding seasons carried its stock so well that when it is completed as planned it can undoubtedly be depended upon to yield 100,000 eggs yearly. The brown trout fry were reared in the pens below the dam, and 16,000 were distributed, 800 being reserved as breeders.

The capacity for trout fingerlings was increased by the addition of two concrete ponds. Some of the older ponds vielded more by increasing the shade. The one pond which was considered to be insufficiently shaded (No. 3), suffered a severe loss, and came through to the end of the season stocked to little more than half its capacity. Several ponds yielded less than the usual number, but this was more than made up by the heavy yield of others, especially the group built in the weeded ground just below the principal spring supply. It is evident that if all the ponds could be made to yield to the full capacity of each the output would be more largely increased, and the most promising step towards securing this is shading and protecting the more exposed ponds. The work that has been done is of such value and is so necessary to keep up the yield and check the raids of predatory birds that it ought to be more profitable to build permanent coverings, rather than to continue the makeshift structures of brush and bagging now in use.

The ponds built in the woods are well shaded, but need covering for the purpose of keeping out the falling leaves. Where the shipment of fingerlings is long delayed, the leaves blow in and often fill the ponds nearly to the surface of the water. This endangers the fish, and results in long-continued and vexatious work in separating the fish and the leaves.

Fifty thousand rainbow trout eggs, forwarded by the United States Bureau of Fisheries, were received and hatched in December. This early hatching at the time of an extreme shortage of water made it impossible to give them proper accommodations, and by the time that the season was so advanced that they could be moved outside, they were in an enfeebled condition. The pond in which they were placed froze over frequently, interfering with regular feeding, thus causing further loss, so that by the time the weather moderated and permitted the pen below the dam to be occupied they were greatly reduced in number. Placed in this water, which has been found to agree best with them, they thinned to a marked degree, and 3,500 fingerlings of the largest sizes were distributed.

As in past years, improvements for increasing the rearing capacity were undertaken only after careful consideration of the effect on

existing facilities, and so far no curtailment elsewhere has resulted by reason of any extensions. The concrete ponds built the present season were constructed of heavy concrete, possibly the most enduring work on the place. Though they were on water already used, it was plainly capable of further use. On the east side, the new pond used the water flowing from the outside troughs; on the west side, the water from the west ponds was used again; and in the construction of the pond there the concrete was continued to form a dam for the large west pond, replacing the mud dam.

Below the hatchery the brook was changed into a runway, built of concrete slabs supported by a chestnut frame, as the soft bottom was not favorable for the heavy work built on the hard ground above the pond. This runway is intended for yearling spawners, and will undoubtedly carry enough so that the pond used so many years for yearlings can be used for rearing fingerlings, thus increasing the output of those by fully 20,000. An extension of this runway up the brook to the dam would materially increase its capacity, and would prevent the troublesome wash from the muck beds along this part of the stream into the completed part, and, by permitting the use of covers, would keep out the leaves from the heavy growth of hard wood between the meat house and hatchery.

Below this runway and extending for 100 yards down the brook the conditions are very favorable for a larger and deeper extension that would carry a large stock of adult brown trout. The water as it leaves the present runway is still good, and at this point it receives the drainage from the four lower rearing ponds, while further down a good supply of unused spring water flows in, and this locality is believed to offer the best prospects for flowing wells.

The outside troughs were found so useful that stands were built for increasing the number from 16 to 40, and lumber to make the increased number, with double-hinged covers for the whole 40, was bought and fitted.

In August a 2 horse-power gasolene engine was added to the equipment for preparing food. An addition to the meat and ice house was put up to shelter it, and later a refrigerator with overhead ice chamber was constructed in this building. In addition, conditions about the meat house were greatly improved by tearing out the wooden floor and laying one of concrete, and by building concrete steps and walk from the driveway on the dam. The wall extending along the dam from the steps was torn out and replaced with concrete, in order to break up a troublesome resort of rats.

The floor of the hatching house had so far decayed that it fell into the mud beneath, and therefore, over that part used for hatching purposes, would not support the troughs. As permanent repairs were not desired, the floor was broken up and the débris thrown into the mud to support a filling of sand and gravel. The filling was mainly of sand, with four inches of well-tamped gravel for a surface. The waste water was carried away in a cemented ditch.

The removal of the outside tub stand, repairs to the building and troughs, new head trough, changes in piping and heater, made the expenditure of labor unfortunately large for such temporary work.

Many other improvements were carried out about the buildings and grounds, though partly with reference to bird work. Grading and terracing was done, to get better locations for the brooders; underbrush was cut, to facilitate moving coops; land was cleared of stumps for plowing, in order to do some experimental planting for breeding coops; fences were put up, to keep visitors under better control; concreting for ratproofing was done wherever practical; and many small improvements were made, valuable in the aggregate, for guarding the safety or facilitating the handling of the fish or birds.

The continued improvement of the station has resulted in a greatly increased capacity, with less liability to loss from disease and accident; and the further improvements approved will, when carried out, make it possible to get a still larger yield of eggs and fingerlings, and in addition to feed a large number of fry to the stage called advanced fry,—a change that would largely increase the fish-cultural value of the place.

Further work of improvement is desirable, for it is certain that what is contemplated does not utilize the water flow to its full capacity or in the best way; and an important part of this work must still be in replacing the earlier construction with permanent work, which so far has hardly kept pace with the rate of decay.

It is well known that rearing fingerlings was not contemplated when the station was located and constructed, and that the equipment for this work, as well as for rearing pheasants, grouse and quail, has been added yearly, with the expense not in any way separated from the ordinary operating expenses.

The deficiencies of equipment have been made up each year as circumstances would permit, and the necessity of constantly adding has at all times hampered each season's work of production, for many years keeping that of fingerlings down to a point much lower than a proper number, and more recently interfering in developing the bird work.

The recommendations previously made for additional land and a safe road are renewed, but the need of these and of a proper hatching house have been stated in detail before.

Respectfully submitted,

ARTHUR MERRILL, Superintendent.

GAME AND INSECTIVOROUS BIRDS.

While there is an urgent demand for pheasants for liberation, and although these birds are known to be active feeders upon injurious insects and their larvæ, including both the gypsy and brown-tail moth, we are of the opinion that a greater degree of attention should be bestowed upon the maintenance of our native birds,—the quail as an unrivalled insect destroyer, and the ruffed and pinnated grouse as food and game birds. Of these we have demonstrated beyond question that an experienced person can under suitable conditions rear to an age suitable for liberation a much greater number of young birds than a pair of wild quail would normally produce, not to mention the undoubted advantages of breeding from selected individuals, thus progressively increasing size, productivity and other desirable qualities.

In the case of grouse, the problem of mating the birds is the most troublesome.

While the general consensus of opinion is that the ruffed grouse has this year increased in certain localities under the more favorable conditions existing, the areas where this bird has in recent years become uncommon or even absent are annually becoming more extensive. Attempts to rear this grouse in captivity have resulted solely in experience.

Quail are again becoming established in favorable localities. This bird can without doubt be reared in large numbers under suitable conditions.

Birds distributed during 1909.

Number of pheasants	distr	ibuted,				669
Applications filled,						76
Applications unfilled,						57

That part of the report of the superintendent of the Sutton hatchery which covers the rearing of pheasants, grouse and quail, follows:—

To the Commissioners on Fisheries and Game.

Gentlemen: — I herewith submit a report on raising pheasants, grouse and quail for 1909.

The work on pheasants, grouse and quail was carried on, as usual, in connection with fish-cultural work, therefore it was under the disadvantage previously noted, that the attention the work deserves could not be given, and that the data collected are neither so complete nor so conclusive as was hoped. However, the work of the season, considering the practical side, was far more successful and encouraging than any yet, inasmuch as many unlooked-for results were achieved in the breed-

ing and rearing processes, with positive demonstration that simpler and easier methods could be employed.

The results, viewing the work as one of experiment and investigation are: (1) that feeding and the care of young or old presents no difficulties except in so far as the feed of the old birds may affect the vitality of the embryos or young, and (2) that infectious diseases do not present the menace formerly feared, provided that sufficient intelligent and careful attention is given; (3) that maintaining maximum vitality in the breeding birds and their progeny is the most serious problem to be considered at present. A study of the influences that affect it is of the utmost importance.

The breeding of grouse was continued in an experimental way, but with good results. Of the breeding lot of four birds, one female was killed in the winter by swallowing a rifle shell; another was killed by the male in mating; the third nested in one of the large pens, laid 9 eggs and hatched 5, but failed to raise any chicks. Twenty eggs from wild birds were brought by Deputy Mecarta, the first lot of 11 hatching 7 chicks, 1 a monstrosity, 1 noticeably weak; these and 1 other died, the remaining 4 growing to practically full size. The second lot of 9 eggs all hatched; 2 died and 7 were reared.

Both lots were reared in brooders with the ordinary 4 by 6 inch brooder coop attached, and seeded with grass, clover and buckwheat. This vegetation supplied green food; other food consisted of curdled milk with shredded wheat, custard and maggots. Fine grain was given as they needed it; fruit was given in small quantities, but no attempt was made to supply insects. The food given was sufficient for a most vigorous growth.

When the chicks were not quite a month old they were moved to larger coops seeded with buckwheat, and a month later were moved again.

Early in September they were moved from the brooder ground to the hill west of the pond, where they thrived until late in October, when one of the first lot died. The cause was recognized as amæbic disease, and this was confirmed by examination of another bird by Dr. Tyzzer. The birds were separated upon discovery of the disease, but 2 more died, 1 of the 4 escaping infection.

The second lot developed a very quarrelsome disposition, and were separated into small lots, but before this was done one was so badly injured that it was liberated.

The results with these grouse as compared with the results of previous years showed that with good sanitary conditions and proper temperature the feeding and care of the young was not a more difficult matter than with quail or pheasants; and in these lots, as with previous ones, the characteristic contentment in close quarters when growing up, with quarrelsomeness when near maturity, and friendliness with attendants or strangers, was noted.

Work with grouse in the immediate future lies in devising suitable breeding methods. Their disposition makes it difficult to keep them even in very small flocks, and it is apparently impossible to breed them in small pens except singly, and then only with constant attention to the safety of the hen from the attacks of the cock. This procedure would so increase the equipment and labor for any extensive breeding that it might make practical results impossible. Of the experimental work that might be suggested for overcoming these difficulties, the most promising may be to attempt breeding in the unused hare pen of nearly two acres. This is natural breeding ground for grouse, except for the lack of underbrush, which was destroyed by the hares, but which is rapidly growing up. The present deficiency, however, is made up in part by a growth of weeds. The fence is high enough to hold pinioned birds, is proof against invasion by any animal, and the danger from hawks is not great in the grouse breeding season. Either to allow the birds to incubate their own eggs or to collect and hatch the eggs, permitting continued laving, would give results of some value: the latter might be preferable, for it has not yet been shown that a captive bird would lay a second clutch. Allowing the birds to rear their own young might well follow later, when there is a proper undergrowth to conceal them.

The stock of breeding pheasants and the output of young was increased twofold over last year. The egg yield per bird was increased from 50 to nearly 60, totaling 4,300; and the hatching was better, resulting in nearly 2,000 chicks,—a number so large that the former percentage grown could not be maintained, and dropped from 60 to 35, but from causes which could be avoided under suitable conditions, as will be shown below. Fertilization was very good, rising as high as 90 per cent. at mid-season, but falling very low at the last. The best lot hatched 80 per cent., but some failures brought the average down to below 50 per cent.

The rearing was satisfactory in the earlier lots, where proper control could be kept over them; but poor in the later lots, where the great numbers overcrowded the coops and the available open grounds where protection could be given, and made it necessary to place them in the more exposed and dangerous places. Birds similarly placed the year before, but in small lots, did finely, exceeding all other lots in percentage raised and in condition; but the more extended operations this year invited numerous enemies, and several of the largest lots were successively reduced to 50 or even to 25 per cent. during the first two or three weeks; and when moved to the open lower ground in front, where some measure of protection could be given, were attacked by roup. This infection remained and decimated them for over two months. Two lots hatched subsequently to these were placed for safety near the weedy ground bordering the brook, and, while safe here from hawks and cats, suffered quite as much from rats, and later with the

other lots lost many from roup. A hen hovering a brood in one of these lots developed a mania for killing them when they were about a week old, and had killed 50 of her own and neighboring broods when discovered.

All of these lots mentioned were reared under hens. Some earlier lots placed under hens and kept in near the buildings did very well, but it was necessary to reserve some of this ground for quail work.

The brooders were used all through the season when they could be spared from quail work, and gave fair results in all cases. Some lots so grown were excellent in condition and numbers; as a rule, though, the numbers placed in the brooders were too large to give the best results

As the birds reached the age of one month they were put in portable coops and kept until ready for distribution; but owing to delays in this work the coops were crowded, and therefore did not give the best results. The insufficient amount of land for moving them was also a severe handicap, and when late in the season there was little hope of reasonable success for the last lots, additional land was rented and the coops moved outside. This afforded some relief from the unfavorable conditions which were largely responsible for the drop in the number of birds from 990 at the age of one month to 668 distributed or reared.

Pheasant rearing, when attempted on a larger scale than the few hundred that can be accommodated here, by reason of the limitations placed upon it by the quail and grouse work and the narrow bounds of the State property, can hardly be done with proper economy. If the scale of work is increased, it should be to such an extent that it will be profitable to do it by itself, with ample room, and with the birds properly guarded, so that they can be grown in the open, securing immunity from disease, and more vigorous birds than penned-up ones would be. As done here, the facilities and methods were adapted to working in a small way, incidental to the fish-cultural work. number handled could be kept in close to the buildings, guarded and cared for with little trouble. The more successful large establishments use ample range room, developing their birds more rapidly and better, with considerable saving in the cost of caring for them in coops and loss from intestinal and other diseases due to confining them in coops, which must fairly offset the cost of guarding them in the open and the loss from predatory enemies. As a suggestion for a practical change in methods for the next year, it is recommended that the work of rearing the young be moved to some point outside where safe and ample range can be secured, retaining that part of the work within the grounds that cannot be easily moved or that requires little space for carrying it on, such as the breeding pens and pens for retaining and shipping grown birds.

The breeding stock of quail was divided into 27 lots, 24 lots of one pair of birds, 2 lots of 2 pairs, and 1 lot of 5 pairs. The lot of 5

pairs was somewhat broken up by the escape of several birds, but while together they mated and laid well-fertilized eggs. One lot of 2 pairs in a small pen laid rather better than the other 2-pair lot in a large pen. The following table shows the size of pens, the number of birds in each and the eggs laid:—

	Pen	No.		Area (Square Feet).	Number of Birds.	Eggs laid.	In- fertile Eggs.	Remarks.
1, .				192	1 pair	28	6	Youngest female hatched Oct. 8, 1908; small, inferior eggs.
2, .				144	1 pair	41	4	Female incubated 15 eggs:
3, .				144	1 pair	27	4	hatched 14; raised 12 chicks.
4, .				144	1 pair	38	13	
5, .				144	1 pair	65	3	
6, .				144	1 pair	63	8	
7, .				144	1 pair	42	19	Female attempted to incubate 1 eggs; left nest.
8, .				144	1 pair	20	6	eggs; left nest.
9, .				144	1 pair	38	4	
0, .				32	1 pair	77	5	Female attempted to incubate 1
1, .				32	1 pair	102	2	eggs; left nest.
2, .				32	l pair	28	5	Escaped about middle of laying
3, .			•	32	1 pair	1	-	season. Female killed by male after on egg was laid; not known if eg
4, .				32	1 pair	-	-	was fertile. Youngest female, hatched October 8.
5, .				64	1 pair	83	2	Female attempted to incubate 1 eggs; disturbed by rats.
6, .				64	1 pair	31	3	eggs; disturbed by rate.
7, .				32	1 pair	67	19	
8, .				32	1 pair	56	3	
9, .				32	1 pair	44	2	
Ю, .				32	1 pair	57	12	
21, .				32	1 pair	80	1	Female, assisted by male, incubated 12 eggs; eggs eaten brats.
22, .				35	1 pair	85	9	1400
23, .				72	1 pair	41	28	Male sick.
24, .				64	1 pair	60	6	
25, .	•	•	•	1,300	2 pairs	79	8	One female attempted to incubate 18 eggs, but the eggs wertaken away for fear of rats.
26, .				2,000	5 pairs	84	15	Three pairs died or escaped i laying season.
27, .				144	2 pairs	110	20	One female incubated 12 eggs hatched 7; raised 2 with n
					1	1,447	207	assistance.

Some valuable data were secured from the hatching work, as the number of eggs was large, and was laid by birds kept under somewhat diverse conditions and to some extent of known antecedents. The

records kept were sufficient to indicate the hatching quality of each bird's eggs, and to denote to some degree what may be considered the transmitted stamina in the embryos and young; and these facts, relating to hereditary influences or as affected by environmental influences incidental to the breeding and hatching processes, are perhaps the most important matter for study in future quail work. Previously, in quail, grouse and pheasant hatching unexpected and unaccountable weakness has been shown in the embyros at times, and the effect has been attributed to what has been considered the most immediate cause. This might be (1) inbred stock; (2) weather conditions, such as excessive winter cold affecting the vitality of the breeders, or either excessive cold, heat or moisture in the nesting season affecting the eggs; or (3) unsuitable practice in incubation. Nothing was observed this year to make it appear at all probable that any one of these mentioned had a predominant influence, but possibly any or all may be contributary causes.

It was noted in the report for 1908 that one quail laid 100 eggs, and that these hatched chicks of noticeable vigor even to the last. The quail grown from these eggs and others known to be descended from prolific layers, while laying well themselves, did not transmit the vigor of their parents to their own eggs, for among these the greater loss from dead embryos and weak chicks was noted.

There is a correlation between the failure of the embryos to hatch and the loss of young chicks directly after hatching, the heavier loss of young chicks following in the lots that showed the greater number of dead embryos. What influences and to what extent they acted in producing this effect is largely conjectural, and the opinion that the trouble is mostly from transmitted weakness is formed only after a study of possible causes, with no evidence of any positive effect from environmental processes or conditions upon embryos or young. inferior eggs come alike from the very small and the largest hens; the best eggs come from some of the small hens. A study of methods of incubation gave no light. Where incubators were used to finish the hatch, they gave varying results, though but little different from corresponding lots left under hens. In both cases the unfavorable results suggested overheating, so during a considerable period the temperature of the hens was taken, and a rather wide variation noted, the ordinary temperature of 104° to 105° rising at times to 108° to 109°. A hen with this higher temperature, sitting very close, near to the time of hatching, might injure the eggs; and this hypothesis was apparently confirmed when it followed an abnormal temperature in several cases, but in some succeeding cases the same results were reached without the same temperature to cause it.

It has been assumed that the hens would not air and cool their eggs as much as might be required, and it has been the practice to shut them off the nests an hour in cool or moderate weather and longer in hot weather, but so far without proof that the practice was correct, or any good reason to change it. However, the very contradictory results with eggs set at the same time and given identical treatment indicate that the results in the matter under consideration are not influenced by the way the hens are handled, unless individual cases call for different treatment.

Of the 1,447 eggs laid by the quail, 19 were discarded or broken in handling; 65 were spoiled or destroyed in the pens; 207 were infertile; 128 were broken under hens; 286 were fertile, but had well-developed dead embryos; 50 died in hatching or immediately after; 691 hatched to all appearances normally, but in many lots aggregating 176 chicks weakness quickly developed, and of these latter few reached the age of one week and none lived over three weeks.

The difference was very clearly marked in the quality of the chicks in the lots defined as good as distinguished from the poor. In the latter there was invariably a heavy loss the first day or two, before any feeding was done or any probability of disease being introduced. A continuous loss to the end was characteristic, the birds at any age appearing to be feeble and spiritless. Pathological examinations of specimens failed to show any infection that would account for their condition or death.

The better birds, including some intermediate lots that did only fairly well, showed a vigorous, healthy growth through this stage, and a small loss, even nothing in some cases. Of 515 hatched, 361 grew to the age of one month, well past the danger from feeble development or any disease or functional disorder that the young might be more sensitive to, and subject only to loss from more controllable causes.

The pens used for the birds up to and past this age were used experimentally the year before with favorable results, and again this year with entire satisfaction, in regard to results and labor required in using them. They are 3 by 6, 4 by 6 or 4 by 8, with top partly open and partly covered. When placed for use they were filled with three inches of loam carted in from the woods, and seeded to clover, grass and buckwheat, which was allowed to get a reasonable start before the birds were put in, and when properly started gave a better supply of green food than could be given in any other way. These coops were seeded in succession, so that the birds could be moved at intervals to fresh ones. As long as this plan was followed there was freedom from losses, with but a single exception, where a lot of 12 was killed by an intestinal disease. At length, however, through increasing number of birds, it became no longer possible to move the coops freely, and larger coops were brought into use on newly terraced ground west of the pond. Some of these larger coops were filled with fresh loam, others placed on soil brought to the surface in terracing. After being here several weeks without loss, disease broke out and destroyed 5 lots, numbering 80 birds, within a very brief period. Five other lots on the same ground, 3 of quail and 2 of grouse, escaped infection. Later the same disease attacked 2 lots on the brooder ground nearer the barn, and 30 birds were lost, but it made no further appearance. The attack was fatal to every bird in the lots infected. In the first lot where it appeared the last bird of 19 was dead in two and one-half days from the time the first one was found. In another instance, 2 birds escaping from an uninfected lot were accidentally put in with a diseased lot; they contracted the disease and died in from four to five days. The progress of the disease was somewhat less rapid in some lots, where perhaps it was not communicated from one to another so quickly; but the infected birds were sick for only a brief period, and as a rule showed no emaciation.

This disease is considered to be of bacterial origin, and the same that was in some grouse in 1908 and quail in 1907, similar lesions in the intestines being noted in every bird examined. These lesions gave a very characteristic spotted appearance to the lower part of the intestine; but the liver and cæca, usually the infected parts in the case of coccidial or amæbic disease, in most cases appeared normal. origin of the disease at this place is difficult to account for, unless it was the surviving infection from the use of the ground two or more vears previous, the terracing operations not covering the infected soil. For some weeks after the loss from these attacks the birds did very well: but late in October, when the congestion of work greatly delayed the moving of coops, a group on the west side containing brooder birds hatched about mid-season, and another group on the south side containing hen-raised birds, began to die from what was recognized as the same disease in both lots, but not previously noted here. Dead birds from all lots were submitted to Dr. E. E. Tyzzer, who diagnosed the disease as "acute nephritis, resulting in the deposition in the tissues of material (largely amorphous wastes) normally excreted by the kidnevs."

The cause of this disease, in its successive appearance and disappearance in different lots, suggests that it is a functional disease caused by certain conditions, and may be remedied by changes that are really an adherence to the methods that have been recommended as the best. The disease appeared in certain lots hatched about mid-season that were not nearly as well developed as the earlier lots, probably on account of being kept with but few changes to fresh coops; and when this condition was noted, they were divided into smaller lots in larger coops and placed on fresh but rather bare ground, where they were soon wholly without incentive to scratch. To make up their deficient growth, they were well fed; thus it followed that their food and exercise was not properly balanced, and this disease, or practically "bird gout," resulted. When the necessity of moving appeared, these birds were

transferred to small coops and placed on a piece of newly seeded ground with a growth of weeds, clover and stunted millet, where they were moved at intervals and came through the winter without further loss. Although on a more restricted diet, they matured as well as the older lots.

The hen-raised lots from the south side were transferred to the large breeding pens, and the same beneficial results followed. interval the older lot suffered the same loss under similar conditions: and the remedy was to place them in the older large pens, previously idle on account of being infested by rats, but about this time cleared of rats and made ready for use. Later the same disease appeared among some of the younger lots and breeding birds, and was remedied in the same way; and the origin appeared in these lots as well as in the others to result from delay in shifting coops and some incidental overfeeding. During the period that this disease was prevalent the pressure of work made it necessary to do what was the most urgent, and the amount of time consumed in filling, levelling and brush cutting for placing coops was so great that no ordered routine could be followed in moving them. A proper balance between the means of doing this work and the necessities of it has been hard to maintain, and delays in doing many things have occurred because some other part demanded more urgent attention. This condition is partly incidental to carrying on several branches of work frequently demanding coincident attention, and partly to doing the work on unimproved ground, which in regard to quail work has been found to be the least suitable, as it is practically prohibitive of a satisfactory routine in growing them. This, as it appears from the experience to the present time, is to continue with the small brooder coops, using them in weekly or fortnightly succession, with fresh loam and tender vegetation each time, until the chicks can be taken from heat, which may be at the age of one month, and then put in larger portable coops on ground that will admit of moving them at frequent and regular intervals. For this purpose no ground used yet is as satisfactory as the ground that can be planted and cultivated to a very smooth condition. Penned quail are very persistent scratchers, and, while the ground that has been in use here - rough, with more or less rocks, stumps, underbrush and fallen leaves - is good for the time being, the birds soon dig it over and eat any tender vegetation, and their removal to fresh ground entails considerable labor. sod ground is objectionable, the grass being too dry and tough in the growing season for quail, and the sod much too tough for scratching. The advantage of specially prepared ground is in growing what the quail need most in their pens, - weeds, unripe grain, clover and any tender vegetation that they can eat, and in supplying these with less labor than they can be gathered and fed; also in encouraging scratching, which in keeping them busy is a great aid in keeping them healthy. The trials that have been made here suggest that a light sandy or gravelly soil, that would grow a stunted or a scrub vegetation, and furnish loose, easily opened surface, would be suitable. This is suggested as the best plan for extending the work and doing it with a reasonable amount of labor, and is probably the most practical for growing good birds; the need of which could be clearly seen in the backwardness of lots that could not be given the conditions for good growth that others had, or the quicker way that disease worked in these lots, and the change for the better when bad conditions could be remedied.

The loss from the kidney disease was approximately 100 birds. Other losses included 20 killed by rats in two raids; a smaller number, about 10, killed by birds getting mixed in pens, usually where one escaped into an adjoining pen or was put into the wrong pen after recapture. A single bird getting into a flock was quite often killed, but it was always safe to mix flocks of the same size. The loss from incidental causes included a few that escaped and were picked up by prowling enemies; many more that died from undetermined diseases, mostly intestinal, and doubtless including many cases of coccidial or amorbic infection.

The part that this disease plays in affecting quail-rearing is not at all clear, and probably will not be until extensive pathological work is done at the place of rearing. It does not appear to have caused much loss among the growing quail, and these only occasional cases, while the very probable exposure to it of many lots was without apparent In the cases where it was the apparent cause of death, the birds dying were greatly emaciated and sick a noticeable length of time, and their death was not followed by continued loss, as though the victims were birds of low vitality, and the more vigorous ones had power to resist its action. This infection seems to have quite the same effect on both quail and pheasants in producing a slow, emaciating disease. In grouse, however, the disease is more rapid in its effects and spreading. In the cases mentioned of probable exposure of birds to coccidial infection, those mentioned were seven lots of quail grown under hens taken from the flock considered to be infected with coccidia. course could not be determined, but if they did, it could hardly have had any effect on the chicks, as what losses were met with were accounted for in other ways, the birds generally doing quite as well as the brooder lots.

The results with these lots are herewith given, as being of interest in showing what can be done with bantams:—

	L	от М	UMBE	R.	Number hatched.	Number at Age of One Month.		Lor N	ÜMB	Number hatched.	Number at Age of One Month.	
2,					14	7	21,				23	9
12,					19	12	23,				24	20
14,					18	13	25,				19	15
17,					12	10]

The heaviest loss in lot 21 came the first night, when 10 were apparently stepped on by the hen. Lot 23 was in the region where the bacterial disease broke out in September, and was destroyed in a few days.

This experimental work has been so encouraging that it is well to try it more thoroughly another year, and if it can be done with proper pathological work, we might determine to what extent quail-rearing can be done with bantams, which, were it not for the necessity of considering disease, seems a more practical way than with the use of incubators and brooders, as the equipment and labor required is much less.

Respectfully submitted,

ARTHUR MERRILL.

THE DEER PROBLEM.

The deer problem in this State is a complicated one. The majority of land owners and city residents sojourning temporarily in the country enjoy the occasional sight of a deer on the land-scape. From this point of view the animal is thus an attractive and valuable asset to the community.

On the other hand, a large group of people regard the deer as a source of sport and food. The head, hide and meat of a good specimen would bring \$25 and upwards, if placed on the market. To the farmer and fruit grower, market gardener and nurseryman deer are a costly and unmitigated nuisance. Even the \$8,000 paid by the State Treasurer to settle claims of damage to crops by deer does not in the aggregate cover the actual damage done, since in many instances the damage to orchards and nurseries cannot be repaired by money.

From the facts which have come to our notice, we are of the opinion that deer have not increased in numbers during the year. We judge that 1908 showed the high-water mark of

recent years in the deer population, and that now effective checks to their further increase have come into action; such as, notably, the law permitting deer to be shot when in the act of damaging crops, supplemented by the considerable number killed by trains and trolley cars, by wire fences, and the "moving accidents of flood and field."

Summary and Comparison of Deer Statistics, 1907, 1908 and 1909.

					1907.	1908.	1909.
Deer seen,				. 1	1,298	2,035	1,594
Deer chased by dogs,					114	120	72
Deer seen damaging crops,				.	85	100	227
Deer shot illegally,				.	4 0	36	49
Deer killed by trains and trolley cars,				.	25	60	55
Deer shot while in the act of damaging cro	рв, .			.	16	17	198
Dead from other causes,				.	47	83	82
Totals,		-			1,625	2,451	2,277
Live deer,					1,497	2,255	1,893
Dead deer,					128	196	384
Totals,		•			1,625	2,451	2,277
Notices issued relative to dogs chasing deep	r, .				27	37	30
Court cases: —							
Dogs chasing deer,					5	2	5
Killing, hunting or wounding deer,					6	15	22
Number of reports from which above stati	istics v	were t	abulat	ed.	503	700	589

ENFORCEMENT OF LAW.

That branch of our duties which relates to the enforcement of law has been under the immediate direction of Chief Deputy Nixon. The list of paid deputies, with their district, residence and telephone number follows:—

WILLIAM W. NIXON, Chief Deputy, Central Office, State House. Telephone, Hay. 2700; residence telephone, 466-2 Cambridge.

Assigned to District —	Name.			Residence.	Telephone Number.
1	Everett B. Mecarta,			Harwich,	36-4
2	Samuel J. Lowe, .			New Bedford,	761-2
3	Allen A. David, .			Taunton,	966-1
4	Charles E. Tribou, .			Brockton,	2101
5	William H. Leonard,		. !	East Foxborough, .	Foxborough 9-
ſ	George H. Brown, 1.			Quincy,	-
6	Benjamin A. Foster, 1			Roxbury,	-
l	Orrin C. Bourne, 1 .			Malden,	1071-4
7	Edward J. Cogan, .			Gloucester,	348-L
8	Thomas L. Burney,			Lynn,	1613-13
9	Walter A. Larkin, .			Andover,	172-5
10	James I. Mills, .			Ayer,	51-2
11	James E. Bemis, .			South Framingham, .	228-J
12	Irving O. Converse,			Fitchburg,	53-14
13	A. D. Putnam, .			Spencer,	75-4 or 75-6
14	John F. Luman, .			Palmer,	17-5
15	Dennis F. Shea, .			Ware,	132
16	James P. Hatch, .			Springfield,	2571-3
17	Lyman E. Ruberg, .			Greenfield,	376-R
18	Arthur M. Nichols, .			North Adams,	391-12
19	Fred R. Zeigler, .			Pittsfield,	362-11
20	DeWitt Smith, .			Great Barrington, .	72-6
21	Charles L. Savery, .			West Tisbury	_

¹ Central office, State House.

The following were employed as special paid deputies: --

NA	ME.			Residence.	Time of Service.
Charles H. Gehle, .			_	Westfield,	. Sept. 25-Nov. 30, 1909
A. H. Eldredge, .				Ware,	Oct. 28-Nov. 30, 1909
Allan Keniston, .				Edgartown, .	June 3-Nov. 30, 190
John P. Murphy, .				Greenfield, .	Sept. 25-Nov. 30, 190
Bradford A. Scudder,				Taunton,	Sept. 23-Nov. 30, 190
Albert L. Stratton, .				Gardner,	Sept. 30-Nov. 30, 190
F. M. Truesdell, .				Great Barrington,	. Sept. 23-Nov. 30, 190

Cities and Towns alphabetically arranged, with the Number of the District in which Each is included.

4	Abington,	18	Chesterfield.	15	Hadley.
	Acton.		Chicopee.		Halifax.
	Acushnet.		Chilmark,		Hamilton.
	Adams.		Clarksburg.		Hampden.
16	Agawam.		Clinton.		Hancock.
	Alford.	6	Cohasset.		Hanover.
7	Amesbury.	17	Colrain.	4	Hanson.
	Amherst.	10	Concord.	15	Hardwick,
9	Andover.	17	Conway.	10	Harvard.
8	Arlington.	19	Cummington.	1	Harwich.
12	Ashburnham.	19	Dalton.	17	Hatfield.
10	Ashby.	15	Dana.	9	Haverhill.
17	Ashfield.	8	Danvers.	18	Hawley.
11	Ashland.	2	Dartmouth.	18	Heath.
12	Athol.	5	Dedham.	6	Hingham.
8	Attleborough.	17	Deerfield.	19	Hinsdale.
13	Auburn.	1	Dennis.	5	Holbrook.
5	Avon.	8	Dighton.	13	Holden.
10	Ayer.	13	Douglas.	14	Holland.
1	Barnstable.	5	Dover.	11	Holliston.
	Barre.		Dracut.	16	Holyoke.
	Becket.		Dudley.		Hopedale.
	Bedford.		Dunstable.		Hopkinton.
	Belchertown.		Duxbury.		Hubbardston.
	Bellingham.		East Bridgewater.		Hudson.
	Belmont.		East Longmeadow.		Hull.
	Berkley.		Eastham.		Huntington.
	Berlin.		Easthampton.		Hyde Park.
	Bernardston.		Easton.		Ipswich
	Beverly.		Edgartown.		Kingston
-	Billerica.		Egremont.	_	Lakeville.
	Blackstone.		Enfield.		Lancaster.
	Blandford.		Erving.		Lanesborough.
	Bolton.		Essex.	-	Lawrence.
-	Boston.		Everett.		I.ee.
	Bourne.		Fairhaven.		Leicester.
	Boxborough.		Fall River.		Lenox.
	Boxford.		Falmouth.		Leominster.
	Boylston. Braintree.		Fitchburg.		Leverett, Lexington.
_	Brewster.		Florida. Foxborough.	_	Leyden.
	Bridgewater.		Framingham.		Lincoln.
	Dridgewater.	11	rraminguam.	11	
	Daimfold		Wasaldin	10	
	Brimfield.	5	Franklin.		Littleton.
4	Brockton.	5 2	Freetown.	16	Longmeadow.
4 14	Brockfon. Brockfield.	5 2 12	Freetown. Gardner.	16 9	Longmeadow. Lowell.
4 14 6	Brockton. Brookfield. Brookline.	5 2 12 21	Freetown. Gardner. Gay Head.	16 9 14	Longmeadow. Lowell. Ludlow.
4 14 6 17	Brockfon. Brookfield. Brookline. Buckland.	5 2 12 21 9	Freetown. Gardner. Gay Head. Georgetown.	16 9 14 12	Longmeadow. Lowell. Ludlow. Lunenburg.
4 14 6 17 9	Brockton. Brookfield. Brookline. Buckland. Burlington.	5 2 12 21 9 17	Freetown. Gardner. Gay Head. Georgetown. Gill.	16 9 14 12 8	Longmeadow. Lowell. Ludlow. Lunenburg. Lynn.
4 14 6 17 9 6	Brockton. Brookfield. Brookline. Buckland. Burlington. Cambridge.	5 2 12 21 9 17 7	Freetown. Gardner. Gay Head. Georgetown. Gill. Gloucester.	16 9 14 12 8 8	Longmeadow. Lowell. Ludlow. Lunenburg. Lynn. Lynnfield.
4 14 6 17 9 6 5	Brockton. Brookfield. Brookline. Buckland. Burlington. Cambridge. Canton.	5 2 12 21 9 17 7	Freetown. Gardner. Gay Head. Georgetown. Gill. Gloucester. Goshen.	16 9 14 12 8 8	Longmeadow. Lowell. Ludlow. Lunenburg. Lynn. Lynnfield. Malden.
4 14 6 17 9 6 5	Brockton. Brookfield. Brookline. Buckland. Burlington. Cambridge. Canton. Carlisle.	5 2 12 21 9 17 7 19	Freetown. Gardner. Gay Head. Georgetown. Gill. Gloucester. Goshen. Gosnold.	16 9 14 12 8 8 8	Longmeadow. Lowell. Ludlow. Lunenburg. Lynn. Lynnfield. Malden. Manchester.
4 14 6 17 9 6 5 10 4	Brockton. Brookfield. Brookline. Buckland. Burlington. Cambridge. Canton. Carlisle. Carver.	5 2 12 21 9 17 7 19 1	Freetown. Gardner. Gay Head. Georgetown. Gill. Gloucester. Goshen.	16 9 14 12 8 8 8 7	Longmeadow. Lowell. Ludlow. Lunenburg. Lynn. Lynnfield. Malden.
4 14 6 17 9 6 5 10 4 18	Brockton. Brookfield. Brookline. Buckland. Burlington. Cambridge. Canton. Carlisle. Carver. Charlemont.	5 2 12 21 9 17 7 19 1 13 15	Freetown. Gardner. Gay Head. Georgetown. Gill. Gloucester. Goshen. Gosnold. Grafton.	16 9 14 12 8 8 7 3	Longmeadow. Lowell. Ludlow. Lunenburg. Lynn. Lynnfield. Maiden. Manchester. Mansfield. Marblehead.
4 14 6 17 9 6 5 10 4 18	Brockton. Brookfield. Brookline. Buckland. Burlington. Cambridge. Canton. Carlisle. Carver. Charlemont.	5 2 12 21 9 17 7 19 1 13 15 16	Freetown. Gardner. Gay Head. Georgetown. Gill. Gloucester. Goshen. Gosnold. Grafton. Granby. Granville.	16 9 14 12 8 8 7 3 8	Longmeadow. Lowell. Ludlow. Lunenburg. Lynn. Lynnfield. Malden. Manchester. Mansfield.
4 14 6 17 9 6 5 10 4 18 14	Brockton. Brookfield. Brookline. Buckland. Burlington. Cambridge. Canton. Carlisle. Carver. Charlemont. Charlton.	5 2 12 21 9 17 7 19 1 13 15 16 20	Freetown. Gardner. Gay Head. Georgetown. Gill. Gloucester. Goshen. Gosnold. Grafton. Granby.	16 9 14 12 8 8 8 7 3 8 2	Longmeadow. Lowell. Ludlow. Lunenburg. Lynn. Lynnfield. Malden. Manchester. Mansfield. Marblehead. Marion.
4 14 6 17 9 6 5 10 4 18 14 1	Brockton. Brookfield. Brookline. Buckland. Burlington. Cambridge. Canton. Carlisle. Carver. Charlemont.	5 2 12 21 9 17 7 19 1 13 15 16 20	Freetown. Gardner. Gay Head. Georgetown. Gill. Gloucester. Goshen. Gosnold. Grafton. Granby. Granville. Great Barrington.	16 9 14 12 8 8 7 3 8 2 11	Longmeadow. Lowell. Ludlow. Lunenburg. Lynn. Lynnfield. Malden. Manchester. Mansfield. Marblehead. Mariborough.
4 14 6 17 9 6 5 10 4 18 14 1	Brockton. Brookfield. Brookline. Buckland. Burlington. Cambridge. Canton. Carlisle. Carver. Charlemont. Charlemont. Charlton. Chatham. Chelmsford.	5 2 12 21 9 17 7 19 1 18 15 16 20 17	Freetown. Gardner. Gay Head. Georgetown. Gill. Gloucester. Goshen. Gosnold. Grafton, Granby. Granville, Great Barrington. Greenfield.	16 9 14 12 8 8 8 7 3 8 2 11 4	Longmeadow. Lowell. Ludlow. Lunenburg. Lynn. Lynnfield. Malden. Manchester. Mansfield. Marblehead. Marion. Marlborough. Marshfield.
4 14 6 17 9 6 5 10 4 18 14 1 9 6 18	Brockton. Brookfield. Brookline. Buckland. Burlington. Cambridge. Canton. Carlisle. Carver. Charlemont. Charlton. Chatham. Chelmsford. Chelsea.	5 2 12 21 9 17 7 19 1 13 15 16 20 17 15 10	Freetown. Gardner. Gay Head. Georgetown. Gill. Gloucester. Goshen. Gosnold. Grafton. Granby. Granville. Great Barrington. Greenfield.	16 9 14 12 8 8 8 7 3 8 2 11 4 1 2	Longmeadow. Lowell. Ludlow. Lunenburg. Lynn. Lynnfield. Malden. Manchester. Mansfield. Marblehead. Marion. Marlborough. Marshfield. Mashpee.

Cities and Towns alphabetically arranged, with the Number of the District in which Each is included — Concluded.

5 Medfeld. 12 Phillipston. 3 Taunton. 8 Medford. 19 Pittsfield. 12 Templeton. 11 Medway. 18 Plainfield. 9 Tewksbury. 8 Melrose. 5 Plainville. 21 Tisbury. 11 Mendon. 4 Plymouth. 20 Tolland. 7 Merrimac. 4 Plympton. 7 Topsfield. 9 Methuen. 15 Prescott. 10 Townsend. 2 Middleborough. 12 Princeton. 11 Truro. 18 Middleborough. 6 Quincy. 20 Tyringham. 11 Milford. 5 Randolph. 13 Upton. 13 Milloury. 3 Raynham. 13 Uxbridge. 14 Millon. 3 Rehoboth. 14 Wales. 15 Millon. 3 Rehoboth. 14 Wales. 16 Monroe. 8 Revere. 5 Walpole. 16 Montague. 2 Rockester. 15 Ware. 20 Mount Washington. 8 Rowe. 17 Warrick. 8 Nahant. 7 Rockport. 14 Warren. 20 Mount Washington. 8 Rowe. 17 Warrick. 11 Natick. 16 Russell. 11 Wayland.						
11 Medway. 18 Plainfield. 9 Tewksbury.	5	Medfield.	12	Phillipston.	3	Taunton.
8 Melrose.	8	Medford.	19	Pittsfield.	12	Templeton.
11 Mendon. 4 Plympton. 7 Topsfield.	11	Medway.			9	Tewksbury.
7 Mertimac. 4 Plympton. 7 Topsdeld. 9 Methuen. 15 Prescott. 10 Townsend. 2 Middleborough. 12 Princeton. 1 Truro. 18 Middleton. 6 Quincy. 20 Tyringham. 11 Millord. 5 Randolph. 13 Upton. 13 Millbury. 3 Raynham. 13 Upton. 14 Millon. 3 Rehoboth. 14 Wales. 6 Milton. 3 Rehoboth. 14 Wales. 18 Monroe. 8 Revere. 5 Walpole. 14 Monson. 19 Richmond. 11 Waltham. 17 Montague. 2 Rockester. 15 Ware. 20 Monterey. 4 Rockland. 2 Wareham. 10 Montgomery. 7 Rockport. 14 Warren. 20 Mount Washington. 8 Rowe. 17 Warwick. 10 Montgomery. 7 Rockport. 14 Warren. 11 Natick. 16 Russell. 11 Warren. 12 Royalston. 8 Watertown. 13 Naticket. 16 Russell. 11 Wayland. 14 Westart. 12 Warten. 12 Westart. 15 New Braintree. 20	8	Melrose.			21	Tisbury.
9 Methuen, 15 Prescott. 10 Townsend. 2 Middleborough. 12 Princeton. 1 Truro. 10 Tyngsborough. 8 Middlefeld. 1 Provincetown. 10 Tyngsborough. 8 Middleton. 6 Quincy. 20 Tyringham. 11 Milford. 5 Randolph. 13 Upton. 18 Millbury. 3 Raynham. 13 Uxbridge. 18 Millbury. 3 Raynham. 13 Uxbridge. 18 Millon. 3 Rehoboth. 14 Wales. 18 Monroe. 8 Revere. 5 Walpole. 14 Monson. 19 Richmond. 11 Waltham. 17 Montague. 2 Rochester. 15 Ware. 20 Monterey. 4 Rockland. 2 Wareham. 16 Mongomery. 7 Rockport. 14 Warren. 20 Mount Washington. 8 Rowe. 17 Warwick. 16 Russell. 11 Wayland. 18 Nahant. 7 Rowley. 19 Washington. 10 Nantucket. 12 Royalston. 8 Watertown. 11 Natick. 16 Russell. 11 Wayland. 18 New Ashford. 8 Salem. 11 Wellsely. 2 New Bedford. 7 Salisbury. 1 Wellfleet. 15 New Braintree. 20 Sandisfield. 17 Wendell. 20 New Marlborough. 1 Sandwich. 7 Wendham. 13 West Boylston. 15 New Salem. 8 Saugus. 13 West Boylston. 15 New Darintree. 20 Sandisfield. 17 Wendell. 20 New Marlborough. 1 Sandwich. 7 Wendham. 18 North Adams. 20 Sheffield. 20 West Bridgewater. 16 North Adams. 20 Sheffield. 20 West Stockbridge. 9 North Andover. 17 Shelburne. 21 West Tisbury. 18 North Brookfield. 10 Shirley. 16 West Bridgewater. 19 North Brookfield. 10 Shirley. 16 West Bridgewater. 19 Northborough. 1 Sherborn. 13 WestBrookfield. 9 North Reading. 13 Shrewsbury. 16 Westfield. 9 North Brookfield. 10 Shirley. 16 Westfield. 10 Shirley. 16 Westfield. 11 Weston. 13 Northbridge. 6 Somerwile. 11 Weston. 12 Westminster. 12 Northborough. 13 Shrewsbury. 16 Westminster. 12 Westminster. 13 Northbridge. 6 Somerwile. 11 Weston. 12 Westminster. 12 Westminster. 13 Northbridge. 16 South Hadley. 2 Westport. 14 Williamsbourg. 15 Oakham. 13 Spencer. 14 Williamsbourg. 16 Oakham. 13 Spencer. 14 Williamsbourg. 17 Orange. 16 Springfield. 16 Williamsbourg. 17 Winchendon. 18 Winchester. 19 Wenthington. 19 Winchendon.					20	Tolland.
2 Middleborough. 12 Princeton. 1 Truro. 19 Middlefeld. 1 Provincetown. 10 Tyngaborough. 8 Middleton. 6 Quincy. 20 Tyringham. 13 Upton. 13 Millbury. 3 Raynham. 13 Upton. 13 Millbury. 3 Raynham. 13 Uxbridge. 11 Millis. 8 Reading. 8 Wakefield. 14 Wates. 16 Milton. 18 Monroe. 8 Revere. 5 Walpole. 14 Wates. 18 Monroe. 19 Richmond. 11 Waitham. 17 Montague. 2 Rochester. 15 Ware. 16 Montgomery. 7 Rockport. 14 Warren. 16 Montgomery. 7 Rockport. 14 Warren. 17 Warwick. 18 Montucket. 12 Royalston. 8 Watertown. 11 Waitham. 17 Matick. 16 Russell. 11 Wayland. 18 New Ashford. 8 Salem. 11 Wellesley. 18 New Marlborough. 1 Sandwich. 1 Welldleet. 10 New Marlborough. 1 Sandwich. 1 Wenham. 10 Wellfleet. 10 New Marlborough. 1 Sandwich. 7 Wenham. 10 West Mortough. 1 Sandwich. 1 West Brookfield. 1 Wendell. 1 Wenham. 10 West Newbury. 18 Savoy. 4 West Bridgewater. 1 West Newbury. 18 Savoy. 4 West Bridgewater. 1 West Newbury. 1 Sekonk. 1 West Newbury. 1 Sekonk. 1 West Mortough. 1 Shirley. 1 West Tisbury. 1 West Mortough. 1 Shirley. 1 Westford.	7	Merrimac.			7	Topsfield.
19 Middlefeld. 1 Provincetown. 10 Tyngsborough. 8 Middleton. 6 Quincy. 20 Tyringham. 11 Milford. 5 Randolph. 13 Upton. 13 Upton. 13 Upton. 14 Mills. 8 Reading. 8 Wakefield. 6 Milton. 3 Rehoboth. 14 Wales. 16 Monroe. 8 Revere. 5 Walpole. 16 Monson. 19 Richmond. 11 Waltham. 17 Montague. 2 Rochester. 15 Ware. 20 Monterey. 4 Rockland. 2 Wareham. 16 Montgomery. 7 Rockport. 14 Warren. 16 Montgomery. 7 Rockport. 14 Warren. 17 Warwick. 18 Rowley. 19 Washington. 8 Rowe. 17 Warwick. 18 Rowley. 19 Washington. 18 Rowley. 19 Washington. 18 Rowley. 19 Washington. 18 Rowley. 19 Washington. 18 Rowled. 11 Walland. 14 Webster. 16 Russell. 11 Wayland. 18 Webster. 19 Washington. 18 Rowled. 18 Rowled. 19 Washington. 18 Welfleet. 10 Webster. 19 Washington. 18 Welfleet. 19 Wendell. 19 West Brookfield. 19 West Brookfield. 10 West Broo	9	Methuen.	15	Prescott.	10	Townsend.
8 Middleton. 6 Quincy. 20 Tyringham. 11 Milford. 5 Randolph. 13 Upton. 13 Millbury. 3 Raynham. 13 Upton. 11 Millis. 8 Reading. 8 Wakefield. 6 Milton. 3 Rehoboth. 14 Wales. 18 Monroe. 8 Revere. 5 Walpole. 14 Monson. 19 Richmond. 11 Waltham. 17 Montague. 2 Rochester. 15 Ware. 20 Monterey. 7 Rockport. 14 Warren. 20 Mount Washington. 8 Rowe. 17 Warwick. 18 Nahant. 7 Rowley. 19 Washington. 1 Natick. 16 Russell. 11 Wayland. 1 Natick. 16 Russell. 11 Wayland. 1 New Ashford. 8 Salem. 11 Wellfleet. 2 New Bedford. 7 Salisbury. 1 Wellfleet. 20 New Baribree. 20 Sandisfield. 17 Wendell. 20 New Baribrough. 1 Sandwich. 7 Wenham. 15 New Salem. 8 Saugus. 13 West Boylston. 7 Newbury. 18 Savoy. 4 West Bridgewater.	2	Middleborough.	12	Princeton.	1	Truro.
8 Middleton. 6 Quincy. 20 Tyringham. 11 Milford. 5 Randolph. 13 Upton. 13 Millbury. 3 Raynham. 13 Upton. 14 Millis. 8 Reading. 8 Wakefield. 6 Milton. 3 Rehoboth. 14 Wales. 16 Milton. 19 Richmond. 11 Waltham. 17 Montague. 2 Rochester. 15 Ware. 20 Monterey. 4 Rockland. 2 Wareham. 20 Mount Washington. 8 Rowe. 17 Warwick. 20 Mount Washington. 18 Rowe. 17 Warwick. 20 Mount Washington. 18 Rowe. 11 Washington. 11 Natick. 16 Rowelon. 12 Washington. 11 Natick. 16 Rowelon. 10 Washington.<	19	Middlefield.	1	Provincetown.	10	Tyngsborough.
11 Milford. 5 Randolph. 13 Upton. 13 Millbury. 3 Raynham. 13 Uxbridge. 16 Milton. 3 Rehoboth. 14 Wales. 18 Monroe. 8 Revere. 5 Walpole. 14 Monson. 19 Richmond. 11 Waltham. 17 Montague. 2 Rochester. 15 Ware. 20 Monterey. 4 Rockland. 2 Wareham. 16 Montgomery. 7 Rockport. 14 Warren. 20 Mount Washington. 8 Rowe. 17 Warwick. 8 Nahant. 12 Royalston. 8 Watertown. 11 Natick. 16 Russell. 11 Wayland. 15 Needham. 12 Rutland. 14 Webster. 16 New Ashford. 8 Salem. 11 Welleleet. 15 New Braintree. 20 Sandisfield. 17 Wendell. 20 New Marlborough. 1 Sandwich. 7 Wenham. 15 New Salem. 8 Saugus. 13 West Boylston. 7 Newbury. 18 Savoy. 4 West Bridgewater. 7 Newbury. 18 Saroy. 4 West Brookfield. 10 North Adams. 20 Sheffield. 20 West Stockbridge	8	Middleton.	6	Quincy.		
13 Millbury. 3 Raynham. 13 Uxbridge. 11 Millis. 8 Reading. 8 Wakefield. 6 Milton. 3 Rehoboth. 14 Wales. 18 Monroe. 8 Revere. 5 Walpole. 14 Monson. 19 Richmond. 11 Waltham. 17 Montague. 2 Rochester. 15 Ware. 20 Monterey. 4 Rockland. 2 Wareham. 16 Montgomery. 7 Rockport. 14 Warren. 20 Mount Washington. 8 Rowe. 17 Warwick. 8 Nahant. 7 Rowley. 19 Washington. 1 Natick. 16 Russell. 11 Wayland. 1 Natick. 16	11	Milford.				
11 Millis.	13	Millbury.		•		•
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18 Monroe. 8 Revere. 5 Walpole. 14 Monson. 19 Richmond. 11 Waltham. 17 Montague. 2 Rochester. 15 Ware. 20 Monterey. 4 Rockland. 2 Wareham. 18 Montgomery. 7 Rockport. 14 Warren. 20 Mount Washington. 8 Rowe. 17 Warwick. 8 Nahant. 7 Rowley. 19 Washington. 1 Natick. 16 Russell. 11 Wayland. 1 Natick. 16 Russell. 11 Wayland. 1 Needham. 12 Rutland. 14 Webster. 18 New Ashford. 8 Salem. 11 Wellesley. 2 New Bedford. 7 Salisbury. 1 Welffeet. 2 New Braintree. 20 Sandisfield. 17 Wendell. 20 New Marlborough. 1 Sandwich. 7 Wenham. 15 New Salem. 8 Saugus. 13 West Boylston. 7 Newbury. 18 Savoy. 4 West Bridgewater. 8 Newton. 3 Seekonk. 7 West Newbury. 9 North Adams. 20 Sheffield. 20 West Stockbridge. 9 North Andover. 17 Shelburne. 21 Wes				•		
14 Monson. 19 Richmond. 11 Waltham. 17 Montague. 2 Rochester. 15 Ware. 20 Monterey. 4 Rockland. 2 Wareham. 16 Montgomery. 7 Rockport. 14 Warren. 20 Mount Washington. 8 Rowe. 17 Warwick. 8 Nahant. 7 Rowley. 19 Washington. 11 Natick. 16 Russell. 11 Wayland. 5 Needham. 12 Rutland. 14 Webster. 18 New Ashford. 8 Salem. 11 Wellesley. 2 New Bedford. 7 Salisbury. 1 Wellfleet. 20 New Marlborough. 1 Sandwich. 7 Wenham. 15 New Salem. 8 Saugus. 13 West Boylston. 7 Newbury. 18 Savoy. 4 West Bridgewater. 8 Newborn. 3 Seekonk. 7 West Newbury. 10 Newborn. 3 Seekonk. 7 West Newbury. 10 North Adams. 20 Sheffield. 20 West Stockbridge. 10 North Brookfield. 10 Shirley. 16 West Field. 10 North Brookfield. 10 Shirley. 16 Westford. 10 Northborough. 3 Somerset.						
17 Montague. 2 Rochester. 15 Ware. 20 Monterey. 4 Rockland. 2 Wareham. 16 Montgomery. 7 Rockport. 14 Warren. 20 Mount Washington. 8 Rowe. 17 Warwick. 8 Nahant. 7 Rowley. 19 Washington. 1 Nattick. 16 Russell. 11 Wayland. 5 Needham. 12 Rutland. 14 Webster. 18 New Ashford. 8 Salem. 11 Wellesley. 2 New Bedford. 7 Salisbury. 1 Wellfleet. 15 New Braintree. 20 Sandisfield. 17 Wendell. 20 New Marlborough. 1 Sandwich. 7 Wenham. 15 New Salem. 8 Saugus. 13 West Boylston. 7 Newbury. 18 Savoy. 4 West Bridgewater. 8 Newboury. 18 Savoy. 4 West Bridgewater. 9 North Adams. 20 Sheffield. 20 West Stockbridge. 10 North Adams. 20 Sheffield. 20 West Stockbridge. 10 North Adams. 20 Sheffield. 20 West Stockbridge. 10 North Reading. 13 Shrewsbury. 16 Westfield. 10 North Brookfi						
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16 Montgomery. 7 Rockport. 14 Warren. 20 Mount Washington. 8 Rowe. 17 Warwick. 8 Nahant. 7 Rowley. 19 Washington. 1 Nantucket. 12 Royalston. 8 Watertown. 11 Natick. 16 Russell. 11 Wayland. 5 Needham. 12 Rutland. 14 Webster. 18 New Ashford. 8 Salem. 11 Wellesley. 2 New Bedford. 7 Salisbury. 1 Welffeet. 15 New Braintree. 20 Sandisfield. 17 Wendell. 20 New Marlborough. 1 Sandwich. 7 Wenham. 15 New Salem. 8 Saugus. 13 West Boylston. 7 Newbury. 18 Savoy. 4 West Bridgewater. 8 Nowley. 18 Savoy. 4 West Bridgewater. 9 Newbury. 18 Savoy. 4 West Brookfield. 10 Nowtholoo. 3 Seekonk. 7 West Newbury. 10 North Adams. 20 Sheffield. 20 West Stockbridge. 10 North Andover. 17 Sheburne. 21 West Tisbury. 10 North Brookfield. 10 Shirley. 10 Westford. 10 North Brookfield. <td></td> <td>_</td> <td></td> <td></td> <td></td> <td></td>		_				
20 Mount Washington. 8 Rowe. 17 Warwick. 8 Nahant. 7 Rowley. 19 Washington. 1 Nantucket. 12 Royalston. 8 Watertown. 11 Natick. 16 Russell. 11 Wayland. 5 Needham. 12 Rutland. 14 Webster. 18 New Ashford. 8 Salem. 11 Wellfeet. 2 New Bedford. 7 Salisbury. 1 Wellfleet. 15 New Braintree. 20 Sandisfield. 17 Wendell. 20 New Marlborough. 1 Sandwich. 7 Wenham. 15 New Salem. 8 Saugus. 13 West Boylaton. 7 Newbury. 18 Savoy. 4 West Bridgewater. 8 Newton. 3 Seekonk. 7 West Newbury. 8 Norton. 16 Scituate. 14 West Bridgewater. 9 Nortolk. 5 Sharon. 16 West Springfield. 18 North Adams. 20 Sheffield. 20 West Stockbridge. 9 North Andover. 17 Shelburne. 21 West Tisbury. 3 North Brookfield. 10 Shirley. 16 Westfield. 9 North Reading. 13 Shrewsbury. 16 Westfield. 10 Northbridg		-				
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List of Cities and Towns included in Each District assigned to Deputy Fish and Game Commissioners.

DISTRICT No. 1.

Deputy EVERETT B. MECARTA, Harwich.

Telephone, 36-4.

Falmouth. Barnstable. Provincetown. Gosnold. Bourne. Sandwich. Harwich. Brewster. Truro. Mashpee. Wellfleet Chatham. Yarmouth. Dennis. Orleans. Eastham.

DISTRICT No. 2.

Deputy SAMUEL J LOWE, New Bedford.

Telephone, 761-2.

Acushnet. Lakeville. New Bedford. Rochester, Dartmouth. Mattapoisett. Marion. Wareham. Fairhaven. Westport. Freetown. Middleborough.

DISTRICT No. 3.

Deputy ALLEN A. DAVID, Taunton.

Telephone, 966-1.

Attleborough. Mansfield. Seekonk. Berkley. North Attleborough, Somerset. Dighton. Norton. Swanses. Easton. Raynham. Taunton. Fall River. Rehoboth.

DISTRICT No. 4.

Deputy CHARLES E. TRIBOU, Brockton.

Telephone, 2101.

Abington. Halifax. Plymouth. Bridgewater. Hanover. Plympton. Brockton. Hanson. Rockland. West Bridgewater. Carver. Kingston.

Whitman. Duxbury. Marshfield.

East Bridgewater. Pembroke.

DISTRICT No. 5.

Deputy WILLIAM H. LEONARD, East Foxborough.

Telephone, Foxborough 9-4.

Holbrook. Randolph. Avon. Bellingham. Medfield. Sharon. Canton. Needham. Stoughton. Dedham. Norfolk. Walpole. Norwood. Westwood. Dover. Plainville. Wrentham. Foxborough.

Franklin.

DISTRICT No. 6.

Chief Deputy William W. Nixon, Central Office, State House.

Telephone, Hay. 2700; residence telephone, Cambridge 466-2.

Deputy Benjamin A. Foster. Telephone, Roxbury 1948.

Deputy Orkin C. Bourne. Telephone, Malden 1071-4.

Deputy George H. Brown, Quincy.

Boston. Hingham. Quincy. Braintree. Hull. Scituate. Brookline. Hyde Park. Somerville. Cambridge. Milton. Weymouth. Chelses. Newton. Winthrop. Cohasset. Norwell.

DISTRICT No. 7.

Deputy EDWARD J. COGAN, Gloucester.

Telephone, 348-L.

Amesbury. Manchester. Rowley.

Essex. Merrimac. Salisbury.

Gloucester. Newbury. Topsfield.

Hamilton. Newburyport. Wenham.

Ipswich. Rockport. West Newbury.

DISTRICT No. 8.

Deputy Thomas L. Burney, Lynn.

Telephone, 1613-13.

Arlington, Marblehead. Salem. Belmont. Medford. Saugus. Melrose. Beverly. Stoneham. Middleton. Danvers. Swampscott. Everett. Nahant. Wakefield. Lynn. Peabody. Watertown. Lynnfield. Reading. Winchester. Malden. Revere. Woburn.

DISTRICT No. 9.

Deputy WALTER A. LARKIN, Andover.

Telephone, 172-5.

Andover. Dracut. Lowell. Bedford. Georgetown. Methuen. Billerica. Groveland. North Andover. Boxford. Haverhill. North Reading. Burlington. Lawrence. Tewksbury. Chelmsford. Lexington. Wilmington.

DISTRICT No: 10.

Deputy JAMES I. MILLS, Ayer.

Telephone, 51-2.

Acton. Concord. Pepperell. Ashby. Dunstable. Shirley. Ayer. Groton. Stow. Berlin. Harvard. Townsend, Bolton. Hudson. Tyngsborough. Boxborough. Littleton. Westford, Carlisle. Maynard.

¹ Assigned to launch "Egret" and to special duty.

DISTRICT No. 11.

Deputy JAMES E. BEMIS, South Framingham.

Telephone, 226-J.

Ashland. Marlborough. Southborough. Blackstone. Medway. Sudbury. Framingham. Mendon. Waltham. Holliston. Milford. Wayland. Hopedale. Millis. Wellesley. Hopkinton. Natick. Weston. Lincoln. Sherborn.

DISTRICT No. 12.

Deputy IRVING O. CONVERSE, Fitchburg.

Telephone, 53-14.

Ashburnham. Lancaster. Royalston. Athol. Leominster. Rutland. Clinton. Lunenburg. Sterling. Fitchburg. Petersham. Templeton. Gardner. Phillipston. Westminster. Hubbardston. Princeton. Winchendon.

DISTRICT No. 13.

Deputy A. D. PUTNAM, Spencer.

Telephone, 75-4 or 75-6.

Northborough. Sutton. Auburn. Northbridge. Upton. Boylston. North Brookfield. Uxbridge. Douglas. Grafton. Paxton. West Boylston. Holden. Shrewsbury. Westborough. Leicester. Worcester. Spencer. Millbury.

DISTRICT No. 14.

Deputy JOHN F. LUMAN, Palmer.

Telephone, 17-5.

Ludlow. Wales. Brimfield. Brookfield. Monson. Warren. Webster. Charlton. Oxford. West Brookfield. Dudley. Palmer. Hampden. Southbridge. Wilbraham. Holland. Sturbridge.

DISTRICT No. 15.

Deputy DENNIS F. SHEA, Ware.

Telephone, 132.

Hadley. Pelham. Amherst. Prescott. Barre. Hardwick. Shutesbury, Belchertown. Leverett. New Braintree. South Hadley. Dana. Sunderland. Enfield. New Salem. Oakham. Ware. Granby. Greenwich.

DISTRICT No. 16.

Deputy JAMES P. HATCH, Springfield.

Telephone, 2571-3,

Agawam. Blandford. Chesterfield.

Chicopee.

East Longmeadow. Easthampton. Granville.

Holyoke.

Longmeadow. Montgomery. Northampton. Russell.

Southampton. Southwick.

Springfield.

West Springfield. Westfield. Westhampton. Williamsburg.

DISTRICT NO. 17.

Deputy LYMAN E. RUBERG, Greenfield.

Telephone, 376-R.

Ashfield. Bernardston. Buckland. Colrain. Conway. Deerfield.

Erving. Gill. Greenfield. Hatfield. Leyden. Montague.

Northfield. Orange. Shelburne. Warwick. Wendell. Whately.

DISTRICT No. 18.

Deputy ARTHUR M. NICHOLS, North Adams.

Telephone, 391-12.

Adams Charlemont.

Cheshire. Clarksburg. Florida. Hancock.

Hawley. Heath

Monroe. New Ashford. North Adams. Rowe Savoy.

Williamstown. Windsor.

DISTRICT No. 19.

Plainfield.

Deputy FRED R. ZEIGLER, Pittsfield.

Telephone, 362-11.

Cummington. Dalton. Goshen. Hinsdale.

Chester.

Huntington. Lanesborough. Lee.

Lenox. Middlefield. Peru. Pittsfield. Richmond. Washington. Worthington.

DISTRICT No. 20.

Deputy DEWITT SMITH, Great Barrington.

Telephone, 72-6.

Mount Washington.

New Marlborough.

Alford. Becket. Egremont.

Great Barrington. Monterey.

Otis. Sandisfield. Sheffield.

Stockbridge. Tolland. Tyringham. West Stockbridge.

DISTRICT No. 21.

Deputy CHARLES L. SAVERY, West Tisbury.

Telephone,

Chilmark, Edgartown, Gay Head. Oak Bluffs. Tisbury. West Tisbury.

The districts should be organized with a competent assistant or subdeputy in each town.

The report of Chief Deputy Nixon follows: —

BOSTON, MASS., Jan. 1, 1910.

Commissioners on Fisheries and Game, State House, Boston, Mass.

Gentlemen: — I herewith submit my annual report as chief deputy for the year ending Dec. 31, 1909.

During the year I have devoted a large part of my time in the office to directing and supervising the work of the deputies in the field engaged in the enforcement of law. I have also assisted deputies at times in field work, and instructed them in work which was to be done. always having in mind the enforcement of the fish and game laws in a fair and impartial manner, with justice for all and malice toward none. The officers in charge of the execution of laws must enjoy the confidence of the people, because when information is given it is done in absolute confidence, and usually only after assurance is given that the informant will not be in any wise connected with the prosecution after such information is given. Then devolves upon this department the investigation, the securing of evidence, and the beginning of the prosecution if sufficient evidence can be secured. I am pleased to say that from indications in the past this office has enjoyed to a great extent the necessary co-operation of those who believed in a fair and impartial enforcement of the fish and game laws. During the year 231 complaints have been received at this office for violation of the fish and game laws, by coming in person to the office at 158 State House, by letters to the office and by telephone, all of which have been referred to the deputy in whose district they occurred, where the prompt investigations which have been made have resulted in a large number of arrests and convictions.

Automobiles.— The use of the automobile as a means of transportation to the hunting grounds has become very popular, and wide territories are covered by hunters who use them, with the result that birds are liable to be completely exterminated in covers to which the auto has easy access. The auto comes again into play as a means of escape for violators. It has been used to good advantage (to the vio-

lator) in cases of Sunday hunting, killing deer, shooting pheasants, etc., as wide territories may be rapidly covered. It is located with difficulty by the deputies, as the hunters work an hour or two in certain covers if violating the law, and then (for another hour) take the auto to fields anew, which may be miles from the last scene of operation. Thus it is wholly impossible for the deputies to follow, even when they know where the violators are to operate. Partridge, pheasant and deer have been shot illegally by this means, and the violators have escaped the penalty of the law.

Some Important Changes in Game Laws (Wild Fowl and Deer). - Many important changes were made in the game laws at the last session of the Legislature, noticeably in regard to wild fowl (chapter 421), which puts a close season on geese and brant for the first time in Massachusetts, and stops all spring shooting. Under the new deer law (chapter 396, Acts of 1909), which became operative June 14 of this year, allowing the owner of land which was under cultivation to shoot deer doing damage thereon, 198 deer have been shot and the meat used by persons shooting it, or given away by them to others for food; as compared with 16 in 1907 and 17 in 1908, when the meat was required to be sold and the money turned into the State treasury. Upon receipt at the office of notice of killing (the law provides that the person shall send to the office within twenty-four hours), the nearest deputy was notified to make a thorough investigation of the damage done and facts of such killing, and a report sent to this office. As a result of such investigations, four different parties have been put into court, under instructions from the office, for illegal killing of deer; two were found guilty and paid fines, one was found guilty and the case filed, and one was discharged.

In looking over the premises when damage was claimed to be done by deer, the deputies in nearly every case found damage which fully justified the killing under the present law. In one case the owner claimed damage done by the deer shot as the value of apples eaten, 15 cents. The deputy's estimate was 3 cents on the same case. Another case, the owner's estimate was 15 cents; deputy's estimate, 5 cents. The largest estimate of damage was \$60, and was allowed by appraisers appointed by the chairman of the selectmen of the town.

The largest number of deer present at one time and doing damage when one of their number was shot was seven. The largest number of deer shot by one person at one and the same time while doing damage was three, one doe and two fawns. The largest number of deer shot by or under the orders of the same person since June 17, when the new law became operative, was three each by four different persons.

In some instances the deer were probably shot first, and the hoof marks made later, and there are "rumors" that damage done by woodchucks and rabbits was attributed to deer by the hoof-mark method. Salt was sometimes used for enticing the deer to destruction. The number killed by farmers this year appears to be greatly in excess of that required.

The present law has caused a vast amount of criticism among the sportsmen, as they claim that it gives the farmer not only an open season, but a chance to shoot a deer at any time that he feels so inclined. The open season on deer should allow the shooting of one, and not confine the hunter to either sex, for the reason that if they are allowed to shoot their allotment they will return perfectly satisfied with their hunt after getting their deer. If the law makes it illegal to shoot does, I think a mistake will be made, for the reason that a person when hunting deer will shoot at the deer first, and find out what the sex is afterwards; and a good many does will be shot, and after the hunters find out their mistake they will either take chances in taking the deer in violation of law, or leave it to be destroyed. If they are allowed to shoot either sex, then they will be satisfied. I am of the opinion that a short open season with special deer license would bring a very substantial sum into the treasury of the Commonwealth. It would seem that something of this kind should be done to protect the State's interest, and to get some return for moneys expended by the State for damage done by deer and for the State moneys expended by this commission for the deer's protection. The argument is often raised that to have an open season on deer will cause the loss of a number of lives and many serious shooting accidents. This is a chance that all hunters and sportsmen take when they go into the woods with loaded firearms. An accident is liable to happen at any moment, no matter how careful the hunter may be; and in my opinion would not be any more liable to happen in hunting deer than it would in hunting other game. If a hunter is allowed to shoot his allotment of deer of either sex, he will get out of the covers sooner than if he is restricted to buck deer.

As the law stands to-day, a farmer not only can shoot a deer doing damage, no matter how little or insignificant, but can have the carcass for food and can also collect damage from the State in money value. If a farmer shoots deer doing damage and can have the deer carcass, then no money should be paid to him for damage done by the deer shot. In numerous instances when damage was done the past year to crops no claim was made, nor was any deer shot, the farmer being averse to taking advantage of the law by making claim for damages, or shooting, as they like to see the deer around.

Below is given a summary of deer killed, by counties, amount of damages, etc.; a comparison of deer shot doing damage the past three years under different laws; also a comparison of deer seen the past three years, reported by deputies and others. The estimate of damage is somewhat misleading, as in some cases it was almost impossible to give any estimate as to deer eating apples, eating buds and blossoms from fruit trees, tramping down millet, rye, rape, clover, corn and vegetables. In opening up the stomachs of deer, quantities of apples

and vegetables would be found. In some cases the owner would not, or could not, give any estimate, and the deputies have done the best they could. This problem of how to best protect the deer is becoming a very important one, and will need careful consideration in regard to future laws made concerning them.

Total Arrests for killing Deer illegally, 1909. — During the year just closed, 22 arrests were made by deputies for the illegal killing of deer in this Commonwealth. Of these cases, 20 convictions were secured, and \$1,185 in fines were paid on 19 cases. One case was placed on file, and 2 discharged.

Summary of Deer killed under Chapter 396, Acts of 1909, since the Law went into Effect, June 14, 1909.

						Number	DAM	AGB.
	 C	OUNT	¥.	 		killed.	Owner's Estimate.	Deputy's Estimate.
Barnstable,					.	-	_	_
Berkshire,						20	\$183 40	. \$89 78
Bristol, .						-	-	-
Dukes, .						-	-	-
Essex, .					.	5	40 00	17 50
Franklin, .					. !	94	758 00	727 25
Hampshire,					.	20	98 50	57 00
Hampden,					.	27	210 98	103 58
Middlesex,					.	4	23 00	5 50
Norfolk, .						2	-	-
Nantucket,					. !	-	-	-
Plymouth,						2	45 00	25 00
Suffolk, .					.	-	-	-
Worcester, .					. !	24	53 00	76 00
Total, .						198	\$1,411 88	\$1,101 61

Money paid by the State Treasurer, according to Acts of 1903, Chapter 407, for Damage done by Wild Deer.

1903,						\$237 30
1904,						392 25
1905,						1,117 05
1906,						2,822 73
1907,						2,912 78
1908,						4,370 03
1909,						7,923 09

Forest Fires. — Inasmuch as our deputies spend much of their time in the woods, assistance is frequently given in checking forest fires, and especially in arresting persons thus violating the State laws relative to setting fires. The following cases were reported:—

Deputy	Bemis,	•	•	•	•			3
Deputy	Burney,							1
Deputy	Converse,							3
Deputy	David,							8
Deputy	Larkin,							3
Deputy	Leonard,							2
Deputy	Mills,							3
Deputy	Ruberg,							1
Deputy	Marks,							3
Deputy	Shea,							1
Deputy	Tribou,							2
Deputy	Stratton,							2
Deputy	Nichols,							1
Deputy	Osborn,							8

Pheasants.— The pheasant, the game bird of Massachusetts in the future, is reported as multiplying in good shape and in excellent condition; and I think that when the commission decided to stock the covers of Massachusetts with this most popular game bird, they planned better than they knew. All the covers of Essex County, the starting-point in this work, to-day contain many hundred pheasants. This hardy bird has proved its ability to live through the most severe New England winters, and has multiplied wherever liberated, and, if it were left alone and not hunted for a few years, would spread over a large area. From every part of the State where these birds have been liberated come good reports of their multiplying and their ability to care for themselves.

A number of complaints have been made by farmers regarding the pheasants doing damage to growing crops, peas, corn, etc., but no serious damage was reported. In some cases pheasants were accused of doing damage which was not done by them. The pheasant, if the farmer only knew it, is a benefit to him, as they eat numerous bugs and insects which destroy crops, chiefly the gypsy and brown-tail moth, locust, etc. These they consume by the hundred daily. I think the new law, Acts of 1909, chapter 309, putting a close season on them, will be very beneficial, although a good many will in all probability be shot in violation of the law. Pheasant hunting is a very exciting sport when done legally with a good dog and gun, and will give any sportsman a good run for the bird.

Partridge. - From all reports in regard to the partridge, I think that they have come through the season fairly well, and that a goodly

number have been left over for the breeding season. In the absence of strong public sentiment against the sale of partridge, it is very difficult to secure convictions, for the reason that the law is easily evaded.

Quail. — Good reports are received from deputies in various parts of the State regarding the increase of the quail, notably from the Cape district. In various parts of the State there is an unwritten law that the quail shall not be shot, but left for breeding purposes; the sportsmen have lived up to it very well the past few seasons, and a good many covies have been left, and with a mild winter and proper care much good will result.

Rabbits.—Gray rabbits have from all reports increased during the past season, and are affording good sport to those hunters who like this kind. White "rabbits," or, more properly, hares (northern varying hare), are gradually disappearing. Foxes, gray rabbits and overshooting are believed to be the cause. A law should be passed making it unlawful to dig out rabbits after the dog has driven them into their burrows, as this kind of work will soon deplete the covers. In certain localities to-day good covers have been completely cleaned out by this method.

Squirrels. - A large increase of gray squirrels is reported all over the State, due no doubt to the close season. The law on gray squirrels should be changed so as to allow the owner of fruit trees and corn fields to shoot them when found in the act of doing damage to the same. Numerous complaints have been made to the office and to deputies in regard to damage done by squirrels to pears and corn, mainly to pears, when they go into the tree and destroy large quantities of pears by eating holes in them and taking out the seed, which seems to be the objective point. I have had experience at my home in Cambridge in the heart of the city. I have three pear trees in the yard, and during the month of September every morning at daybreak I could see two gray squirrels in the pear trees, and on going out could pick up from two to three quarts of pears which had been destroyed. I also know of instances where squirrels have gone into corn fields and have carried off whole ears of corn in large quantities. I have seen them at this work in West Gloucester, in 1907.

Lobsters. — In the enforcement of the lobster law for the past season 29 arrests were made, on which 28 convictions were secured, with 1 case discharged; fines amounting to \$546 were imposed and paid. The minimum penalty was \$5; the maximum, \$75. One case, where a \$45 fine was imposed, is still pending.

Four hundred illegal lobsters were returned to the water from which they were taken, after being seized by the deputies, in the above cases.

Feathers used for Millinery Purposes. — I have devoted considerable of my time to the enforcement of the law regarding the sale of illegal feathers used for millinery purposes, and I am pleased to report that

the dealers, dyers, cleaners and wearers who formerly handled and used these feathers have become aware of the fact that the law is to be enforced without fear or favor, and I find that all (with a very few exceptions) are in full sympathy with such enforcement. I have found in my visits to these places that all intend to live up to the letter of the law. I have always been treated in a courteous manner, whether I was there for the purpose of giving a warning or for more serious business. I have endeavored to stop the having in possession of these illegal feathers by a number of warnings, but when that method failed I took more severe measures by putting the parties into court, where they were convicted and fined. I find that the general public are in full sympathy with such enforcement and I have received information of much value at different times from persons who were interested in the work.

The display of the Massachusetts Audubon Society at the Boston 1915 Exhibit, from Nov. 1 to Dec. 11, 1909, in which were shown some of the feathers and birds (loaned to the society by this commission) upon which convictions were secured and fines paid, attracted considerable attention, and was very instructive to the ladies and others who were interested in the law enforcement.

I was at the exhibit each night, and gave to the public all information desired as to which birds and feathers were in violation of the law, and which were not.

Power Boats. — Chapter 328, Acts of 1909, should be more clearly defined in relation to the pursuit of water fowl by power boats.

The number of power boats is rapidly increasing and the temptation to hunt from them is very strong, as no labor is required in getting to the hunting grounds along the shore and out in the bays. The law should be changed so as to allow the shooting of wild fowl from motor boats while at anchor, but not when under power, nor should they be allowed to pursue birds of any kind when the boat is under power. Considerable violation is being done by power boats hunting, pursuing and killing wild fowl in various waters along the shores in Massachusetts, and it is a very hard matter for the deputy to catch them. In order to do so the deputy is compelled to hire another boat, which sometimes is rather a hard proposition, as the owner will not consent if he knows for what purpose the boat is to be used. I would say, however, that deputies have at times found sportsmen who have not only been willing to let their boats, but have even assisted the deputy in making the arrest.

A good many violators use high-speed boats, and cannot be caught by a boat of ordinary speed. In some cases they use a boat with speed as high as 20 miles an hour.

Hunting Licenses. — The certificate of registration of all hunters should be confiscated by the court upon conviction of a violation of the act, and given to the deputies who make the arrest, to be immediately

forwarded to this office and placed on file. If the certificate is not taken away, the convicted person could use it indefinitely and show it on demand to any officer or other person who did not know it was void.

No person should be allowed to hunt without a license. Farmers, land owners and all should be included. If the farmers feel that they should be given special privileges, then give them the license free, or for the recording fee of 15 cents, but compel all to have a license. When deputies meet a hunter in the covers, and ask to see the license, and the hunter claims to be the owner of the land and does not require one, it is impossible to detect an impostor except by a very rare chance. If he is acquainted with the locality, and perhaps knows the person, then the matter is easily looked up. If, on the other hand, he does not know the locality, or the parties or owner, what is he to do?

Similarly, many hunters found in the covers, when approached by the deputy and asked to show the license, evade the law by claiming to be hunting foxes, woodchuck, crows and various other animals, or birds which are not protected, and for which no license is required unless the hunter is a nonresident or alien. If the law were changed so as to include all birds and animals, this prolific source of evasion could be very easily stopped. The act should also be changed so as to make it compulsory that the certificate be carried on the person when hunting.

I am of the opinion that no duplicate certificates should be issued, and I think it would be in violation of law to issue them. If a certificate is lost or destroyed, that should be a matter for the party to whom it was issued to be responsible for, and not the State. I think the fee should be changed so as to make it \$1.15, so that the State could get the \$1, and the clerk issuing it the 15 cents, as they are put to some expense for postage, stationery, etc. This would greatly assist the State Treasurer, by avoiding the necessity of drawing checks for trivial amounts, and would avoid the delay incidental to the return of the fee to the town clerks.

Numerous complaints have been made to the office regarding persons hunting without licenses, all of which have been investigated, and in some cases arrests have been made. In most cases it was too late for the deputies to locate the violators.

Acting under instructions from this office, the paid deputies have sent in since September 21 the registered number of 1,004 certificates of hunters whom they have met on the hunting grounds and looked over for illegal game.

The total number of different offences committed by violators was 51, of which one was for interfering with a deputy in the discharge of his duty; this offender was arrested, convicted, and paid \$30. Another was for assault on a deputy; and the offender was arrested, convicted and fined \$10, together with a fine of \$25 for hunting without a license, making a total of \$35, which was paid.

The number of persons arrested for violation of Acts of 1909, chapter 325 (violation of act requiring the registration of hunters), since Jan. 1, 1909, was 23. The details and summaries are given on another page.

The assignment of deputies to definite districts and the publication of the districts in the fish and game laws was, I think, a step in the right direction, as it put the public in a position to report violations to deputies at short notice, with resulting quick service and sometimes the catching of violators in the act.

Deputies should be brought more under the control of the office, and not allowed to go into each other's districts, thus adding additional expense to the State without good reason therefor. Each deputy is given to understand that he must be as economical as possible in the expenditure of all moneys which are to be charged up to the State, from whose treasury comes his wages and expenses. It is important that it should be firmly impressed on the mind of every deputy that the best work with the least possible expenditure of public money will bring to him and to this commission the hearty co-operation of all.

Criticism of the methods of work of the deputies is gladly welcomed, as is also any suggestion for the enforcement or betterment of the work done by them, as only in this way can an efficient force be maintained and the best results accomplished.

I wish at this time to speak a good word for the deputies and for the work which they have to do. A large majority of them are honest, capable, faithful, conscientious and willing public servants. The life of a deputy is not one grand, sweet song. At times he has to stand a lot of criticism concerning the methods of work of himself and the commission, which is often unjust. The deputies of this department, unlike most other employees of this Commonwealth, do not have an eight-hour schedule, but give their entire time, if necessary, to the work which they have to do. I know of numerous instances when the deputies have worked out in the coldest weather the entire twenty-four hours. without sleep. They work all Sundays and holidays, as well as every day of the week; generally the hardest work brings the least results. A deputy must have good common sense, sound judgment, and be quick to act on things as he finds them; sometimes the most important matters must be decided in an instant, and be decided in the right way. think the deputies of this commission will compare favorably with any body of men similarly employed anywhere in the United States.

Much credit should be given to the various police officials, police officers, constables and all officers who have during the past year assisted the various deputies in the work which they had to do; also to the clerks of the several courts, for their assistance and help to the deputies; and more especially to the judges of the courts of the Commonwealth, for their fairness and the judicial manner in which they have disposed of the various cases for violation of the fish and game laws,

always having in mind their duty to the Commonwealth and the right of the defendant. As the enforcement of the fish and game laws lies largely with the court, the decisions rendered educate and enlighten the public, which is most vitally interested, and without whose assistance and co-operation no law can be upheld. I think the general public and the law-abiding sportsman are in full sympathy with the commission for a full and impartial enforcement of the fish and game laws.

Certain unpaid deputies should be commended for the good work done by them the past year. This work was not done for what was in it, but for the good of the cause and a wish to see the law upheld, and was done in some cases at a financial loss to the deputies.

Respectfully submitted,

WILLIAM W. NIXON, Chief Deputy.

Classification of Arrests during the Year 1909.

FORM OF	Vio	LATIC	on.		 		Number of Counts.
Shellfish from polluted waters,							. 77
Hunting on Lord's Day,							. 54
Aliens hunting without license, .							. 33
Residents hunting without license, .							. 20
Possession of and hunting with ferret,			٠				. 4
Shooting pheasant,							. 4
Using over ten hooks on ponds, etc.,							. 3
Possession of seed scallops,							. 1
Killing or possession of gray squirrels,							. 20
Hunting, wounding or killing deer, .						٠.	. 22
Shooting gulls or terns,							. 4
Setting traps or snares,							. 4
Interfering with officer,			-				. 1
Possession of smelts in close season, .							. 10
Taking smelts with net,							. 7
Taking trout in close season,							. 2
Possession of pickerel under ten inches,							. 6
Taking fresh-water fish with net, .							. 10
Possession of short lobsters,							. 23
Killing song or insectivorous birds, .							. 11
Possession of short trout,							. 15
Killing fish by dynamiting waters, .							. 2
Fishing in closed ponds,							. 5
Using over one hook on stocked pond,							. 4
Destroying or taking eggs of wild birds			by b	9.W			. 6

Classification of Arrests during the Year 1909. — Con.

FORM OF VIOLATION.											
Possession of short bass, . : .									. 8		
Having egg-bearing lobsters for sale,									. 4		
Mutilating lobsters,									. 1		
Torching herring,									. 11		
Having unmarked lobster car,									. 1		
Spearing fish,									. 5		
Larceny of lobsters,									. 1		
Pursuing wild fowl with power boat,									. 3		
Assault with dangerous weapon, .									. 1		
Nonresidents hunting without license,									. 5		
Possession of ruffed grouse in close sea	on,								. 2		
Residents refusing to show license, .									. 3		
Killing rabbits in close season,									. 4		
Killing wood duck,									. 1		
Using seine of less than five-inch mesh	١, .								. 5		
Maintaining fish trap without permit,									. 1		
Pursuing ducks in Great Pond, Edgard	lown,								. 1		
Dogs chasing deer,									. 3		
Possession of prohibited feathers for m	illine	ry,							. 7		
Possession of black ducks in close seas	on,								. 1		
Seining pond,									. 1		
Total,									417		

Comparative Table of Law Enforcement, 1908-09.

									1908.	1909.
Total fines im	рове	d,						$\overline{}$	\$7,097 50	\$5,804 50
Fines from arr	esta	by p	aid d	leput	ies,			.	6,348 50	5,400 50
Fines from arr	ests	by u	npaic	d de	outies,				759 00	404 00
Total number	cou	ots ta	ken 1	to co	urt,				472	417
Total number	pera	ons a	rrest	ed,					455	383
Convictions,								.	424	397
Discharged,									45	19
Defaulted,									2	1
Cases filed,									77	59

Of two cases appealed in 1908, not included in above, one paid \$20 and the other \$53. One lobster case, fine \$45, appealed in 1909, still pending.

Itemized List of Moneys received by the Commissioners on Fisheries and Game during the Year 1909 and paid to the Treasurer and Receiver-General.

Received for												Amount.
Issuance of nonresident hunte chapter 262, Acts of 1909).	ars'l	icenses	(cha	pter	198,	Acta	1907,	85	amen	led	by	\$988 20
Heath hen fund (chapter 504,	Act	of 190	7),									100 00
Sale of egg-bearing lobsters to	Uni	ted Sta	tes I	Bure	au of	Fish	eries :	stat	ions,			672 25
Sale of deer carcasses (chapter	377,	Acts o	f 190	8),								38 50
Interest on deposits in bank,												29
Total												\$1,799 24

There have been no applications for the inspection of fish under the Acts of 1902, chapter 138, and no fees have been received.

Under the Acts of 1907, chapter 198, as amended by chapter 262, Acts of 1909, this commission, which issues licenses to nonresidents, has granted licenses as follows:—

1907,	81 licen	ses, a	t \$10	each,					\$810 00
	18 licen	ses, a	t \$1	each,					18 00
1908,	46 licen	ses, a	t \$10	each,					460 00
	21 licen	ses, a	t \$1	each,					21 0 0
1909,	92 licen	ses, a	t \$10	each,					920 00
•	68 licen	ses, a	t \$1	each,					
7	Cotal,							. \$	2,297 00

RECOMMENDATIONS FOR LEGISLATION.

We respectfully recommend the passage of laws designed to accomplish the following purposes:—

1. That investigation be made of the infectious diseases of native birds and of foreign birds introduced into the State, with

In addition to the issue of \$10 licenses for 1909, as here given, we issued 5 licenses as exchanges, 2 for licenses paid for in 1908 and not used, 3 in exchange for licenses issued in error by town clerks and money paid by them into State treasury.

- a report including expert opinions upon the probability of such diseases spreading among our native birds, and, so far as possible, suggesting remedies and methods for preventing such infection; and that for these purposes money be appropriated from money received by the Commonwealth for hunting licenses.
- 2. That a biological investigation and report be made upon the adaptability of the public waters of the State for rearing food fishes, to devise methods and to determine as nearly as possible the quantity of fish which various waters are capable of producing annually and to ascertain the best methods of stocking such waters; and that an appropriation not exceeding \$2,000 a year for three years be appropriated for this purpose.
- 3. That the laws relative to shooting from boats propelled by mechanical means other than oars should be so defined as to make plain their meaning relative to power boats when not under power.
- 4. That the commission should have authority to purchase, lease or receive as a gift lands to be used as bird reservations, i.e., specially protected breeding places for birds. Property thus acquired should become the property of the Commonwealth, to be administered by the Commissioners on Fisheries and Game, for the purpose of securing the utmost possible population of useful birds. Whenever necessary to confirm titles, power of eminent domain should be given similar to that in chapter 504, Acts of 1907; and that of the money received by the Commonwealth for hunters' licenses a sum not exceeding \$5,000 annually may be expended for the purpose of acquiring land for such purposes.
- 5. That to secure more satisfactory enforcement of the laws the legal measurement of lobsters should be made upon the shell (carapace), exclusive of the tail; and that this legal measure of length should be 43/4 inches, in conformity with the law of Maine.
- 6. That all lobster fishermen, dealers and all persons catching or transporting lobsters within this Commonwealth should be licensed.
- 7. That all lobsters or parts of lobsters sold for use in this State or for export therefrom must be sold and delivered in the shell.

- 8. We renew our recommendations of last year for more adequate and economical facilities for propagating and distributing food fish and useful birds.
- 9. Also, for such amendment of the laws as to ensure the development of the mollusk fisheries below high-water mark in such a manner as to permit increase in the economic yield of food material; to furnish wider opportunities for remunerative employment of skilled and unskilled labor.
- 10. The laws relative to deer should be amended so as to permit a short open season, under suitable restrictions.
- 11. Dogs should not be allowed to run at large during the breeding season of birds in areas frequented by them, from March first to October first.
- 12. Special investigations should be made to determine how those birds which feed upon gypsy and brown-tail moths, leopard moths, cut worms and other noxious insects, can be increased or colonized within the infected regions or in special locations.
- 13. Some decision should be made relative to the issuance of duplicate licenses under Acts of 1907, chapter 198, as amended by Acts of 1909, chapter 262, and Acts of 1908, chapter 484, as amended by Acts of 1909, chapter 325.

Also, under same acts, the persons applying for a license should be required to establish their identity; and for the purpose of permitting effective enforcement the requirements for license or registration should be extended to all persons hunting for any species of bird or mammal, and further require that the license or certificate of registration should be carried on the person when hunting.

Minors under sixteen years of age making application for registration should be obliged to have the consent of their parents or guardian in writing.

Upon conviction of violation of game laws, persons holding licenses should be instructed by the court convicting them to surrender such license to the deputy who secures the conviction, and that said license shall then be sent to the office of the commission.

14. Many complaints have arisen relative to damage done to crops and to other property by gray squirrels. Some pro-

vision should be made for reimbursement by the State; or else a short open season, with a "bag limit," should be permitted in those sections where damage is most frequent.

- 15. The protection of upland plover expires by limitation July 15, 1910. We recommend that this be extended until July 15, 1915.
- 16. Section 12 of chapter 92 of the Revised Laws, as amended by Acts of 1906, chapter 278, should be further amended to coincide with date of the open season on hares and rabbits.
- 17. Chapter 285, Acts of 1907, which permits the taking of clams and quahaugs from contaminated waters, should be repealed.
- 18. Depositing shavings, garbage, ashes, acids, dye stuffs and other waste materials, which may directly or indirectly injure the economic value of public waters, should be prohibited.
- 19. On petition of the mayor and aldermen of a city or of the selectmen of a town within which a great pond or any portion thereof is situated, the Commissioners on Fisheries and Game, subject to the approval of the Governor and Council, may prescribe such reasonable regulations relative to the fishing in such ponds and their tributaries, with such penalties, not exceeding \$20 for one offence, as they deem to be for the public interest, and shall cause such regulations to be enforced.
- 20. The deputies of this commission should be authorized to arrest hunters whom they find in the act of tearing down walls, destroying fences, cutting trees or injuring or destroying other property.
- 21. That chapter 367, section 1, Acts of 1904, be amended so as to allow the commissioners or their deputies or other officers to search in certain places for game or fish without a warrant.

Courtesies.

It is a pleasure again to acknowledge the assistance so courteously rendered to the commission by Mr. Arthur L. Millett, local agent of the United States Bureau of Fisheries at Gloucester, and by Mr. F. F. Dimick, the efficient secretary of the Boston Fish Bureau, in furnishing statistics and special information relating to the marine fisheries.

Permits to hold egg-bearing lobsters in confinement, for collection by the agents of this commission, according to chapter 408, Acts of 1904, were issued to 553 fishermen and dealers.

Permits for taking birds and eggs under section 9, chapter 92 of the Revised Laws, as amended by chapter 287, Acts of 1903, were issued to the following-named persons:—

Albert H. Tuttle, Cambridge.
Frederick H. Carpenter, Seekonk.
B. G. Willard, Millis.
John H. Hardy, Jr., Boston.
Clarence Birdseye, Amherst.
Frederick H. Kennard, Boston.
Chester S. Day, West Roxbury.
Chester A. Reed, Worcester.
Arthur F. Gilbert, New Bedford.
Robert O. Morris, Springfield.
Fred B. McKechnie, Boston.
George M. Gray, Woods Hole.
William Dearden, Springfield.
J. A. Barton, Fitchburg.

A. C. Bent, Taunton.

Nathan F. Stone, Shrewsbury.

Owen Durfee, Fall River.

William Brewster, Cambridge.

James P. Porter, Worcester.

Prank S. Akin, Fall River.

Haynes H. Chilson, Northampton.

Charles R. Lamb, Boston.

Edward R. Adams, Canton.

Henry P. Burt, New Bedford.

F. A. Binford, Hyannis.

R. H. Carr, Brockton.

Frank Blake Webster, Hyde Park.

Permits to have wild ducks in possession, for purposes of propagation, were issued to:—

Seth A. Borden, Fall River.
Alfred V. Freeman, South Duxbury.
J. Goulding, South Sudbury.
Bayard Thayer, Lancaster.
Thos. S. Plummer, Dartmouth.
Spencer Borden, Fall River.
James E. Rothwell, Brookline.

Guilford C. Hathaway and Benjamin W. Brown, Fall River. Allan Keniston, Edgartown, H. S. Little, Newbury. Frederick E. Mosher, New Bedford. Wm. H. Thurston, Plymouth.

Permits to have wild Canada geese in possession, for purposes of propagation, were issued to:—

H. S. Little, Newbury. James E. Rothwell, Brookline.

Permit to have native insectivorous birds in possession, to be used in connection with experiments and observations upon the use of birds for destroying certain flies in greenhouses, was issued to:—

Seth A. Borden, Fall River.

Permits to bring into the Commonwealth during the close season not exceeding 50 birds known as Anatidæ, in accordance

with the provisions of Acts of 1909, chapter 421, section 2, were issued to:—

H. B. Endicott, Boston.
Thomas S. Silsbee, Boston.
H. Wendell Endicott, Dedham.
Eben C. Norton, Norwood.
James M. Codman, Brookline.
Thomas Barbour, Brookline.
Henry E. Bigelow, Cambridge.
John N. Beebee, Boston.
Decim Beebee, Boston.
F. S. Mead, Brookline.
Frank B. Bemis, Boston.

Wilton Lockwood, Boston.
Arthur N. Milliken, Boston.
John B. Paine, Weston.
Charles Merriam, Weston.
G. F. Blake, Weston.
Charles J. Paine, Weston.
Dr. B. Vincent, Boston.
J. D. Upton, Boston.
Paul Windsor, Weston.
Wm. H. Slocum, Boston.

Permits to have quail in possession, for purposes of propagation, were issued to:—

Clarence M. Snow, Provincetown. Edmond L. Sinnott, Bridgewater. J. Goulding, South Sudbury. Spencer Borden, Fall River. C. F. Hodge, Worcester. James H. Porter, Worcester.

Permits to have ruffed grouse in possession, for purposes of propagation, were issued to:—

C. F. Hodge, Worcester. James P. Porter, Worcester.

Permit to have native insectivorous birds in possession for purposes of observation, was issued to:—

James P. Porter, Worcester.

Permit to have northern varying or white hares in possession, for purposes of propagation, was issued to:—

Fish and Game Protective Association, Brockton.

Permits to rear and sell pheasants, in accordance with the provisions of Acts of 1909, chapter 309, were issued to:—

Howard E. Newton, Foxborough. Thomas R. Sherburne, Lexington. Frederick W. Fisher, Newton. Albert L. Brown, Cohasset, Andrew S. Covle. Taunton. Minnie Blagden, Rowley, H. S. Little, Newbury, Austin L. Millett, Rowley. Milan A. Brayton, Fall River. Grenville Lindall Winthrop, Lenox. Charles M. Emerson, Taunton. Edward C. Alden, Taunton. C. L. Converse, Stoneham. Elmer A. Macker, North Grafton. James Ashton, Fall River. A. N. Reynolds, Westwood. Chester H. Keyes, Middleborough.

E. H. Allen, Stoneham. S. B. S. Keyes, Middleborough. Frank R. Boston, Beverly, G. Marston Whitin, Whitinsville, John Clark, Brockton. J. Goulding, South Sudbury, George M. Ballard, Danvers. Charles F. Berry, Needham Heights. Bayard Thayer, Lancaster. E. P. Wilbur, South Framingham. Seth A. Borden, Fall River. John C. Phillips, Boston. M. J. McQuaid, Clinton. Spencer Borden, Fall River. Frederick E. Mosher, New Bedford. James E. Rothwell, Brookline.

Permits to take sand eels for bait, under chapter 164, Acts of 1902, were issued to the following persons:—

Elmer A. Durgin, Rowley. A. P. Hilton, Newburyport.

Permit to have lobsters of any size in possession, for scientific purposes, was issued to:—

Marine Biological Laboratory, Woods Hole.

Permit to transfer spawning white perch and pickerel to a satisfactory spawning ground was issued to: --

Charles E. Tribou, Brockton.

Permit to take smelts during close season, for the purpose of ascertaining facts regarding breeding habits, was issued to:—

William W. Nixon, Somerville.

Permit to take trout from the waters controlled by the town of Mashpee, for purposes of propagation, was issued to:—

Frank E. Hitchings, Sandwich.

Permit to have live brook trout of less than legal length in possession, for purposes of study, was issued to:—

Lester F. Potter, New Bedford. .

Permits to use a seine in the waters of Pleasant Lake, lying between Harwich and Brewster, and in the ponds in Barnstable County, for securing white perch for scientific purposes, were issued to:—

Everett B. Mecarta, Harwich.

Permits to buy and sell or have in possession trout artificially propagated and maintained, in accordance with the provisions of Acts of 1909, chapter 377, were issued to:—

Sandwich Trout Company, Sandwich.
A. R. Graham & Son, Berkley.
A. B. Savery, Wareham.
Jacob Diegel, Agawam.
Estate of Walter L. Gilbert, Chas. S.
Davis, trustee, Plymouth.

Plymouth Rock Trout Company, Plymouth.

H. F. Hurlbut, East Freetown.

N. F. Hoxie, Plymouth.

William A. Gaston, Barre.

Charles R. Doten, Plymouth.

Respectfully submitted,

GEORGE W. FIELD,
JOHN W. DELANO,
GEORGE H. GARFIELD,
Commissioners.

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APPENDICES.

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A. B. Alexander, Assistant in Charge of Division of Statistics and Methods. Hector Von Bayer, Architect and Engineer.

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J. L. Leary, San Marcos, Tex.

W. T. Thompson, Leadville, Col.

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Ga R. H. Wood, Fred W. Chambers, H. G. Thomas, W. McDonald Lee, C. S. Wilkins Matthews, George B. Keezell,	comne,	Fish Bonissio	T., and VE	Oys TAH TAH TAH TAH TAH TAH TAH	S. S	· · · · · · · · · · · · · · · · · · ·		ion. Rockport. Salt Lake City. Stowe. Irvington. Oak Hall. Keezletown.

WASHINGTON.

Fish Commi. John L. Riseland, .							
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	V	Vesi	· Vi	RGIN:	IA.		
a	ame	e and	l Fü	sh W	arde	n.	
James H. Marcum, .							Huntington.
	8	Speci	ial L)eput	u.		
F. H. Merrick,		-		-	-		Huntington.
		W	acos	ISIN.			
70 4 4	,						1.0
Department f					-		
G. W. Rickeman, State W		•					Madison.
J. F. Sugden, Chief Deput	y,	•	•	•	٠	•	Madison.
a-				of F	·. L	·	
The Governor, ex officio.	mm	เรชเบา	иетв	OJ F	ısner	æs.	
Calvert Spensley, Presider	nt						Mineral Point.
James J. Hogan, Vice-Pres					•		LaCrosse.
E. A. Birge, Secretary,							Madison.
William J. Starr, .							Eau Claire.
George B. Hudnall, .							Superior.
Jabe Alford,							Madison.
A. A. Dye,							Madison.
James Nevin, Superintend							Madison.
		W.	YOM	ING.			
	Sta	te G	ате	War	den.		
D. C. Nowlin,			-	•			Lander.

[B.]

DISTRIBUTION OF FOOD FISH.

TROUT FRY.

Distribution of Trout Fry from the Adams Hatchery during April and May, 1909.

APPLICANT.	Town.		Name of Brook.	Number.
APPLICANT. James M. Burns, William N. Jones, William H. Newton, Joseph Ward Lewis, Allen H. Bagg, Edwin T. Smith, Arthur H. Wood, Dr. A. L. Boudreau, John McCormick, Fred Harris, D. E. Burnett, George E. Safford, Robert Groves, J. E. Morgan, Harry J. Sheldon, George F. Sayles, C. J. Fales, C. J. Fales, C. J. Fales, Ceorge McAuley, William P. Martin, Humphrey J. Coughlin, Fresident Anglers' Club, J. M. Van-Huyck, Bradley C. Newell, Nelson M. Oties, C. L. Haughton, Robert C. Hollister,	Pittsfield, Lanesborough, Pittsfield, Lanesborough, Lanesborough, Lanesborough, Lanesborough, Lanesborough, Savoy, Savoy, Savoy, Savoy, Savoy, Adams, Cheshire, Adams, Cheshire, Adams, Cheshire, Adams, Cheshire, Rowe, Rowe, Chester,		Shaker. Laurel Hill, Daniels, Hollow, Wells, Sachem, Rice, McCormick, Tanny, Gulf, Bear, Tophet, Bassett, Dry, Fales, Mason, Chapman, North Branch, Sherman, Tunnell, Hudson, Mud Pond, Barlow, Newell, Knox,	\$,000 5,000
F. H. Saunders, Leon H. Bowers, Leon H. Bowers, Edward G. Clark, James B. Hanks, Edward L. Douglass, Ralph L. Conner, Charles H. Gehle, George F. Gehle,	Westfield,	{	Powder Mill, Munn's, Timber Swamp, Oak Orchard, Hundred Acre, Jack's,	50,000
Jones I. Como, . ,				190,000

Fry distributed from the Hadley Hatchery during April, 1909.

Fred E. Field, .	_	Montague, .		Coldbrook.			.	10,000
R. L. Clapp.		Montague, .		Pond.			.	10,000
George H. Thomy	mon.	New Salem,		Middle Branch	Swift	Rive	r, .	10,000
	tema						.	
Club,		Greenfield,		Green River,			.	25,000
L. W. Pettingill.		Cummington,		Mitchell, .			.	10,000
W. S. Gabb.		Cummington,		Nipping,				10,000
W. G. Bishee, .		Williamsburg,		Hill.				5,000
Fred LaValley,		Williamsburg.		Bullard.				5,000

Fry distributed from the Hadley Hatchery, etc. — Concluded.

APPLICANT.		Town.		Name o	of B	rook.		Number
F. E. Hawks, M. W. Smith, W. A. Smith, John Doberty, A. D. Prouty, P. M. Taylor, H. A. Bussell, Charles S. Ballard,	:	 Goshen, . Goshen, . Goshen, . Goshen, . Springfield, Longmesdow, Longmesdow,	 :	Packard, Rogers, Hampshire, Highland, Bliss, Entry Dingle, Entry Dingle, Scantic,	:	:	•	 5,000 5,000 5,000 20,000 10,000 10,000

Fry distributed from the Sutton Hatchery during April and May, 1909.

Γ. B. Stevenson, .	: = = =	Barber,	5.00
C. A. Reynolds, .			5.00
Norton Company, .	. Worcester,	. Barber	. 5.00
Henry E. Dean	Worsester	Beaver	R Of
Henry E. Dean, Henry E. Dean,	Wornester	Lincoln,	5.00
Elmer A. Macker, .	North Confine	Dimoni,	5,00
cimer A. Macker, .	, North Gratton, .	. Dummit,	. 5,00
Gus S. Dickinson, . E. A. Ludden, .	11.55		1
E. A. Ludden,	\ North Brookfield,	. Webb, Harrington,	. 15,00
A. P. Morin.	J I		ľ
James Nolan, C. S. Robinson,	. Milford,	. Louisa Lake	. 5.00
C. S. Robinson.	Mendon, Sturbridge, Sturbridge, Upton, Oakham, Hubbardston, Ashburnham,	Thompson, Clay, Himman, Taft, S-mile River, Natty, Willow, Brown Meadow,	5.00
John Day, J. S. Hubbard,	. Sturbridge, .	Clav	5.00
R Hubbard	Sturbridge	. Clay,	5.00
W. F. Durgin,	. IInton	Tota	5.00
m. F. Durgin,	Opton,	. I mile	. 5,0
W. R. Dean, Henry H. Hallock,	Oaknam.	o-mile River,	. 5,00
Henry H. Hallock,	. Hubbardston,	. Natty,	5,00
	. Ashburnham, .	. Willow,	5,00
F. A. Gravlin,	Ashburnham,	. Brown Meadow	5,00
Albert H. Sherman.	. Shirley and Luner	Brown Meadow, Mulpus, Tophet, Houghton, Shoeshank, Wheeler, Sheehan, Spec. Pond, Berlin, Harvard, Newton, Popple Camp, Newton, Ellinwood, Ellinwood, Newton, Riceville, Hubbardston, Poor Farm, Marrow Meadow, Bailey, Wilder, Kneeland, Chicken, Foster, Bumstead, Conant, Cider Mill, Warwick, Hart,	- 1
	hure	Mulnus Tonbet Houghton	5.00
Anthur C. Chickenine	Languator	Shoeshank	5.00
Archur G. Chickering,	. Musebanesses	Wheeler	. 3,0
atrick murphy,	muschopauge, .	. Wheeler,	. 5,00
Arthur Snow,	. Clinton and Sterling	, Sheenan,	5,00
oseph E. Johnston,	. Lancaster,	. Spec. Pond,	. 5.00
William M. Lee.	Bolton and Berlin.	Berlin.	. 5.00
W.I. Tedford	Harvard	Harvard.	5,00
Foster A Caples	Athol	Newton	5.00
D Names, .	Dhillington .	Popple Comp	5.00
L. D. Newwin,	. Fainteacon, .	. roppie Camp,	. 5,00
A. B. Shaw,	Athol,	. Newton,	. 5,00
H. A. Bancroft, .	. Athol,	. Ellinwood,	. 5,00
Arthur B. Perkins	. Athol.	. Ellinwood,	. 5.00
loseph Hamel	Athol	Newton.	5.00
lames W Routell	Athol	Riceville	5.00
Murron D. Coddord	Cardner	Hubbardeton	5.00
nyion R. Goddard,	. Candulat,	Deer France	5.0
w. o. Richardson, .	. Gardner,	. Foor Farm,	. 0,0
W. A. Streeter, .	. Westminster, .	. Marrow Meadow,	. 5,00
A. W. Pratt,	. Gardner,	. Bailey,	. 5,0
H. L. Curtie.	Gardner	Bailey.	. 5.0
Harry J. Paige	Gardner.	Wilder	5,0
Elmar F Sanjor	Gardner	Kneelend	. 5,0
A W. That-C.L.	Tralling.	Chi-l	5.0
A. W. Littleneid, .	. nonision, .	, Chicken,	. 9,0
George G. Leathe, .	. Gardner,	roster,	. 5,0
A. D. Norcross, ,	. Monson,	. Bumstead, Conant,	. 10,0
A. D. Norcross, .	. Wales,	. Cider Mill,	. 5,0
A. G. Moody.	1	1	1 .
harles H. Steerns	Northfield	Warwick Hart.	. 15.0
John Phelps,	Trottomuota, .		. 10,0
		i	1
Greenneid Sportsman	Northfield,	7	
Club,	. Northheld, .	. Louisiana, Panchaug, .	. 15,0
C. P. Abbott	. Groveland, .	. Morrill's	. 3,0
A. B. Robinson.		Wheeler	. 3.0
A. W Flve	Glovoester.	Alewife	. 3.0
C. P. Abbott,	Rockport	Morell's. Wheeler, Alewife, Wine,	3.0
	. Rockport,	File	
Edmond H. Smith, . James E. Bemis,	Feeding Hills,	Filo,	. 3,0
James E. Bemis, .	Gloucester, Rockport, Feeding Hills, North Sudbury,	. rantry,	. 3,0
•	1		I
	1		268,0

Fry distributed from the Winchester Hatchery during April, 1909.

APPLICANT.	Town.	Name of Brook.	Number
Phillip P. Conners	Lowell,	. Mendow,	5.000
Willis S. Holt,	Andover,	Hardy's	5.000
Henri E. Richardson	Westford	Hardy's, Snake Meadow,	5.000
Melvin G. Gooch,	Tewksbury, .	. Trull,	5.000
Harry L. Shedd	Tewksbury.	. Felker.	5,000
Fred E. Jones	Tyngsborough, .	Flint's,	5.00
	Chelmsford	Flint's, Crooked Spring,	5.00
T. H. Varnum, George W. Alcott,	Chelmsford.	. Black,	5,000
Caleb L. Smith.	Chelmsford.	Golden Cove,	5.000
S. J. Bigelow.	Chelmsford.	Swain's,	5.000
Charles E. Blaisdell.	Dracut.	Richardson	5,000
Herbert E. Tyler.	Weston,	Richardson,	5.000
Henry H. Watson.	Waltham,	Beaver,	5.000
Thomas H. Bruce.	Waverley,	Clomatic	5.000
C. A. O. Grip.	Waverley,	Clematis,	5.000
	Wellesley,		5.000
Fred W. Bean	West Peabody,	Indian Spring,	5.000
	West readouy, .	. Twist,	5.000
J. J. Kennedy,	Stoughton, .	. Dead Meadow,	
George B. Treen,	Mansfield,	Atwood,	5,000
Henry W. Cobb	Mansfield,	. Atwood	5,000
Charles P. Sprague,	Taunton,	. Flax Mill,	5,000
Leominster Sportsmen's	l .		
Association,	Leominater, .	. Moonoosnock, Lunenburg,	
,	1	Houghton,	20,000
[Ashby.	. Willard, Lock, Trap Falls,	
Fitchburg Sportsman's	Ashburnham, .	. Laws,	24.000
Club,)	Fitchburg,	Falulah, Shattuck,	22,000
	Shirley,	. Catacoonamue,	
E. Frank Blake,	Ashland,	. Cold Spring,	5,000
Charles E. Boyd	Mansfield,	Canoe River,	5,000
C. Minton Taylor,	_ `		5,000
E. H. Ives.			5,000
Heman A. MacDonald, .	Beverly Farms,	Bennett's,	5,000
Leslie K. Morse.	Haverhill	Hoyt.	5,000
R. M. Keith.	Bridgewater	Hoyt, Spiny,	5,000
Charles W. Davol.	Dighton	Spiny, Segregansett,	5.000
			189,000

Fingerling Trout Plants during Fall of 1909.

W. L. Taft,		Northbridge, .		Northbridge, .				1,000
W. L. Taft, C. V. Dudley,		Whitinsville, .	•	Burt. Purgatory.	F	rent	ice,	1,000
Basil E. Aldrich, .		Milford,		Bathrick, . Bungy, .	٠	•	•	1,00 500
W. F. Durgin,		Upton.	٠	Toft	•	•	- 5	
W. F. Durgin.			•	Taft,	•	•	- } [50
E. H. Kinnicutt.			•	<i>M</i>	•	•	7	50
			٠	rox,	•	•		
ames B. Hodder, .			•	Fox,	٠	•	- 1	50
Elmer A. Macker,			٠	Bummit,		•	. [50
Sdward C. Traver,	•	Upton						50
I. F. Despeaux, .		Upton,	٠					50
C. A. Barber,	•	Upton,		Warren,			- 1	50
E. A. Ludden,	1							
Geo. S. Dickinson,	}	North Brookfield,		Five-mile River,			.	1,50
A. P. Morin,				·			- 1	
R. E. Haskins, ,	1	ł	ſ	Tanny,			1	
C. H. Clark,	- 1 :	W B1-6-13	-]	Barrett,			- []	0.00
C. E. Bill,	1	West Brookfield,	1	Budish			11	2,00
J. G. Shackley			- 1	Tyler.	-			
Frank F. Bullard.		East Brookfield,	.`	Tyler, Great, Bond, Walker,			1	50
J. Frank Stone, .		East Brookfield.	•	Bond, Walker.	•	•	· 1	50
J. W. Barney	:	West Brimfield,	:	Quaboag River,	•	•	٠,	1,00
E. D. Atkins.		77	:	Cold Spring, .	•	•	:	1,00
George N. Gelley,	•		:	Taffs,	•	٠		50
H. H. Hosley, .			-	Osgood's,	•	•	- 1	50
n. n. nosiey,		East Frinceton,	٠	Disal Comme	•	•		50
Henry A. Ross.	•		٠	Black Swamp, .	٠	•	•	
Adelbert D. Thayer,	•		٠	Woodward, Uncas,	•	•		50
Henry U. Plympton, r. B. Stevenson, .	•	Millbury,		Sawmill Stream,	•	•		50 50

Fingerling Trout Plants during Fall of 1909 — Continued.

APPLICANT.	Town.	Name of Brook.	Numb
S. Callahan,	Fiskdale,	Hyland,	5
L. Houde,	Sturbridge,	Hobo,	5
om Pocai,	Southbridge.	Brickyard,	5
arl W. Ide	Southbridge,	Brickyard,	5
ufus B. Dodge	Worcester,	Tatnuck,	5
. L. Allen	Worcester,	Data	5
		Barber,	
enry E Dean,	Worcester,	Lincoln, Beaver,	1,0
. C. Dodge	Shrewsbury,	Wyman,	5
ohn F. Cummings, ving J. Johnson, oy R. Stimpson, G. McKnight,	Shrewsbury,	Rawson Hill,	5
ving J. Johnson,	Shrewsbury,	Wyman,	. 5
oy R. Stimpson.	Jefferson,	Mill	5
G. McKnight.	Westminster	Mare Meadow,	1,0
eorge F. Gehle, eeph D. Cadle, eorge W. Searle, harles H. Gehle, oward G. Noble,		1	
eenh D Cadle			1
come W. Sanda			i
corge w. Searle,		\	1
harles H. Gehle,		İ	
oward G. Noble, .		Timber Swamp,)	
rthur Foley.	Westfield, {	Canda Will	5.0
rthur Foley, dward G. Clark,		Sandy Mill,	1
rin E. Parke		1	1
F Shenerd		1	l
ichael F Sullium		1	l
F. Shepard, ichael F. Sullivan, harles N. Oakes,]	1
inhani Cultin	Chi	Cooler Poor	1
ichael Sullivan,	Chicopee	Cooley, Poor,	1,0
. H. Roberts,	Chicopee Falls,	Poor,	
a J. Humes,	Holyoke,	Tannery,	
ed Laduke,	Holyoke	Broad,	
M. Taylor,)		•	1
arry A. Bussell	Longmeadow,	Pecowsie,	1,0
arry A. Bussell, dmond H. Smith,	Agawam,	Filo,	۱ ،
harles S. Ballard,	Agawam,	1110,	
maries S. Dallard,	V	Guardia Delle Come	1 8
D. Norcross,	Monson,	Sutcliffe, Peck's, Conant,	٠.,
		Tupper Hill,	1,0
ſ	Leominster,	Moonoosnock,	t
eominater Sportsmen's {	Lunenburg,	Massapoag.	2,
Association,	Sterling,	Massapoag, Heywood, Chocksett,	
rthur Snow,)		,, ,	I
R. Eustace.			1
linton Gun Club,	Bolton,	Collins, Sheehan,	2,0
nium Gun Club, .	,		1 '
J. Tedford, C. Wheelock,	i . .		
C. Wheelock,	Lancaster,	Lewis,	1 -
G. Chickering.	Lancaster,	Shoeshank,	
ichael J. Powers			1
red R. Marsh,	Sterling,	Waushacum,	1
ohert A. Mason			1
alter P. Bowers,	West Berlin,	Clamshell,	1 .
ardinar I T		Clay	
ardiner L. Tarr,	Framingham,	D.m.st.	
rank D. Blake,	Ashland	Butcher,	
D. Phillips, .	Hopkinton,	Indian,	1
dward M. Prescott, .	Ashland,	Waushakum,	1
E. Eames.	Hopkinton, .	Cold Spring,	1
harles N. Hargraves, .	South Framingham, .	Angelica,	1 .
itchburg Sportsman's		1	1
Club, imes W. Boutell,	Lunenburg,	Mulpus,	2,
mes W Boutell	Athol,	Riceville,	*
. B. Newton,	Phillipston	Popula Camp	
. D. Mewion,	Phillipston,	Popple Camp,	i
verett King,	Phillipston,	Ellinwood,	1
seph Hamel,	Phillipston,	Sawyer,	
. L. Curtis,	Gardner,	Bailey, Marrow Meadow,	1
. A. Streeter.	Westminster,	Marrow Meadow,	Į.
. A. Streeter, . E. Goddard,	Westminster,	Perley,	1
yron R. Goddard.	Westminster,	Cook	}
K. Learned	Westmington	Reed	1
	Westminster,		1
H. Gates,	Westminster,	Perley	1
Stanley Lovell,	Westminster,	Foster,	1
illiam H. Doody.	Westminster	Ramsdell	1
Stanley Lovell, illiam H. Doody, P. O'Donnell,	Templeton,	Bourn and Hadley	1
armi H. Baker,	South Gardner, .	Nigger,	ł
W. Rogers.	Phillipston,	Brigham	
on D. Uneterell	Dhillington	Brigham, Gardner, Templeton,	i
eo B. Hartwell,	Phillipston,	Gardner, rempleton,	1
lbert J. Ray	Westminster,	Moores,	1
. L. Stratton,	Phillipston,	Phillipston Meadow,	1
1 A G 11	Ashburnham,	Black,	1 .
rank A. Gravlin, L. G. Howard,	ASHDUMANAM,		1 .

Fingerling Trout Plants during Fall of 1909 — Continued.

Applicant.	Town.	Name of Brook.	Numb
. W. Lombard,	Ashburnham,	Blodgett,	4
L. Hager,	Winchendon,	Carter's	4
Charles A. Merrill,	Winchendon,	Stockard,	4
C Needham	Oakham,	Coldbrook,	4
V. R. Dean,	Oakham	Tributary of Five-mile River, .	4
V. R. Dean, Gardner M. Dean, ohn H. Neff, Larold W. Robinson,	Oakham	Pratt,	4
obn H. Neff,	Ware,		4
iarold W. Robinson, .			4
red Sharpe,			4
D Schoonmaker			1 4
. H. Schoonmaker, L. W. Lawton,	1 [[1 4
lenry H. Hallock,	Hubbardston,	Natty,	1
harles E. Gee	North Dana,	Blackmer,	1
reenfield Sportsman's			1 -
Club	Greenfield,	Green River, Punch and others,	2,4
ohn S. Coates,	Greenfield	Wright's Mountain	4
Club,	Shelburne.	Taylor,	4
. S. Outhouse,	Charlemont,	Deerfield River,	4
G. Moody,	Northfield,	Louisiana, Pauchaug, Warwick, Hart,	4
	Northfield,	Warwick, Hart,	8
red E. Field,	Montague,	Coldbrook,	1 1
L. L. CLAPP,	Whately,	Posting	1 1
v. M. CRIUS,	Rowe,	Roaring, Hunt, Newell Farm,	1 3
L. Crafts,	1 AWHE,	TAGEN, MEWOR FAIRE,	1 4
Iomer Sherman,	Rowe,	Pelham Lake,	4
awson Ramage,	Monroe,	Dunbar	4
ohn N. Moore.	Orange,	Jones.	1 4
ohn N. Moore, I. H. Ramsey,	New Salem.	Middle Branch Swift River.	! 4
lufus T. Shumway, .	New Salem.	Moosehorn,	4
. H. Sawyer,	Hatfield.	Running Gutter	4
Rufus T. Shumway, L. H. Sawyer, Valter L. Stevens,	Whately, Sunderland,	West	1 4
leorge L. Harris,	Sunderland,	Welch	1 1
George W. Gilbert,	Sunderland,	Meadow,	1 4
ohn A. Crosier,	Sunderland,	Mohawk,	4
A. Shumway,	Williamsburg,	Bradford,	4
ohn N. Lyman, Vilfred Laro,	Easthampton,	North, Bassett's, Broad, Hammond,	8
V. A. Smith,	Easthampton, Goshen,	Highland,	3
ohn Doherty,	Goshen,	Hampshire,	3
. E. Hawks,	Goshen,	Packard,	4
I W Qmith	Goshen,	Rogers	1 4
W. Pettingill,	Cummington	Mitchell	4
V. S. Gabb, Burt F. Fellows, Fred D. Walker,	Cummington,	Nipping	4
Burt F. Fellows,	Belchertown,	Fuller's,	4
red D. Walker,	Belchertown,	Jabish, Thomas,	4
neurge m. rianer,	Belchertown,	Nipping, Fuller's, Jabish, Thomas, Jabish, Sodom,	1 1
R. Anderson,	Pelham,	COOK 8,	1 4
Royal W. Aldrich,	Pelham,	Amethyst,	4
.T. Mitten.	Amherst,	Swift River,	4
man i urue,	Pittsfield,	Schoolhouse,	1 1
Villiam Turtle, ames M. Burns, Iarold C. Leonard,	West Pittsfield	Shaker,	1 3
L. H. Gamwell,	Pittsfield,	Schoolhouse,	
I. J. Coughlin.) }
. L. Hargreaves.	North Adams,	South Branch Hoosic,	
. B. Millard,	North Adams	Hudson,] 4
B. Millard,	Florida,	Cole River,	1 4
homas H. Hughes	Adams,	Tophet,	4
O. Hicks,	Adams,	Dean,	1 1
alter B. Sanford,	Great Barrington,	Seekonk, Alford,	1 8
lomer E. Foote.	Great Barrington, .	Seekonk,	1
. C. Bidwell,	Monterey,	Old Center, Harmon,	8
H Clarico	Dalton,	Barton,	4
. A. CLAFESCY, [T. Ouinlan	Dalton,	Cleveland,	4
J. C. Bidwell,	West Stockbridge,	Egypt,	1 4
F. Brennan	Russell,	Blacka	1 3
J. F. Brennan, V. J. Cross,	Becket.	Blacks,	1 4
H Martin	Reading,	Willow,	1,2
C. A. O. Grip,	Weston,	Severance,	1 7
. H. Bruce,	Weston	Severance, Cherry,	8
	Weston,	Cherry,	4

Fingerling Trout Plants during Fall of 1909 — Concluded.

H. Whitcomb, Hartwell Whitcomb, corge M. Fitch, outs Pleiffer, corge E. Wilkins, alate Burkes, larry E. Hersam, Stonaham, Cold, Hudson, Hog, Walter Snith, ierre Gregoire, larry L. Shedd, Thusbon, Hudson, Hog, Walter Snith, ierre Gregoire, larry L. Shedd, Tewksbury, Willis S. Holt, Frank Blake, erbert Tyler, alph H. Hosmer, H. Hilton, bert W. Littlefield, bert W. Littlefield, Bert W. Littlefield, more H. Robinson, Georgetown, Lephen H. Sinclair, West Pabody, Norris, harles H. Preston, Verett T. Guilford, Rowley, Batchelder, West Pabody, Norris, harles H. Preston, verett T. Guilford, Rowley, Batchelder, West Medway, Lone Star, D. Searles, L. Freeman, R. Medway, Lone Star, L. Freeman, R. Medway, L. Me	APPLICANT.	Town.	Name of Brook.	Numb
H. Whitcomb, Hartwell Whitcomb, corge M. Fitch, outs Pleiffer, corge E. Wilkins, alate Burkes, arry E. Hersam, Stonaham, Cold, Husson, Hog, Walter Snith, ierrs Gregoire, larry L. Shedd, Take,	rank J. Knight.	Townsend.	. Wallace.	. 4
seorge M. Fitch, outs Pleiffer, eorge E. Wilkins, Carlisle, Aiter Burkes, arry E. Hersam, Stoneham, Sweetwater, C. Chenay, Hudson, Hog, West Pandover, Hardy's, Larry L. Shedd, Hudson, Hog, West Andover, Hardy's, Larry L. Shedd, Tewksbury, Killis S. Holt, harles F. McCarthy, Ashland, Sudbury River, Johnson, Brank B. Kolliston, Holtson,	. H. Whitcomb, . . Hartwell Whitcomb,	1.	•	
sorge E. Wilkins, dater Burkes, arry E. Hersam, Stoneham, Sweetwater, C. Chensy, C. Chensy, Morth Acton, Cold,	eorge M. Fitch.	,	·	
Alter Burkes,	ouis Pleiffer,			
Stoneham, Sweetwater, Ocid., Swalter Smith, Serre Gregoire, Tyngborough, Gregoire's, Early L. Shedd, Tewkabury, Felker, Smith, Shedd, Tewkabury, Felker, Smith, Shedd, Tewkabury, Hardy's, Milham, Shedt, Shedd, She	Alter Burkes	Carnele,	nms.	
Walter Smith, ierre Gregoire, larry L. Shedd, likins S. Hotz, S. West Andover, Hardy's, Harles F. McCarthy, Ashland, Marlborough, Sudbury River, Johnson, erbort Tyler, alph H. Hoemer, H. Hilton, Bert W. Littlefield, dward H. Yeston, Georgetown, Georgetown, Jackman, artin Carr. (Solinson, Larin Carr. (Middleton, Pine, Sophen H. Sinclair, avid G. Wheeler, Middleton, Proor's, avid G. Wheeler, Morest T. Guifford, H. O'Brien, Rowley, Batchelder, Down, R. Georgetown, H. A. MacDonald, Beverly Farms, Sawmill, L. R. Groesbeck, Saugus, Little River, Cold Spring, Larry D. Phillips, West Medway, Hopping, Method, West Medway, Black Swamp, Arary D. Phillips, West Medway, Black Swamp, South Franklin, Country Club, Woodards, Pranklin, Country Club, Country Clu	Larry E. Hersam,			. 4
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ierre Gregoire, larry L. Shedd, Tewksbury, West Andover, Hardy's, harles P. McCarthy, Marlborough, S. Fank Blake, lerbert Tylener, alph H. Hoemer, Sudbury, Clark Pasture, Overbound, Bert W. Littlefield, dward H. Yeston, Georgetown, Jackman, Lartin Carr., lephen H. Sinclair, Middleton, Poor's, Norris, Lartin Carr., lephen H. Sinclair, Middleton, Poor's, Norris, Lartin Carr., Lar	lenry P. Andrews,	Hudson,	. Hog,	
Mills S. Hott, harles F. McCarthy, farlborough, ashland, sudbury River, Johnson, elerbert Tyler, alph H. Hoemer, sudbury, Clark Pasture, Overbound, H. Hilton, Holliston, Holliston, Overbound, H. Hilton, Middleton, Middleton, Poor's, Nariborough, Ashland, Sudbury River, Johnson, Jackman, Jac	Walter Smith,	Typeshamush	Grandino's	
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H. Hilton, blort W. Littlefield, dward H. Yeaton, Georgetown, Georgetown, Jackman, J	Frank Blake,	Ashland,	. Sudbury River, Johnson,	
H. Hilton, blort W. Littlefield, dward H. Yeaton, Georgetown, Georgetown, Jackman, J	elph H Hosmer	Sudbury	Clark Pasture	
lbert W. Littlefield, dward H. Yesaton, moe B. Robinson, Georgetown, Jackman, Jackma	H. Hilton.			
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R. Groesbeck, Saugus, Little River, Cold Spring, Jyde C. Hunt, Medway, Gurney's, Tthur LeB Treen, West Medway, Hopping, Chicken, D. Searles, South Franklin, Woodards, Pranklin, Woodards, Pranklin, Country Club, Woodards, Pranklin, Prank	verett T. Guilford, .	Rowley,		
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South Franklin, Country Club, Woodards, Franklin, Sharon, Beaver, Sharon, Beaver, Noanet, Sand Hill, J. Kennedy, Stoughton, Dead Meadow, Spring, Scobb, Mansfield, Spring, Mullen Hill, Puscott W. Tisdale, Lakeville, Mullen Hill, Lakeville, Holloway, Cornell, Lakeville, Holloway, Mestport, Broad and Cheese, Noquechoke, Lakey, Noquechoke, Lakey, Rank M. Chaoe, Assonet, Rank M. Chaoe, M. Cha	larry D. Phillips,	West Medway,	. Chicken,	
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F. McMahon, J. Kennedy, Stoughton, Dead Meadow, J. Kennedy, Stoughton, Dead Meadow, J. B. Treen, Mansfield, Spring, Sp	eorge B. Ames	Dover,	Noanet.	
ames Burke, Lanley A. Aldrich, Rochester, Doggett, Broad and Cheese, homas Taylor, Westport, Broad and Cheese, homas L. Lewis, Westport, Noquochoke, Tank M. Chace, Assonet, Ledge, Millford, Gardner, Swansea, Millford, Gardner, Swansea, Swan Lake, Tanklin S. Simmons, Somerset, Hathaway's, "illiam H. Smith, South Hadley, Elmer, Bachelor, sanuel S. Corayer, Brockton, Montello, Beaver, State Farm, Stockwell, Bridgewater, State Farm, State	F MaMahan		. Sand Hill,	. 4
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rank M. Chaoe, swansea, Millford, Gardner, Swansea, Swan Lake, ranklin S. Simmons, Somerset, Hathaway's, Elmer, Bachelor, Stank Stockwell, Auburn, Stone's, Montello, Beaver, Brockton, Montello, Beaver, State Farm, State Farm, State Farm, More, Morse, Haverbill, Whittier, Bryant's, 1.3, Morse, Haverbill, Whittier, Bryant's, 1.4, Morse, Hawerhill, Whittier, Bryant's, 1.5, Morse, Hawerhill, Whittier, Bryant's, 1.5, Morse, Hawerhill, Whittier, Bryant's, 1.5, Morse, G. Tenney, Williamstown, Hemlock, 1.6, Morse, G. Tenney, Williamstown, Hemlock, 1.6, Morse B. Clark, Carver, White Spring, 1.6, Morse F. Brown, Sutton, Smith, 1.6, McDonald, 1.6, Morse F. Foote, Great Barrington, Seekonk, 1.6, Marles T. McMahon, Randolph, Milltown, Spring, 1.6, Marles T. McMahon, Randolph, Milltown, Spring, 1.6, Morsen, Morsen, Morsen, Miltown, Spring, 1.6, Morsen, Morsen, Morsen, Morsen, Miltown, Spring, 1.6, Morsen, Morsen, Morsen, Morsen, Miltown, Spring, 1.6, Morsen, Morsen, Miltown, Spring, 1.6, Morsen, Morsen, Miltown, Spring, 1.6, Morsen, Miltown, Spring, 1.6, Morsen, Morsen, Miltown, Spring, 1.6, Morsen, Miltown, Spri	tanley A. Aldrich, .	Kochester	. Doggett,	
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. W. Fiske, . Swansea, . Swansea, . Swan Lake, . Isthaway's, . South Hadley, . Stone's, . South Hadley, . Stone's, . Stone Farm, . Stone River, . Sassett, . 1, . Sassett, . 1, . Stones Gross, . Worcester, . Seaver, . Whitte Spring, . Stone Lake, . Stone Farm, .	Thoid i) (ierdner	Swansea,	Millford, Gardner,	
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eshe R. Morse, Haverhill, Whittier, Bryant's, lenry B. Davis, Harwich, Doane River, 1. Doane River, 1. Harwich, Homas H. Hughes, Adams, Bassett, 1. G. Tenney, Williamstown, Hemlock, 1. G. Tenney, Worcester, White Spring, 1. Goese Grose, Worcester, Beaver, 1. Goese Grose, Worcester, Beaver, 1. Goese F. Brown, Sutton, Smith, 1. Gilliam Turtle, Cheshire, McDonald, 1. Grafton, Newton, 1. Grafton, Newton, 1. Grafton, Newton, 1. Grafton, Newton, Miltown, Spring, 1. Grafton, Miltown, Miltown, Spring, 1. Grafton, Miltown, Miltown, Spring, 1. Groman Barstow, New Bedford, Paskamansett, 1. Groman Barstow, New Bedford, Paskamansett, 1. Grown's, 1. G. Putnam, Spencer, Howe, 1. Grown's, 1. Grow	sauk Stockwell,			
eshe R. Morse, Haverhill, Whittier, Bryant's, lenry B. Davis, Harwich, Doane River, 1. Doane River, 1. Harwich, Homas H. Hughes, Adams, Bassett, 1. G. Tenney, Williamstown, Hemlock, 1. G. Tenney, Worcester, White Spring, 1. Goese Grose, Worcester, Beaver, 1. Goese Grose, Worcester, Beaver, 1. Goese F. Brown, Sutton, Smith, 1. Gilliam Turtle, Cheshire, McDonald, 1. Grafton, Newton, 1. Grafton, Newton, 1. Grafton, Newton, 1. Grafton, Newton, Miltown, Spring, 1. Grafton, Miltown, Miltown, Spring, 1. Grafton, Miltown, Miltown, Spring, 1. Groman Barstow, New Bedford, Paskamansett, 1. Groman Barstow, New Bedford, Paskamansett, 1. Grown's, 1. G. Putnam, Spencer, Howe, 1. Grown's, 1. Grow	oland M. Keith.	Bridgewater.	State Farm	. 1 .
homas H. Hughes, Adams, Bassett, 1,6 G. Tenney, Williamstown, Hemlock, 1,6 corge B. Clark, Carver, Worcester, Beaver, 1,6 obert F. Brown, Sutton, Smith, 1,6 illiam Turtle, Cheshire, McDonald, 1,1 iram L. Reynolds, Grafton, Newton, 1,6 harles T. McMahon, Randolph, Milltown, Spring, 1,6 harles B. Jerome, Stockbridge, Muddy, 1,6 M. Jacot, New Bedford, Paskamansett, 1,6 rthur L. Nason, Haverhill, Brown's, 1,6 D. Putnam, Sponeer, 1,6 Hemlock, 1,1 Members, 1,1 McDonald, 1,1 McDonald, 1,1 Milltown, Spring, 1	eslie K. Morse,	Haverhill,	. Whittier, Bryant's,	. 1,3
G. Tenney, Williamstown, Hemlock, 1,6 eorge B. Clark, Carver, White Spring, 1,6 oees Grose, Worcester, Beaver, 1,6 obert F. Brown, Sutton, Smith, 1,6 mer E. Foote, Great Barrington, Grafton, Newton, 1,6 iram L. Reynolds, Grafton, Newton, 1,6 harles T. McMahon, Randolph, Milltown, Spring, 1,6 harles B. Jerome, Stockbridge, Muddy, 1,6 orman Barstow, New Bedford, Paskamansett, 1,6 thur L. Nason, Haverhill, Brown's, 1,6 D. Putnam, Spencer, 1,6 Mose, 1,6 Mo	enry B. Davis,	Harwich,	Doane River,	
eorge B. Clark, obest Gross, obest Gross, obest F. Brown, obest Gross, obest F. Brown, obest F. Gross, obest F. Brown, obest F. Gross Burton, obest F. Gross Burton, obest Gross Burrington, obest Gross Burrin	homas H. Hughes, .	Adams,	. Basett,	
obert F. Brown, Sutton, Smith, 1,4 illiam Turtle, Cheshire, McDonald, 1,4 omer E. Foote, Great Barrington, Seekonk, 1,4 iram L. Reynolds, Randolph, Newton, 1,4 harles B. Jerome, Stockbridge, Muddy, 1,6 M. Jacot, Stockbridge, Muddy, 1,6 orman Barstow, New Bedford, Paskamansett, 1,6 rthur L. Nason, Haverhill, Brown's, 1,6 D. Putnam. Spencer, Howe, 1,6	orma B. Clark	Corver		
obert F. Brown, Sutton, Smith, 1,4 illiam Turtle, Cheshire, McDonald, 1,4 omer E. Foote, Great Barrington, Seekonk, 1,4 iram L. Reynolds, Randolph, Newton, 1,4 harles B. Jerome, Stockbridge, Muddy, 1,6 M. Jacot, Stockbridge, Muddy, 1,6 orman Barstow, New Bedford, Paskamansett, 1,6 rthur L. Nason, Haverhill, Brown's, 1,6 D. Putnam. Spencer, Howe, 1,6	oses Gross.	Worcester.		. i i i
illiam Turtle, omer E. Foote, omer E. Foote, iram L. Reynolds, Grafton, . Great Barrington, . Seekonk, . 1, . iram L. Reynolds, Grafton, . Randolph, . Milltown, Spring, . 1, . harles B. Jerome, . Stockbridge, . Muddy, . 1, . M. Jacot, . Stockbridge, . Muddy, . 1, . orman Barstow, . New Bedford, . Paskamansett, . 1, . Tthur L. Nason, . Haverhill, . Brown's, . 1, . D. Putnam Spencer, . Howe, . 1.	obert F. Brown	Sutton,	. Smith,	. 1,0
rram L. Reynolds, harles T. McMahon, harles B. Jerome, M. Jacot, M. Jacot, Orman Barstow, New Bedford, Church, D. Putnam, Spencer, Leynolds, Paskamansett, Leynolds, Leynolds, Paskamansett, Leynolds, Paskamansett, Leynolds, Paskamansett, Leynolds, Paskamansett, Leynolds, Leynolds, Paskamansett, Leynolds, L	'illiam Turtle	Cheshire,	. McDonald,	. 1,0
harles B. Jerome, Stockbridge, Muddy, 1,6, M. Jacot, Stockbridge, Muddy, 1,6, orman Barstow, New Bedford, Paskamansett, 1,6 rthur L. Nason, Haverhill, Brown's, 1,6, D. Putnam. Spencer, Howe, 1,6,	omer E. Poote,	Great Barrington,	. Seekonk,	-] 1,0
harles B. Jerome, Stockbridge, Muddy, 1,6, M. Jacot, Stockbridge, Muddy, 1,6, orman Barstow, New Bedford, Paskamansett, 1,6 thur L. Nason, Haverhill, Brown's, 1,6 D. Putnam, Spencer, Howe, 1,6	irani L. Reynolds, harles T. McMahon	Randolph	Militown Spring	1 112
M. Jacot, Stockbridge, Muddy, 1,6 orman Barstow, New Bedford, Paskamansett, 1,6 thur L. Nason, Haverhill, Brown's, 1,6 D. Putnam, Spencer, Howe, 1,6	harles B. Jerome.	Stockbridge.	Muddy.	[] \ i?
orman Barstow, New Bedford, Paskamansett, 1,0 rthur L. Nason, Haverhill, Brown's, 1,0 D. Putnam, Speencer, Howe, 1,0	. M. Jacot,	Stockbridge, .	. Muddy	. i i i
rthur L. Nason,	orman Barstow,	New Bedford, .	. Paskamansett,	. 1,0
Enry S. Davis, Spencer, Howe, 1,0 Boyle, Flat, 1,0	rthur L. Nason,	Haverhill,	. Brown's,	.] 1,0
enry S. Davis, ware, Boyle, Flat, 1,t	. D. Putnam,	Spencer,	. Howe,	. 1,0
	enry S. Davis,	ware,	. Doyle, Flat,	. 1,0

Ponds stocked and closed in Accordance with Chapter 91, Section 19, Revised Laws, as amended by Chapter 274, Acts of 1903, and further amended by Chapter 306, Acts of 1907.

Name (OF I	Pone). 	To	wn.			Rainbow Trout Finger- lings.	Brown Trout Finger- lings.	Adult White Perch.
Moore's,				Warwick, .				900	-	_
Gravel, .				Hamilton, .		•		-	800	_
				Upton, .				-	1,000	-
Vabnasset,				Westford, .				900	- 1	-
Iarris, .				Methuen, .				1,000	-	-
itetson, .				Pembroke, .				-	900	500
Kelley's.				Dennis, .			.	-	900	_
North				Orange, .			. 1	-	1,000	_
dartin, .				North Readi				- i	800	200
Valden.	-	_		Concord			. !	900	-	500
rospect Lake,				Egremont, .				-	1,000	-
								3,700	6,400	1,200

PONDS RESTOCKED DURING THE YEAR 1909.

Name of Pond.	Town.			Brook Trout Finger- lings.	Brook Trout Adults.	Rainbow Trout Finger- lings.	Brown Trout Finger- lings.	Land- locked Smelt Eggs.
Lake Nagog, Lake Massapoag, Lake Scargo, Lake Quinsigamond, North Pond, Wales Pond, Reservoir Pond, Lake Singletary,	Acton, . Sharon, Dennis, Worcester, Worcester, Wales, . Holyoke, Sutton,			1,000	250 - - 343 593	800	1,000 900 	500,000

RIVERS STOCKED WITHOUT FURTHER ACTION.

Name of River.	Town.	Brook Trout Adults.	Brown Trout Finger- lings.	Brown Trout Adults.	White Perch.
Quinsigamond, Charles River, Charles River Basin,	Worcester,	225 255	4,000 3,500	- - 75	- 475
		480	7,500	75	475

[C.]
DISTRIBUTION OF PHEASANTS.

APPLICANT.				Town.	Number.
George Brinscombe, .				North Grafton,	6
M. A. Witham.				North Grafton	6
M. A. Witham, F. E. Wallace,				Westborough,	6
F. F. Bullard.				East Brookfield	6
P. S. Callahan, George B. Treen, Bradley M. Rockwood, W. F. Durgin, Harry F. Pierre, Clyde C. Hunt				Fiskdale,	6
George B. Treen				Mansfield	8
Bradlev M. Rockwood,				Franklin,	8
W. F. Durgin				Hopedale,	
Harry F. Pierce				Hopedale,	10
Clyde C. Hunt				Medway,	10
Harry D. Phillips				West Medway	10
Clyde C. Hunt,					8
C. J. Kelly, Ralph B. Dodge, Leander F. Herrick, Bernard W. Stanley, Lames H. Grimes				Taunton,	8
Ralph B. Dodge				Worcester	10
Leander F. Herrick				Worcester,	9
Bernard W. Stanley.					8
				West Acton	10
James A. Baxter.	·			Reading,	8
I. Pfeiffer, Jr				Bedford	10
James A. Baxter, I. Pfeiffer, Jr., J. A. Williams, Lawson A. Seagrave, Labn Parkinger			_	Reading,	10
Lawson A. Seagrave, John Parkinson, Thomas S. Lockwood, F. P. Smith		-		Uxbridge,	10
John Parkinson.				Boston,	
Thomas S. Lockwood.			Ċ		10
F. P. Smith,	·	•			1 10
F. P. Smith, Richard H. Bond, .	•	•	:	Dedham,	10
Richard W. Hale	•	•	:	Dover	10
Richard W. Hale, George E. Patterson,	•	•	•	Salem	10
S. H. Sinclair.				Salem	1 7.2
H. T. Drew.		·	•	Salem,	10
H. T. Drew, William F. Scholz, .		•	•		10
E. K. Dyer,				Lawrence,	1 7.1
John Bradbury	•	•	•	Lawrence,	
John Bradbury, . Leslie K. Morse, .		•	Ċ	Lawrence,	1
H. A. Smart,	•	·			1
O B Tarbox	·	•	•	Byfield,	1
O. B. Tarbox, E. R. Sandford,		•		C 41 D C - 1 - 1	10
T. C. Wilson,			•	Ipswich.	
D H O'Brien	•	•	•	Rowley,	1
Fred D Rutler	•	•	•	i meu c'il	
D. H. O'Brien, Fred D. Butler,	•	•	•	Great Barrington,	1 -
nomer E. Foote, .	•	•	•	Great Darrington,	8

Distribution of Pheasants — Concluded.

Applicant.				Town.		Number
Fred M. Truesdell, .				Great Barrington.		8
Samuel Newell				Great Barrington,		8
S. G. Tenney,						8
Dr. Upton				Shelburne Falls,	· .	8
A. B. Rose.		•		Miller's Falls, .		8
E. W. Strecker				Greenfield, .		8
John H. Neff,		-		Ware.		8
John H. Neff, Edward J. Brannigan,				Ware, Ware, West Medway, West Medway		8
Stephen D. Phillips.	-	_		West Medway.		8
Stephen D. Phillips, . E. L. Freeman, . William P. Pierce, .		_				8
William P. Pierce.	•			New Bedford,		10
Albert W. Lewis, .			Ċ	North Dartmouth,		10
William H. Seaman.	-		-	Fall River, .		10
William H. Seaman, . William H. Gifford, .	-		·	Westport Point,		10
Franklin S. Simmons,				Somerset,		10
Lewis I. Tucker.		•	Ĭ.			10
Lewis I. Tucker, . Herbert E. Guy, .			·	Brockton,		10
Herbert E. Guy, Manuel S. Corayer,	-			Brockton,		10
Charles S. Baker,	·		•			10
Jonathan H. Jones.			·	Waquoit.		10
Jonathan H. Jones, . Harry W. Plympton,	•	•		Waquoit, Sutton,		10
T. B. Stevenson, .	·			Manchaug		ĩŏ
Henry E. Dean	•	Ċ	Ū			10
Henry E. Dean, Charles H. Goodell, .	•	•	•	Worcester, .	•	8
Frank Stockwell, .	•	•	•	Auburn,	•	8
H E Carfield		•	•	***		8
Francis B Greene	•	•	•	New Bedford, .	•	8
A T Mitten	•	•	:	Amherst,		8 8
Francis B. Greene, A. T. Mitten, Bernard W. Stanley,	•	•				8
A M Allen	•	•	•	Reading		8 7 7
A. M. Allen, Frank J. Knight, .	•	•	•	Reading Townsend, .		7
Ragil F Aldrich	•	:	•	Milford,		7
F H Kinnioutt	•	•	•	Blackstone, .	• •	7
F A Moulton	•	•	•	Chester,	• •	8
Basil E. Aldrich, E. H. Kinnicutt, F. A. Moulton, Norman Shannon,	•	•		Chester,	• •	8
Clarence C. Puffer, .	•	•				3
Clarence C. Fuller, .	•	•	•	, DIOCKIOII,		
						668
						500

[D.]

DISTRIBUTION OF BELGIAN HARES.

The distributing of Belgian hares has been discontinued. We hope next year to report the distribution of native game and insectivorous birds.

[E.] ARRESTS AND CONVICTIONS.

Report upon Convictions, Fines, etc., for Violations of the Fish and Game Laws.

Town or City. Offence.	Town or City.	STATE 1
w Bedford, where the second of	New Bedford, New Bedford, New Bedford, Lynn, Lynn, Lynn, Revere, Revere, Revere, Revere, Lynn, Lynn, Lynn, Lynn, Lynn, Lynn, Lynn, Lynn, Lynn, New Bedford,	Innuel Crug, Innue Costa, Innue Costa, Innue Gravalho, Innue A. Neal, Innue A. Neal, Innue A. Neal, Innue A. Wilson, Ilexander Rose, Ilbion F. Simson, Ideander Rose, Ilbion F. Simson, Innuel Correia, Ired J. Gaouatte, Innuel Correia, Innuel Laratmeux, Iredone Ilearatmeux, Intone Sylvia, Innuel Correia, Innuel Laratmeux, Intone Sylvia, Innuel Laratmeux, Intone Sylvia, Innuel Costa, Innuel Laratmeux, Innuel

Report upon Convictions, Fines, etc., for Violations of the Fish and Game Laws - Continued.

STATE F. — Town or City.
nard Belif, h Conrad. hull, h Conrad. Hull, h Hull, h Hull, h Cummines. Bull, h Cummines. Hull, h Chelsea, chelsea, hel Daly. Hull, helf Pachero, hel Bedford, hew Bedford, he Highard, hew Bedford, hew S. Savage, he Cheever, he Chever, hew Bedford, hew Waugh, hew Bedford, hew Waugh, hew Bedford, hew Waugh, hew Waugh, hew Bedford, hew Waugh, hew Bedford, hew Waugh, hew Bedford,

Octave Arsens, Antone Rapora, Oliver LeMoore, Antone Santos, Manuel Sylvia, Henry Ferrisa, Jose Leinhares, Achilla Carson, Sylvester Richards, New Bedford, Patrhaven, New Bodford, Patrhaven, New Bedford,	Taking shellfish in violation of \$ 114, c. 91, R. L., also c. 285, Acts of 1907,	Convicted, 10 00 340 of this fine remitted. Convicted, 5 00 Convicted, 5 00 Convicted, 10 00 C
Charles Adams, Arthur Scudder, Talunton, Trhomas Connell, H. L. Nixon, Daniel L. Reynolds, Trauben, Tony Rosco, Tony Rosco, Tony Rosco, North Adams, Muliard, Muliard, Muliard, Muliard, Muliard, Muliard, Tonroy, Trauben,	Hunting on Lord's Day in violation of § 1 c. 92, R. L., as amended by c. 176, Act, of 1904,	Convicted, 10 00 Discharged, -
Joseph Carroso, Edward Mali, Fred L. Clark, Irving F. Cates, Abiel J. Plummer, Arthur Harris, Dama Gillingham, Edson S. Cowen, Edgar Howland, Rockinad, Rockinad,		Convicted

Report upon Convictions, Fines, etc., for Violations of the Fish and Game Laws - Continued.

STATE P	Town or City.	Offence.	Court Decision.	Fine.	Remarks.
Charles Johnson, Jeorge Wright, Jeorge Small, Semuel Croak, Jeorge H. Bowen, Jelix St. Orate, Jelix J. Jeli	Ipswich, Hillerica, Billerica, Billerica, Bandisfisid, Winchendon, Winchendon, Mariborough, Mansfield, Tmunton, Sheffield, Blackstone, Hiackstone, Blackstone, Scituate, Scituate, Woburn, Enfield, Enfield, Enfield, North Spencer, Paston, Paston, Paston, Paston, Paston, Paston, Paston, Crange, Scituate, Scituate, Woburn, Enfield, Sorth Spencer, Paston, Paston, Paston, Orange, Scituate, Scituate,	Hunting on Lord's Day in violation of § 1, c. 92, R. L., as amended by c. 176, Acts of 1904.	Convicted,	\$10 00 10 00	Filed. Did not pay; went to jail. Filed: paid costs court, sixty cents.
Alfridio Tommicio, Charles G. Nelson, Edward F. Hicks. Eurico Dente, Frank Santio, Tony Bosen, Augustus Mossenid, Salvatois Mussenid, Salvatois Mussenid, Charles Cameau,	Milford, Worrester, Dedbarn, Framingham, Chester, North Adams, Lawrence, Lawrence, Swam peocit,	Aliens hunting without license in violation of c. 317, Acts of 1905, as amended by c. 492, Acts of 1908,	Convicted,	10 00 10 00 10 00 10 00	Filed. Filed. Also conts of court, \$2.60. Filed.

Gastano Privistora, Raffael Depantes. Mika Musameri. Ralph Toran, Michael Finaguari, James Chapman, Antonio Romane, Thomas G. Maloof, Joseph Santospirito, Emanuel Rando, Soldoni Caldoni, Charles Deboevere, James Gabriele, Emilio Basile, Alfred Procari, Toney Montague, Angelo Masulla, Felir St. Unge, John Kabarshitz, Andrew Buffo, Frank Mack, Bragio Falo, Onorie Molle, Andriano Sabbatturi,	Lawrence, Springfield, Lawrence, Somerville, Springfield, Manafield, Manafield, Norton, Boston, Marlborough, Marlborough, Boston, Lawrence, Orange, Stoughton, Leominster, Leominster, Leominster, Marlborough, Taunton, Sheffield, Leominster, Mariborough, Taunton, Sheffield, Leominster, Scituate, Marion, Milford,	Aliens hunting without license in violation of c. 317, Acts of 1905, as amended by c. 492, Acts of 1908,	Discharged, 10 00	Filed.
Affridio Tommicio, Charles Isbo, Frank W. Parmenter, Gilbert Barnes, Woodrow Bausett, William G. Roberts, Edson H. Rowman, Aubrey Steen, Melvin J. Dillon, William Willard, Samuel Smith, Homer B. Smith, Joseph Thomas, Gordon Bourque, Charles Arnold, John W. Downs, John J. Berry, Horace W. Athesru,	Mülford, West Warren, Concord, Springfield, Springfield, Boston, Westport, Revere, Boston, Longmendow, Springfield, Boston, Revere, Revere, Revere, Revere, Revere, Revere, Revere, Rittsfield, Sandwich, West Tisbury,	Residents hunting without license in violation of c. 489, Acts of 1908,	Convicted, 10 00 Discharged, 10 00 Discharged, 10 00 Convicted, 10 00 Discharged, 10 00 Convicted, 10 00 Discharged,	Filed. Filed.

[Dec.

Report upon Convictions, Fines, etc., for Violations of the Fish and Game Laws - Continued.

STATE F.	Town or City.	Offence.	Court Decision.	Fine.	Remarks.
ohn Henry, outs DeScous, Jaarles Tebo, Jaarles Tebo, Jewin Carlson, Jearles A. Rono, Jeans Birrache, Villiam Amero, tepben H. Bohanson, ultan H. Hood, Jaarles A. Darryll, Jimer A. Harris, Joward Crows.	Springfield, Full River, Full River, Wat Warrett, Worsmiter, Marlborough, Northorough, Northorough, Someret, Werester, Reading, Resking, Reliaboth, Fairhuven,	Killing pheasant in violation of c. 309, Acta of 1909,	Convicted, Convicted,	\$10 00 10 00 10 00 20 00 5 00 5 00 20 00 20 00	Filed. Filed. Filed: paid costs of court, \$3.10
Nicholas Skidders, Henry G, Williams, Harold O, Young, Peter Carricchii, Frank L, Kinnessi, William Williams, Soldmii Galdoni, Petrick J, Coyms, Harold Booth, Lawrence Gale, Thomas Sansens,	Chelmsford Centre, Walpole, Foxborough, Melrose, Clinton, Westfield, Boston, Charlemont, Charlemont, Springfield,	Killing of, or possession of, gray squirrels in	Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted,	10 00 2 00 	Filed.
Bilford Geskill, Villiam G. Chrk, Charles Blanchard, Jurbert Learned, ohn Kalenshitz,	Charlemont, Watertown, Franklin, Bernardston, Pittsfield, Taunton, Holliston, Leominster, Orange,		Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted,	10 00 10 00 10 00 10 00 30 00 10 00 10 00 10 00	Filed.

mes Serina,		11	East Saugus, East Saugus,			Convicted, Convicted.	:1	100 00	
hn W. Avant.		0	Santuit.			Convicted.		100 00	1
varies N. Collins.		1	Mashpee,			Convicted.		100 00	
Monce Avant.		3.1			1		9	100 00	1
thur Johnson,		1	Santuit,	1 1		Convicted,			
	+		Malden,			Convicted,	100	100 00	
nes Seott,			Boston,			Convicted,		100 00	
d Dill,			Omerville,			Convicted,	+	100 00	
hur P. Oakley,			Mashpee, .			Convicted,		100 00	Transition of the Control of the Con
nes Pelkey,		0	Florida.		Hunting, wounding or killing deer in viola-	Convicted,	4.0	No.	Filed.
suncey Burdick.		. 1	North Adams.		nunting, wounding of killing deer in viola-	Convicted,		100 00	5.55
bur C. Andrews.		.	Topsfield,	100	tion of § 17, c. 92, R. L., as amended by c. 377, Acts of 1908, and c. 396, Acts of 1909,	Convicted,		100 00	All the second s
rold K. Howes,		31	Ashfield,	3	c. 377, Acts of 1908, and c. 396, Acts of 1909,	Convicted.		-	Filed.
ron E. Harris,	4	- 1	Florida,		The second secon	Discharged,	-	- 2	- mour
from Kennedy,			Leominster,			Discharged,		207	
sodgre P. Tower,			Cummington,		1			10 00	
dinand de Jony	*					Convicted,		25 00	Assistant and the same of the same
	*	*	Bellingham.	e .		Convicted,			Appealed; withdrew and paid.
land F. Chaffee.			Seekonk,			Convicted,		20 00	Many Property and a second second second
ges Giroux,			North Adams,			Discharged,	1.0	-	
liam Lauderville,	4		North Adams,			Convicted,		10 00	
in Hourassa,		7.1	North Adams,			Convicted,		10 00	
Charlmonu, ,		. 1	North Adams.			Convicted.		10 00	
orge C. Locke,		. 1	Everett,		100	Convicted,	201	10 00	
ion K. Sylvis.		1511	Nantucket,		Shooting gulls or terns in violation of § 5,	Convicted,	201	10 00	
isoppe Luca,		10	Lynn,		c. 92, R. L., as amended by c. 414, Acts of	Convicted.		-	Filed.
alli G. Rocco.	,	1	Lynn, .		1905, and c. 506, Acts of 1909,	Convicted.		10 00	A nou.
Imniel C. Bartlett.		. 1	Holliston,	9 9		Convicted,		10 00	Filed to prevent criminal record
	+				Setting traps, snares, etc., in violation of				
arles Comesu.	*		Swampscott,	- X	11, c. 92, R. L., as amended by c. 241,	Convicted,	11.		Filed.
um G. Sumner,			Fexberough,		Acta of 1906.	Convicted,		10 00	
nk Rudolph,	4	4	Brockton,			Convicted,		20 00	
A. Gordon.	4		Swamen.		Interfering with officer,	Convicted,	121	30 00	
nes Higgins.			Hingham.		Committee of the Commit	Convicted,	100	8 00	STATES AND STATES
eph O. Gaillardet,		.	Weymouth, -			Convicted.		25 00	Appealed; still pending.
a Curran, .			Weymouth,			Convicted.	30	25 00	ASSESSMENT ASSESSMENT
n C. Bently,	2	10	Weymouth,			Convicted.		25 00	
uglass Probrab.	-	3	Weymouth,		Possession of smelts in close season in viola-	Convicted,	100	25 00	
derick Hall,			Wordenter,	0.34	tion of § 71, c. 91, R. L.,	Convicted,		- 00	Filed.
liam Jones.	*	*	Worcester,		HOLL OF \$ 121 O. 021 281 121	Convicted,	10	-	Filed.
niel Smith	4		Worcester,	* *					Filed.
rris Abilon.						Convicted,		-	
			Worcester, -			Convicted.		-	Filed.
orga Abdon, .		9	Woromter,			Convicted,		-	Filed.

Report upon Convictions, Fines, etc., for Violations of the Fish and Game Laws - Continued.

STATE V. —	Town or City.	Offence.	Court Decision.	Fine.	Remarks.
meges O. Gaillardes.	. Weymouth,		Convicted,	\$50 00	Appealed; still pending
School To Burus.	Braintree,		Convicted, .	50 00	On probation.
resterick flatt.	. Worcester,	Taking smelts with net in violation of § 72.	Convicted, .	10 00	B 0 2
Illiam Junes,	Worcester,	c. 91, R. L.,	Convicted, .	10 00	
uniel Smith,	. Worcester, .	5, 5, 10, 20,	Convicted,	10 00	
erris Alidon.	Woroester,		Convicted, .	10 00	1
enrey Abdon.	. Woroester,	Lance to the second of the sec	Convicted, .	10 00	
harbert F. Richards, .	Waltham,	Taking trout in close season in violation of	Convicted, .	10 00	
eribur Royskis.	South Barre,	c. 377, Acts of 1909,	Convicted,	12 00	
leorge M. Suppose.	Abington,		Convicted,	2 00	
bruthe A. Ruck,	Bridgewater,	Having pickerel under ten inches in viola-	Convicted,	13 00	
Murles Excer.	Holyoke.	tion of \$ 67, c. 91, R. L., as amended by	Convicted,	2 00	
Inries Porter.	Orange.	c. 329, Acts of 1904,	Convicted, Convicted,	2 00	
nsoph Cardella.	Haverhill.	The second secon	Convicted,	2 00	Filed.
Itred Paterson	North Attleborough.	14	Convicted,	5 00	ruea.
couls Pomeray.	Westfield.		Convicted.	25 00	0.00
cleard E. Hisgins	Westfield.		Convicted,	25 00	
Idward A. Chipman,	Harwich.		Convicted.	5 00	
Thomas A. Ruesre, .	Harwich,	Taking fresh-water fish with net in viols- tion of § 132, c. 91, R. L., as amended by	Convicted.	5 00	
January Gaso,	Lee,	} tion of \$ 132, c. 91, R. L., as amended by	Convicted, .	5 00	
highton Beaser.	Lee.	c. 492, Acts of 1908,	Convicted.	5 00	The same of the sa
lenry H. Rounds -	Great Barrington.		Convicted	5 00	I a const
lalph B. Rounds	Great Barrington, .		Convicted, .	1 m	Filed.
ames W. Ellis,	Yarmouth,		Convicted, .	5 00	4.00
Intert Carlson,	Gloucester,	1)	Convicted,		Filed.
onis A. Drupe.	Fall River,		Convicted, .	20 00	
rahus Si. Pierre.	Fall River,		Convicted,	10 00	
unus Himinbouton	Fall River,	Later the second	Convicted, .	10 00	
Burt White	Onset,	Possession of lobsters under legal length in	Convicted, .	20 00	2-0-03-4-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-
commun F. Powler,	South Seabrook, H. N.,	violation of § 88, c. 91, R. L., as amended	Discharged, .	7.7	Ownership not proven.
smuel F. Fowler,	South Seebrook, N. H.,	by c. 303, Acts of 1907,	Convicted, .	30 00	A Thirty Treats in the 1900s.
rancio J. Cook, smoot MarQuarrie,	Woods Hole,		Convicted, ,	5 00	
Denord H. Benner,	New Bedford,		Convicted.	20 00	
Burley A. Marrow,	New Bedford,		Convicted,	20 00	
Contract of Section 2	. I New Demord,	0	Convicted,	20 00	1

Charles L. Munch, Hull, George H. Fearing, Hingham, P.Searasi S. Rearse, Whitman, Gilbert Hunt, Nahant, Nahant, Frank E. Lowis, Nahant, Samuel McDonald, Hingham, Ulouesster, Samuel Cummings, Scitnate, Scitnate, Glouesster, Samuel Cummings, Glouesster, Glouesster, Frank B. Silvia, Glouesster, Moss Jellows, Scitnate, Scitnate, Litchfield, Scitnate, Lawrence, Lawrence, Lawrence, Communication of the Communic	Possession of lobsters under legal length in violation of \$ 88, c. 91, R. L., as amended by c. 303, Acts of 1907,	Convicted, 5 00 Convicted, 38 00 Convicted, 45 00 Convicted, 75 00 Convicted, 75 00 Convicted, 5 00 Convicted, 5 00 Convicted, 21 50 Convicted, 5 00 Convicted, 24 00 Convicted, 12 00 Convicted, 12 00 Convicted, 12 00 Convicted, 10 00	
Guiseppe Fanco. Nicholas Frank. James Pike, Alexandra Selvitalls, Bonzoo. Bonjamin Thomascon, Chelsen, Thomas Caler. Joseph Santospirito. Roceo Coesto, Harry Levite, Joseph Capler, Joseph Capler	Killing song or insectivorous birds in violation of c. 329, Acts of 1903,	Convicted,	Filed. Sentence suspended on good behavior.
George A. Shaw, Lanesborough, Jasper Derry, Roxbury, Roxbury, William T. Attatin, Pittefield, Irwin P. Thompson, Pittefield, Irwin P. Thompson, Pittefield, Irwin P. Thompson, Pittefield, John H. Bellows, Lanesborough, John H. Bellows, Varider Stanley, Warder Stanley, Walder Stanley, Holyako, Holyako, Holyako, William A. Buttrick, Minteres, Middleborough, Edward Narbory, Westfold,	Possession of trout under six inches in length in violation of § 64, c. 91, R. L., as amended by c. 190, Acts of 1905, also c. 377, Acts of 1909,	Convicted, 100 00 Convicted, 70 00 Convicted, 40 00 Convicted, 30 00 Convicted, 10 00	Filed; paid coets of court, \$2.50. On probation. Sentence suspended.
Sumner C. Miller. Holyake, George Gage, Lee, Lee, Lee, Lee, Lee, Lee, Lee, L	Dynamiting waters in violation of § 133, c. 91, R. L., as amended by c. 246, Acts of 1903,	Convicted, . 10 00 Convicted, . 10 00 Convicted, . 10 00	

Report upon Convictions, Fines, etc., for Violations of the Fish and Game Laws — Continued.

STATE	Town or City.	Offence.	Court Decision.	Fine.	Remarks.
ruijain Carier, Fred Macker, Edward W. Wright, Martin Kennedy, Joseph Iogalls, Prier Bruntolle, George Boyier, Paul Houdry, Henry Langelier, Benjamin Kennedy, H. A. Barlow, Charles Rickerstam, James Quinn, Ray Speight, Allie Griffin, Allier Decter,	Peabody, Tamton, Woonseeket, R. I., Holyoke, Mahapoisett, Mahapoisett, Mahapoisett, Chatham, Chatham, Chatham, Chatham, Chatham, New Bedford,	Destroying or taking tern eggs in violation of § 7, c. 92, R. L., as amended by c. 250, Acts of 1907,	Convicted,	\$5 00 5 00 5 00 5 00 10 00 20 00 20 00 10 00 20 00 10 00 10 00	Filed. Filed. Filed.
And Hanson, M. H. Adams. Adolph Besulieu, Albert Kerjims, Jamoph Zahruche, Michael J. Haverty, Joseph Labrache, Frank Freeman,	New Bedford. Fall Hiver, Fall Hiver, Fall River, Fall River, Roxbury, Fall Hiver, Orleans	Possession of short bass in violation of § 70, c. 91, R. L., as amended by c. 223, Acts of 1904,	Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted,	10 00 10 00 20 00 20 00 10 00 10 00	Defaulted.
Marcus M. Pierus, George W. Bloomer, Vinetrio Contrino, Charles A. Horton,	Orleans, Chatlam, Gloucester, Swattipscott,	Intent to sell egg-bearing lobsters in viola- tion of § 86, c. 91, R. L., Mutilating lobsters in violation of § 89, c. 91, R. L.,	Convicted, Convicted, Convicted,	10 00 10 00 10 00	
Mike Saboli, Francisco Leota, Tony Corali, Antonido Dimino, Battista Damore, Joseph Scalafano, Dominico Friscia,	Boston, Boston, Boston, Boston, Boston, Boston, Boston,	Torching herring in violation of c. 298, Acts of 1908, also c. 194, Acts of 1909, .	Convicted, Convicted, Convicted, Convicted, Convicted, Convicted, Convicted,	50 00 50 00 50 00 50 00 50 00	Six months house of correction; sentence suspended on good behavior. Appealed; filed in Superior Court. Appealed; filed in Superior Court.

Joseph Pirru, Joseph Punzo, Joseph Peloso, Vincent Montagnini,		Boston, Boston, Boston,	Torching herring in violation of c. 298, Acts of 1908, also c. 194, Acts of 1909,	Convicted, Convicted, Convicted, Convicted,	50 00 50 00 50 00 50 00	Appealed; filed in Superior Court Appealed; filed in Superior Court Appealed; filed in Superior Court
Samuel McDonald,	3 3	Hingham,	Having unmarked lobster car in violation		106000	
Joseph Sweatt, .		South Barre.	of \$ 119, c. 91, R. L.,	Convicted,	10 00	Filed.
Mat Branski,		Nouth Dame	A DESCRIPTION OF THE PROPERTY	Convicted.	18 00	rued.
oseph Smith.		South Barre,	(Spearing nan in violation of 2 132, c. 91,)	Convicted.	-00	Filed,
oseph Doyski,		South Barre,	R. L., as amended by c. 492, Acts of 1908,	Convicted, .	16 00	I mout
Charles Porter.	7 7	Orange.		Convicted, .	10 00	
Vinetrio Contrino,		Gloucester,	Larceny of lobsters in violation of § 132,	Convicted	25 00	
ingustus W. Baker.		Chatham,	Pursuing wild fowl with power boat in vio-	Convicted	20 00	
ordon Hourque		Revere.	lation of \$ 11, c. 91, R. L., as amended	Convicted.	20 00	Filed.
barles Arnold.	1 6	Revere,	by c. 328, Acts of 1909,	Convicted.	-	Filed.
Antonio Romano.		Norton,	Assault with dangerous weapon,	Convicted, .	10 00	7.019
William P. Doneby,		New York, N. Y.,		Convicted, .		
William E. Duy,		Danbury, Conn., .	Nonresidents hunting without license in	Convicted.	10 00	
rederick Laurence.	O 18	Danbury, Conn.,	violation of c. 198, Acts of 1907, as amended	Convicted :	10 00	
Harry E. Waddle.		Santiago, Cal.,	by c. 262, Acts of 1909,	Convicted :	10 00	
Frank Burke		New York, N. Y.,		Convicted	10 00	
Albert E. Lowry,		Canton,	Possession of ruffed grouse in close season	Convicted		Filed.
Frank Randolph,		Brockton,	in violation of c. 441, Acts of 1908, as	Convicted.	40 00	1 2001
William J. Courns.		A CAR AND THE STATE OF THE STAT	amended by c. 272, Acts of 1909,	CONTROL CONTROL	100	PO1 -1
harry J. Mullory,	15	Brockton,	Residents refusing to show license in vio- lation of c. 484, Acts of 1908, as amended	Convicted,	5 00	Filed.
forill H. Abbert,		Danvers,	by c. 325, Acts of 1909,	Convicted,	10 00	
George H. Nutter.	× (4	Line	The state of the s	Convicted,	10 00	
Chapter C. Wier.	3 1	Tomoloton	I William as believed to the standard to the state of the	Convicted.	5 00	
Carl H. Thayer.	1 1	Templeton,		Convicted.	5 00	J. 100
John F. Driscoll		Lynn,		Convicted,	0.00	Filed.
Fortuna Gardell.	0.00	Westford,	Killing wood duck in violation of c. 274,	Comtioud, .		a most
The state of the s			Acts of 1906.	Convicted.	5 00	A second
Charles Haynes, .		Springfield	1	Convicted.	25 00	
Benjamin Lavendure	12 3	Springfield,	Halan sales of the ston for that and the	Discharged, .	1.00	
George Lavendure,	9 6	Springfield,	Using seine of less than five-inch mesh in	Convicted	25 00	
Ernest Crosby, .		Enfield,	violation of § 49, c. 91, R. L.,	Convicted, .	25 00	
Charles Randall, .	14. 14.	Enfield,		Convicted, .	25 00	
ohn Haws,	10	Barnstable,	Maintaining fish trap without permit in		100	
			violation of 1 118, c. 91, R. L.,	Convicted, .	10 00	
Charles S. Ashley,		New Bedford,	Pursuing ducks in Great Pond, Edgartown,	Sec. 15. 7. 8	15.27	Committee of the Commit
			in violation of c. 264, Acts of 1907,	Convicted, .	15 00	Appealed; still pending.

STATE 0. — Town or City.				ity.	Offence.	Court Decision.	Fine.	Remarks.		
Chauncey Birslick Harry Martin, Presman Palmer, Abraham London, A. J. R. Chass, Hand Borman, Joseph Taylor, Mary E. McCann, B. Bhom, L. B. Robunsky, Clurkes Prederick, William E. Baker,		**********	North Adams, Carliale, Ayer, Boston, Fall River, Fall River, Fall River, Fall River, Fall River, Fall River, Fall River, Fall River, Fall River,		 Dogs chasing deer in violation of \$18, c. 92, R. L., as amended by c. 245, Acts of 1905, Possession of feathers of certain birds for millinery purposes in violation of c. 329, Acts of 1903, Possession of black ducks in close season in violation of c. 421, Acts of 1900, Seining pond in violation of c. 308, Acts of 1904,	Convicted,	\$20 00 3 00 10 00 10 00 10 00 10 00 10 00 10 00 20 00	Filed. Filed later on account of poverty		
		10				1	\$5,804 50			

RETURNS FROM THE SHORE POUND AND NET FISHERIES FOR THE YEAR 1909.

$Apparatus\ employed.$

PROFRIETOR.						Number of Men.	Number of Boats.		Pounds.	Value.	Nets.	Value.
Frank C. Hodgkins,	Annisquam,					11	9	\$3,865 00	_	-	7	\$1,100 00
reston J. Marchant,	Barnstable,					9	4	1,100 00	2	\$2,500 00	<u>-</u>	
Harry Howes, Edward Holway,	Bournedale,		٠.	-		2	3	100 00	1	1,000 00	-	3 0
Gilbert E. Ellis, Fred Young, A. S. Hall,	Brewster,					16	9	370 00	14	4,000 00	4	75 0
David A. Newcomb, eeorge W. Crowell, amuel Dill, red W. Baker, N. Bloomer, corps N. Bearse, W. Gould & Co., A. Nickerson & Co., rancis A. Ellis,	 Chatham,					17	11	1,163 00	9	4,350 00	34	184 0
landers & Look,	Chilmark,					16	16	1,300 00	11	8,000 00	-	-
D. W. West,	Cuttyhunk,					4	6	1,050 00		_	' - 1	-

Phoprietor.	Town.	Number of Men.	Number of Boats.	Value.	Pounds.	Value.	Nets.	Value.
Hiram E. Baker, . Zenas H. Baker, . Crowell Cold Storage Company,	Dennis,	. 13	10	\$1,645 00	5	\$ 3,500 00	1	\$30 00
Charles Gardner, E. D. Perry, Albertis F. Simmons,	Dighton,	. 18	11	570 00	-	-	10	690 00
E. R. Durkee, David B. Poase & Allen Mayhew,	Edgartown,	. 4	5	70 00	2	360 00	-	-
A. H. Vanderhoop & Co.,	Gay Head,	. 27	20	2,608 00	14	6,700 00	2	35 00
D. D. Diamond & Co., Harry E. Hunt, Waldo F. Loring.	Duxbury,	. 6	7	2,048 00	2	350 00	4	430 00
Fuller A. Andrews, George W. Douglass, Joseph Douglass,								
Henry W. Nelson, Alexander Sargent, Frank A. Tarr,	Gloucester,	. 10	17	4,782 00	3	1,150 00	11	1,700 00
Thomas Douglass, Orin Crosby,	Hyannis.	. 9	7	1,915 00	i -	_	98	850 00
Taylor Bros.,	11 -	`		•		_		630 00
Edw. W. Heeth Company,	Manchester,	. 3	5	555 00	-	-	-	-
H. D. Powell (F. H. Johnson and others), . Avard L. Smith (R. A. Atwood and others),	Nahant,	. 16	11	1,430 00	4	6,000 00	-	-
Arthur J. Barrett & Co., Edward J. Fisher, George H. Hamblin,					 			
Arthur McCleare, Alexander C. Swain, John S. Watkins	Nantucket,	. 21	32	8,135 00	8	3,700 00	327	4,475 00
George M. Winelow,								
C. A. Carwell & Co.,	Newburyport,	. 10	9	3,250 00	-	-	91	1,540 00

Totals for State,	*	*				4						369	319	\$68,131 00	119	\$80,750 00	1,306	\$18,591 00
Shirley D. Lovell,	1					-	Yarmouth,	9	14		3	3	3	275 00	2	500 00	7	-
onathan Usher.	0			-		- 2	1				2.1				0.57	766353		-
olin J. Veeder		1		3	7		Woods Hole,					3	8	5,100 00	1	500 00	- 2	
enry W. Daggett.		15			3	100					- 1			1.00				
A. Maybew & Co.,		1			- 0						- 1							
Nelson Luce.	1	4	0			100										10 46 11		
sed S. Daggett, .							I labury, .		4		120	10	33	2,465 00	17	5,300 00	-	-
hn R. Walker, -				5.	100		Tisbury, .					19	33	0 405 00	17	F 200 00	Q .	5.0
L. & G. F. Tilton,				11.4														
sorge W. Manter,		*		112	4	14												
orge H. Luce,				10.0														
ia B. Luce,					-		Tracy and Trave			1.0	1			1,000 00	0	4,000 00	-	-
en Luce,	*					1.7	Vineyard Have	en.		- 12	21	2	6	1,300 00	6	2,800 00	_	
an Elvander,				11	*		Spring Hill,		+		100	-	9-		-	-	3	25 00
H. Miller, hn Elvander,						15	Somerset, .				181	9	3	130 00	-	-	2	300 00
II. Million		*		16	*	1.0	Segregansett,				(9)		4	140 00	-	-	4	300 00
N. Goff.					+		Sandwich,		16		50	17 2 17	4	565 00	1	1,000 00	-	20.70
igone W. Haines,							Raynham,				1.0	17	4	200 00	-	1 22.7	2	200 0
win Williams,							Rockport, ,				300		-		-	-	7	40 0
Ivin Rich.	*		*				Rockport, .				1	10.					0	40.0
R. Williams,												- 1						
lliam Warelinin.																		
niel P. Vera.	*			10														
in R. Swartz.		1	+		*							11						
win W. Smith.)						
ank I. Sears.		19										1						
artin Nelson,	*	*	+		*													
L. Mayo,		*				1.5							100	10.00		717.44	200	2622.0
fred A. Mayo,							Provincetown,		1.4	1.6		49	50	18,265 00	.6	6,000 00	697	6,314 00
lliam B. Lewis.			*		*		A DOLLAR STORY					200	99	10 mg - 17 mg		JV - W	Contact I	West of
omas J. Lewis,	Vall	.00,																
P. Lewis & Manue	Inn	100									- 1	1						
mes E. Kelley,				3														
lliam Joseph,			*			. 5					- 1							
in Johnson,						4					- 1	- 1						
nes W. Fuller,						1.50	1	~										
L. Daggett,											- 1							1
W. Cook		•					1 iymouth,				100	0	3	410 00	4	300 00	1	300 0
sorge A. Finney, ag	ant.											3	3	415 00	ī	500 00	1	300 0
ed C. Rich, len R. Norson, ager							Oak Bluffs,				5.4	50 /	1	- A. M. M. M.		30,000		
							North Truro,					24	12	3,320 00	10	22,600 00	-	_

1909.]

PUBLIC DOCUMENT - No. 25.

Number of Pounds of Fish taken

					Nunu	er oj 1	ounus	U) I 181	- unen
Town.		Alewives.	Bluefish.	Flounders.	Mackerel.	Menhaden.	Pollock.	Salmon.	Scup.
Allerton,		-	-	-	-	_	-	-	-
Annisquam, .		208,875	-	-	5,376	-	382,900	-	-
Barnstable,		-	-	515	80,358	-	-	-	-
Bay View, .		-	-	-	-	-	-	-	-
Beachmont,		-	-	-	-	-	-	-	-
Beverly, .		-	-	450	-	-	-	-	_
Boston,		_	-	-	-	-	-	-	-
Bournedale,		-	-	-	1,037	-	1,743	-	-
Brant Rock,		-	-	-	\ -	-	-	-	-
Brewster, .		62,550	675	27,150	3,538	-	-	-	-
Cataumet, .		_	-	-	_	-	-	-	-
Chatham, .		2,307	1,909	68,525	4,335	1,000	20,000	-	1,339
Chilmark, .		-	-	14,341	11,660	-	1,730	-	20,874
Chiltonville,		_	-	-	-	-	-	- 1	-
Cohasset, .			-	-	_	-	-	-	-
Cuttyhunk,		-	-	-	6,000	-	10,000	-	25,000
Dennis, .		22,650	667	2,106	16,110	900	-	-	-
Dighton, .		180,823	-	-	-	_	-	-	-
Duxbury, .			_	-	2,120	-	8,000		_
Edgartown,		-	_	1,000	1,575	-	-	-	265
Essex,		- 1	-	_	_	-	i -	-	-
Gay Head, .		45,400	-	5,680	11,800	2,200	5,000	-	8,225
Gloucester, .		105,300	600	175	17,623	790	192,395	-	-
Green Harbor, .		_	_	_	_	_	_	-	-
Hull,		-	_	_	-	-	·-	-	-
Hyannis,		-	4,925	90,100	6,483	-	_	-	-
Ipswich,		_	_	_ '	_	_	_	-	-
Kingston,		_	_	_	_	-	_	_	_
Lanesville,		-	_	_	_	_	_	-	_
Magnolia,		-	-	_	-	-	_	-	-
Manchester, .		8,800	_	_	2,605	-	40,890	-	8,147
Manomet,		-	_	_	-	-	-	_	-
Marblehead, .		-	-	_	_	_	_	_	-
Mattapoisett, .		_	-	_	_	_	_	_	-
Minot,		_	_	-	_	-	_	_	_
Nahant, .			_	_	65	7,450	3,320	_	-
				l			1	l	<u> </u>

in Nets, Pounds, Traps, etc.

		, 							
Sea Bass.	Sea Herring.	Shad.	Squeteague.	Striped Base.	Squid.	Tautog.	Other Edible or Bait Species.	Lobsters.	Value.
_		-	-	-	-	-	_	1,137	\$165 00
-	72,500	-	-	_	_	-	294,615	2,862	5,393 13
-	_	100	-	-	11,000	100	27,500	1,379	7,988 65
	-	-	_	-	-	-	-	6,314	763 58
-	-	-	_	-	-	-	_	7,838	939 35
-	-	-	_	-	-	-	1,800	39,902	3,902 15
-	-	-	_	-	-	-	-	141,915	17,499 42
-	-	-	-	-	106,421	2,659	2,765	18,932	2,535 07
-	-	-	-	-	-	-	-	21,453	1,553 80
-	177,525	225	_	14,	75,525	360	9,676	-	3,544 02
-	_	-	_	-	-	-	-	30	2 50
143	53,610	415	34,393	600·	169,655	1,717	123,861	31,478	16,828 24
17,505	-	25	26,163	1,000	2,000	-	26,968	40,131	8,298 49
-	-	-	_	-	-	-	-	27,779	2,247 40
-	-	-	-	-	-	-	-	147,144	17,707 67
20,000	-	-	2,000	-	-	-	-	197,711	19,407 16
-	24,000	1,500	10,535	-	316,800	1,950	38,820	3,068	5,555 52
-	-	4,440	-	-	-	-	4,725	-	2,365 28
- 1	515,000	-	-	-	-	-	40,731	8,403	7,290 55
100	-	25	4,630	-	25,000	_	6,650	120	1,043 45
-	-	-	•-	-	-	-	- '	1,566	159 15
29,725	-	-	12,970	-	500	1,000	5,600	16,560	6,537 14
-	188,520	655	200	- '	26,885	203	155,559	116,403	17,979 40
-	-	-	_	- '	-	-	_	127,407	13,691 97
-	-	-	-	-	-	-	_	36,927	4,991 07
-	· -	-	700	-	-	-	-	1,253	4,188 40
-	-	-	_	-	-	-	-	870	174 00
-	-		-	-	-	-	-	5,049	650 64
-	-	-	-	-	-	-	-	17,931	1,777 49
-	-	-	-	-	-	-	-	1,590	156 60
- ;	46,200	240	-	-	3,582	-	47,600	9,675	2,583 93
-	-	-	-	-	_	-	-	126,744	10,384 40
- i	-	-	_	-	_	-	-	136,847	16,238 88
-	-	-	-	-	-	-	-	4,469	387 41
-	-	-	-	-	-	-	-	21,842	2,380 54
9,600	712,000	-	-	-	-	-	522,608	27,594	13,328 34

Number of Pounds of Fish taken

Town.	Alewives.	Bluefish.	Flounders.	Mackerel.	Menhaden.	Pollock.	Salmon.	Soup.
Nantasket,	-	-	_	-	_	-	-	_
Nantucket,	450	34,353	4,970	147,883	-	34,460	-	19,080
New Bedford,	-	-	-		-	-	-	_
Newburyport,	-	-	-	7,800	-	51,225	-	-
North Tisbury,	-	-	-	-	-	-	-	-
North Truro,	-	3,340	25,799	21,079	2,000	30,188	-	-
Oak Bluffs,	-	-	-	-	-	-	-	-
Onset,	_	-	-	-	-	-	-	-
Orleans,	_	-	-	-	-	-	-	-
Pasque Island,	_	-	-	-	-	-	-	-
Plymouth,	-	-	-	8,050	-	_	-	-
Privincetown,	_	176	903,473	210,642	-	3,300	-	-
Robinson Hole,	_	-	-	-	-	-	-	-
Rockport,	_	-	-	-	-	-	-	-
Raynham,	241,600	-	-	-	-	_	-	-
Sagamore,	-	-	_	-	-	-	-	-
Salem,	-	-	-	-	-	-	-	-
Sandwich,	-	-	-	7,362	-	-	-	-
Scituate,	_	-	-	-	-	-	-	-
Segregansett,	275,000	-	-	- '	-	_	-	-
Somerset,	26,000	-	-	-	4,000	-	-	-
Spring Hill,	200	-	2,000	25	_	-	-	-
South Dartmouth, .	-	-	-	-	_	_	-	-
South Duxbury, .	-	-	-	-	_	_	-	-
Swampscott,	-	-	-	-	-	_	-	-
Tisbury,	2,500	3,622	25,500	16,690	_	9,130	-	8,600
Vineyard Haven, .	3,250	500	5,056	2,347	_	500	-	7,760
West Falmouth, .	-	-	_	_	_	_	-	-
Westport Point,	-	-	_	_	_	_	-	-
West Tisbury,	_	_	-	_	-	-	-	-
Weymouth,	_	_	_	_	_	-	_	-
Whitman,	_	-	_	_	-	-	-	_
Winthrop,	_	_	_	_	_	_	-	-
Woods Hole,	-	_	-	-	_	_	-	-
Yarmouth,	21,800	_	4,400	700	_	2,500	_	-
Totals for State, .	1 207 505	50,767	1,181,240	593,263	18,340	797,281		99,290

in Nets, Pounds, Traps, etc. — Concluded.

·									
Sea Base.	Sea Herring.	Shad.	Squeteegue.	Striped Base.	Squid.	Tautog.	Other Edible or Bait Species.	Lobsters.	Value.
-	-	-	_	-	-	-	_	62,607	\$7,654 89
2,851	200	781	49,703	143	16,120	-	115,009	12,090	30,740 11
-	- [-	- [-	-	-	-	14,141	1,519 21
-	108,600	-	-	-	- 1	-	208,996	-	3,993 48
-	-	-	-	-	-	-	_	1,073	85 80
-	875,200	43	360	-	1,731,990	175	604,286	-	22,576 74
-	-	-	_	-	-	-	400	-	60 00
-	-	-	-	-	-	-	-	7,017	714 75
-	-	-	-	-	-	_	_	4,806	1,486 00
-	-	-	-	-	-	-	-	12,317	1,210 94
-	-	-	<u> </u>	16	9,200	250	12,300	68,102	7,588 43
-	156,200	2,800	-	-	326,005	-	757,158	3,918	40,036 29
-	-	-	-	-	-	-	-	6,923	1,173 00
-	-	-	-	-	-	-	10,785	164,552	14,710 26
-	-	7,415	_	-	-	-	-	-	3,157 50
-	-	-	-	-	-	_	-	2,421	315 25
_	-	-	-	-	-	_	_	44,694	5,640 50
-	-	26	9	-	35,200	-	2,056	4,818	1,677 97
-	-	-	-	-	- 1	-	-	40,695	3,854 71
-	-	6,080	-	-	-	-	· -	-	1,638 00
- (-	400	100	-	-	-	-	-	1,190 00
-	200	-	-	-	200	-	-	-	29 50
-	-	-	-	-	-	-	-	956	101 36
-	-	-	}	-	_	-	-	13,862	1,410 35
-	-	-	-	-	-	-	-	20,642	2,412 24
827	-	200	44,828	15	7,050	3,972	26,850	3,453	8,291 01
1,000	-)	-	52,867	-	18,000	400	5,320	4,391	5,610 35
-]	-	-	-	-	-	_	-	939	142 00
-	-	-	-	-	_	_	-	35,340	3,432 37
_	-	-	-	-	-	_	-	32,187	2,839 31
_	- {	-	_	-	-	_	-	19,296	3,081 18
-	-	'	- 1	-	-	_	-	3,258	365 52
-	-	-	-	-	-	-	-	24,251	3,233 48
-	-	_	600	-	2,500	-	-	28,157	2,440 16
-	15,000	_	-	-	3,800		560	2,097	962 35
81,751	2,944,755	25,350	240,058	1,788	2,885,433	12,786	3,053,198	1,989,326	\$406,014 80

Returns from the Lobster Fisheries.

Charence P. Davis, Winthrop O. Davis, Clarence Chaes, Barnstable, 2 2 2 255 00 30 20 00 919 217 8 2 2 255 00 30 20 00 919 217 8 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Number of Egg- bearing Lobsten	Value.	Number of Lobsters.	Value.	Number of Pots.	Value.	Number of Boats.	Number of Men.		n.	Tow	PROPRIETOR.
Charles F. Bayls. Winthrop O. Dayls. Clarence Chase. Frank Brewer. Daniel S. Burnham. Daniel McDonald. Howard Robinson. Labar S. Marchant. Charles Neil. John Anderson and Nelson A. Southwick. Wallase Kenney. C. Wallie Foster and Warren Hersey. Harry C. Howel. Albim Frys. Joseph Albett. Frank Ross. Joseph Rerula. Antonie Silva. Antonie Silva. Antonie Silva. Antonie Silva. Antonie Silva. Antonie Silva. Antonie Brengols. Frank Ross. Joseph Serrula. Antonie Brengols. Joseph Berngols.		\$165 00	758	\$25 00	22	\$25 00	1	1	1.		Allerton, .	M. W. Springer,
Clarettee Chees Barnstable 2 2 255 00 30 20 00 919 217 8	47	443 66	1,908	80 00	80	475 00	5	2			Annisquam.	Jarence F. Duyls.
Bay View. 5 5 150 00 227 324 00 4,209 763 55	15	217 85		20 00	30		2				The state of the s	rank Brewer,
Charles Neil. Charle	7	763 58	4,209	324 00	227	150 00	5		- 14	4	Bay View, .	Daniel McDonald.
Vallare Kenney: Wallie Foster and Warren Hersey, larry C. Howell, libien Frye. oseph Albett, frank Angelo, fatthew P. Gill, onquin Perry. Cony Richamilla, frank Rose, oseph Serrilla, intonio Brengola, frank Pengola, olin Brengola, oomin Cabral.	30	939 35	5,225	288 00	110	465 00	3			ř e	Beachmont,	Charles Neil, ola Anderson and Nelson A. South-
oseph Albett, Fank Angelo, fatthew P. Gill, osquin Perry, osquin Perry, osquin Perry, osquin Perry, tony Richamilla, rank Rose, oseph Serrilla, intone Silva, intonio Brengola, rank Brengola, rank Brengola, oseph Serrilla, oseph Serrilla	211	3,785 15	26,601	, 1,131 50	663	2,650 00	12	11	10		Beverly, .	Vallage Kenney; 2. Wallis Foster and Warren Hersey.
fatthew P, Gill, onquin Perry. ony Richamilla. rank Rose, oseph Servila. tatone Silva. tatone Silva. tatone Brengola. rank Brengola. rank Brengola. one Brengola. one Brengola. one Brengola. one Brengola.											}	nseph Albett,
oseph Serrilla, ntonio Birengola, ntonio Brengola, muk Brengola, ohn Brengola, oseph Cabral.												latthew P. Gill.
ntonio Brengola, maik Brengola, olin Brengola, oseph Cabral,							1					ony Richamilla, rank Rose, oseph Serrilla,
mark Brengols, olm Brengols, owrth Cabral.			ľ									intended December 1
olin Brengola,					1		1					the state of the s
owph Cabral,											16	olin Bremgola,
Demaunt 27 30 2,805 00 2,007 2,167 00 94,610 17,499 4	172	17,499 42	94.610	2,167 00	2,097	2,805 00	30	27			Boston	oseph Cabral, .
remain Deganat,	1112	11,100 10	55,010	2,107 00	2,007	2,000 00	- 00			, 4	individ.	reemin Degaust,
immie Dominie,												immis Dominie,
ohn Dordes, adrew Ferralria,	4	i i										olar Dordes,

Costa Goularte,			11						•		n	1	li i		1
Dennis Mahoney, .	•	•	. 11							1			l i		i e
Dennis Manoney, .	•	•	-						ì						i .
John Poe,	•	•	• []										1		1
Jule Rose, . Manuel Rose and Man	'^-		. 11									[1
Manuel F. Vierria, .	inei Gr	acc,	• 11									!			1
Ben Davis.	•	•	. 11												
John Sandstrom.	•	•	• 11						ı		1	ĺ			1
A. J. Chandler,	•	•	. 14									i			
Frank C. Leonard.	•	•	. 11												l
Percy H. Marsh,	•	•	. }	Bournedale,				4	6	320 00	210	275 00	12,621	1,654 46	97
Albert Nightingale, .	•	•	. 11						i						
Clifford L. Harris.	•	•	· 14						i .	1	ì	}	ii	1	1
M. H. Hewins,	•	•	. 11												
George L. Pardy,	•	•	: }	Brant Rock,				5	9	1,370 00	271	463 00	14,302	1,553 80	12
J. E. White,	•	•	: [[~	•	•	•		•	2,010 00		1	1 1,002	*,000 50	1
C. C. Cady,	•	•	: 11						[1	1			
Eugene W. Benson,	•	•	: l'	Cataumet,				1	2	70 00	5	5 00	20	2 50	-
B. R. Baker,	•	•	. h	Cumumou	•	•	•	-	i -			"]} ===		i
Fred W. Baker,	•	-	11								li				
George W. Bloomer,	•		· 11										li		
Joseph D. Bloomer	and	Georg	re												:
Dunbar		~~~~	". J						1				li		İ
Dunbar, Walter W. Eldredge,			. 11								ll .	ł			i
William R. Bloomer, .			. 11												ł
W. N. Eldredge, .			. 11						1		l	l .	li	i	
Howard Eldridge,		· ·	. 11					i					Įį.		
Charles G. Hamilton,			. 11						i		[li .		
T. W. Holway,			. 11							[[
James E. Jones.			. [[[
Rufus A. Nickerson &	Co.,		. }	Chatham,				32	46	8,640 00	1,715	2,188 50	20,985	7,021 63	1,840
Edson F. Olson, .			. 1								1	[į	
James F. Olson,			- 11						1]]]	1	1)	Ì	1
Seymour Patterson, .			. 11									1	!!		1
Wilbur H. Patterson,			.]						1	!	ll .	ŀ	11		
Albert W. Smith,			- []								I	1	ļļ		
Charles E. Smith, .			. []						1		[[1	!!		
George Bearse, .			.						İ				II.		
Bradford N. Bloomer,			.						ł			1			1
Walter C. Bloomer, .			- H										II.		ļ
William A. Bloomer,			- 11						ĺ		1	[il		
Samuel Dill,			. 11												
Francis A. Ellis, .			. []								ll .		li		1
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PROPRIETOR.	Town.	Number of Men.	Number of Boats.	Value.	Number of Pots.	Value.	Number of Lobsters.	Value.	Number of Egg- bearing Lobstern
Ligman Cottle, Rev E. Cottle, Jerry Look, William S. Mayhew, Everett A. Poole, Harry G. Reed, Aneth E. Smith, Onalow Stuart, J. D. and F. P. Tilton,	Chilmark,	п	17	\$2,539 00	473	\$785 00	26,754	\$3,106 70	206
Joseph Boutin, Ernest Johns, Alhort F. Pierce, Harry S. Sampson, John W. Sampson, Charles H. Pierce, R. F. Switt, Levi Cadoss, John Eltman, Anton Grassis, Anton Grassis,	· Chiltonville,	13	16	990 00	325	485 00	18,519	2,247 40	72
Patrick Grassic, Thomas J. Mannix, Manuel Oliver, Andrew Peterson, Orne Peterson, Antons Sidney, Antons Sidney, Antonis I. Sidvia, Manuel S. Trombas, George T. Ainslie, Antons S. Figueiredo, Cornelius Murphy, Octavius H. Reamy, Manuel E. Salvador, Juseph A. Silvia,	Cohasset,	21	-41	7,278 00	2,454	3,574 75	98,096	17,707 67	438

John Beatty, David N. Bosworth, William Bosworth, John F. Cornell, Thomas Dowling, Arthur Gregory, Manuel George, Issae Gregory, Irwin C. Hall, Samuel E. Jackson, Thomas H. Jones, George C. King, Frank Peters, Russell W. Rotch, Roland S. Snow, Oscar H. Stetson, Josiah H. Tilton, Chester F. and Frank B. Veeder, Haroid S. Veeder,	Cuttyhunk,	٠			37	54	16,856 00	2,684	3,153 25	131,807	17,372 16	1,608
John Wall, Ernest D. Veeder, Ansell P. Howes, Austin F. Howes, Soih H. Howes, Benjamin Walker, Samuel P. Burgess,	Dennis, .	*	ė		4	•	50 00	79	60 00	2,045	365 25	119
William K. Bartlett	Duxbury, .				2	5	285 00	85	125 00	5,602	662 24	55
Manuel Deloura, Edwin II, Burnham, Jr., Benjamin J. Attaquin, Granville M. Belain,	Edgartown, Essex,		-	141	1	1	715 00 75 00	6 25	8 00 25 00	80 1,044	16 00 159 15	5 8
Moses P. Cooper, Joseph A. Lang, Charles H. Ryan, A. H. Vanderhoop & Co.,	Gay Head,	2	•	*	5	7	455 00	194	192 00	11,040	1,404 75	163

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Proprietor.	Town.	Number of Men.	Number of Boats.	Value.	Number of Pote.	Value.	Number of Lobsters.	Value.	Number of Egg- bearing Lobeters
Edward L. Ashley, Henry H. Ashley, J. N. Christensen, C. A. Dixon, Charlos H. Douglass, William Gallagher, Nelson F. King, Peter Knutson, John C. Lyeett, Andrew T. Marchant, Walter E. Marchant, D. E. Mehlmann, Forrest E. Marchant, D. E. Mehlmann, Forrest E. Morchart, Joseph S. Moniz, Albert and Howard Parsons, Ira Parsons, Melvin Parsons, Jerry Phillipa, Valentine Powers, Nelson Rowe, Elbridge D. Rust, Everett L. Small, Arthur Stevens, Manuel Vhitor, Jr., Daniel S. Webber, Joseph and Manual William McCallum, Frank B. Silva, Joseph Douglass, Gestrys L. Janulis,	Gloucester,	35	40	\$3,327 50	2,243	\$2,421 75	77,602	\$11,800 39	315

13.691 97

4.991 07

186 25

174 00

650 64

1,777 49

156 60

1,253 48

34 11

142

Green Harbor,

Hull.

Hyannis.

Ipswich.

Kingston.

27

11

1

5.198 00

1.141 00

150 00

550 00

12

1

1,223

446

74

43

2,272 00

811 00

37 00

43 00

90 00

84,938

24,618

835

580

3,366

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Robert Brown. William M. Cushing. George Delano, William N. Englestend, Wilfred Keene,

C. E. Peterson, .

Charles R. Peterson, . Lyman Sears. H. P. Tolman, William H. Tolman,

George W. Gardner, R. M. Cleverly, Hulver M. Gillerson, Walter F. Kelley,

Ambrose B. Mitchell, F. C. Munch, John Pinte,

Orin Crosby,

Meuses Sturgest,

Allen R. Gorham,

Edward M. Poland, Charles W. Lucas, Alfred W. Riley,

Frank A. Gove,

Proprietor.	Town.	Number of Men.	Number of Boats.	Value.	Number of Pots.	Value.	Number of Lobsters.	Value.	Numbe of Egg- bearing Lobsten
C. D. Bacon. Edwin H. Bartlett. Samuel H. Bonson, G. L. Rilnery, G. A. Bouvier, Laban B. Briggs, James E. Burke, Joseph F. Cook, Comfort H. Dixon, Archie Fenton, Ralph R. Holmes, S. P. Howard, George A. Manter, Wallase J. Nightingale, Frank R. Peterson, Charles W. Raymond, J. E. Raymond, Robert Richardson, A. C. Sampson, C. A. Wakefield, George W. Wood, George W. Wood, George D. Cook, Charles A. Dixon, Clarence A. Holmes, W. F. Allen, Charles O. Briggs, Emest E. Cronk, W. F. Jennis, William Dixoy, Peter J. Farty, Arthur D. Frost, Fred A. Fuller, William T. Cardner, Thomas P. Gilbert, Eversti S. Hamson, Jr., George K. Hamson, Jr., Juvid P. Howe, Platrick H. Keenan,	Manomet,	28	37	\$3,370 00	1,364	\$2,162 00	84,496	\$10,384 40	311

ohn W. Mace, ames H. Magee, omathan B. Mason, William F. Merritt.							200/5		1000	20,222	75750.30	472
Lichard T. Millett,	. Marblehead,			*	40	46	7,717 00	1,840	2,155 00	91,231	16,238 88	713
verett P. Peneh.					1		1					
seph S. Phillips,	3				- 1							
ugustus K. Roundy, ichard F. Russell,	15 IV				1				1			
tepben Q. Smith,	311			- 1			1				1	
illiam T. Smith	2511										1	
harles H. Smithurst,	22.11				- 1	1					II.	
benezer E. Snow.	311			- 1	- 1				1	13	1	
Villiam B. Standley	311			- 1					1	1	1	
larence X. Stone,	4.1											
amuel A. Stone,	- 1				- 1							
ohn F. Trefry,	3.1											
Villiam H. Tutt,	* 1											
S. Withum,	16 III				- 1							
E. Brown,	:11											
alter E. Bowman.	Mattapoisett				1	2	170 00	120	120 00	2,979	387 41	103
amos J. Leary	. Mattapolacti					-	210 00	120	120 00	2,010	00/ 11	100
harles H. Pool,	311											
ugene Pratt				- 1			See Level		12.00	10000	100000	
Danforth P. Sylvester,	. Minot, .	-	1.5		7	7	366 00	340	485 00	14,561	2,380 54	95
harles DeCost,	4						100.00		200			
oy K. Gannett, Jr.,	8			- 1								
harles H. Pratt,	.				- 1			1				
H. Crowell,					1			1				
Gilbert G. Hunt,	3			- 1								
Ierbert E. Potter.	Nahant,				7	13	1,330 00	340	416 25	18,396	3,566 39	206
Illiam A. Smith	9					10	1,000 00	940	210 20	10,080	3,000 39	200
butles W. Taylor												
Sarren P. Taylor,	C: 11							0.0				
F. Allen,	111											
larry C. Bates,	. 11						- 1			4		
leorge L. Hatch,	341							1				
leney E. Hatch,	A Part Service			- 1		-55	Vacation 1	10.	556.454	VX 35	-3474 - A	
amuel McDonald,	. Nantasket,		-		9	12	1,252 00	574	798 50	41,738	7,654 89	186
phraim Onderkirk,	6							1000	100	10000	100000	
					- 11						11	
harles A. Bridgham, rank Lean,	0:11			1	11		13		II.		- 11	

FISH AND GAME.

PROPRIETOR.	Town.	Number of Men.	Number of Boats.	Value.	Number of Pots.	Value.	Number of Lobsters.	Value.	Number of Egg- bearing Lobsters
E. C. and J. E. Chapei, Nelson Clark, Orin Coffin, James H. Dennis, Robert S. K. Dunham, William H. Hamblin, Walter Jewett, Joseph Mayo, Manuel Thomas, C. H. Blount, John S. Watkins, Arthur McCleare, Joseph H. Ray,	Nantucket,	10	16	\$2,415 00	516	\$459 00	8,060	\$2,392 79	211
A: D. Peters, Bartholomew Silva,	New Bedford,	4	4	1,375 00	203	375 00	9,427	1,519 21	221
Senrge B. Taber, Valter C. Vincent,	North Tisbury,	1	2	316 00	30	35 00	715	85 80	17
Ioward C. Goodspeed, I. Alton Harrison, Villiam Thompson,	Onset,	4	6	2,050 00	185	220 00	4,678	714 75	29
Daniel B. Gould, Daleh Hayden, Jareus M. Pierce,	Orleans,		5	838 00	139	200 00	3,204	1,486 00	173
Carenes King, V. R. McDowell, George Atwell, James H. Bagnall, Charles A. Briggs, R. J. Caswell,	Pasque Island,	3	4	2,440 00	160	187 50	8,211	1,210 94	160
Ioiu R. Harlow, Bonjamin F. Hodges, Whitman Nickerson, William L. Peterson, A. W. Hampson, Frank Elimona, Bosoph P. Thurston, Charles H. Davia, N. S. Gansso,	Plymouth,	16	23	3,078 00	674	985 00	45,401	6,516 93	m



Cushing H. Emery, Robert L. Newcomb, Joseph S. Perry, John W. Savage, W. G. Snow, Charles Williams, Jr.,	Provincetown, .	0	6	6	440 00	230	193 50	2,612	914 89	90
Manuel Marshall, Antone Vera, 1 Wliam Bennett, Je. Bownian, Ma. 4 downian,	Robinson's Hole,		2	5	560 00	198	161 50	4,615	1,173 00	76
Gas, stino, Peter Prank Joson, George H. Dobson, George H. Dobson, Joseph Dobson, G. Y. Erickson, Joseph Foster, William Garrow, Charles F. Green, W. I. Jones, Russell Lane, John F. Lawson, James Long, Arthur Norwood, William E. Norwood, Edmond S. H. Orr, Arthur Rich, Melvin Rich, Raymond Rich, Everett D. Rowe,	Rockport,	-	31	35	3,645 00	2,269	2,825 00	109,701	14,496 91	146
F. E. Saunders, Andrew Swanson, S. Thurston, Charles Upham, Carl Vreidenburg, George E. Wendell, Herbert Rich, Arthur Gibbs,	Sagamore,		1		70 00	65	65 00	1,614	315 25	40

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Рвориетов.	Town.		Number of Boats.		Number of Pots.	Value.	Number of Lobsters.	Value.	Number of Egg- bearing Lobsters
Charles H. Berry, Charles S. Brown, John Clork, George W. Dunn, Charles P. R. Fellows, Thomas F. Hogan, Louis N. Letourneau, Charles L. Walos, George H. Whelpley,	Salem,		11 13	\$1,224 00	685	\$988 75	29,796	85,640 50	365
George Brady, John F. Mahoney, John Elvander, Eugene W. Haines, Oscar Anderson,	Sandwich,		3 5	506 00	89	95 00	3,212	641 15	61
John F. Cushman, George F. Edson, Elijah P. Pratt, Harry Stevens, Thomas S. Turner, Daniel Ward, Frank H. Barry,	Scituate,		9 17	1,810 00	545	940 00	27,130	3,854 71	130
Thomas Dwyer, William A. Blanchard, James H. Butts,	South Dartmouth,		2 4	1,125 00	50	45 00	637	101 36	23
Chester N. Morse, Frank E. Wadsworth, Samuel G. I. Wadsworth, Rodney Douglass,	South Duxbury, .	-	3 6	540 00	210	266 25	9,241	1,410 35	60
Walter M. Boyden, Henry Douglass E. B. Thyng, Charles Horton,	Swampscott,		7 15	1,790 00	430	555 00	13,761	2,412 24	200

s F. Luce, Maybew & Co., gs W. Manter, Adams.	Tisbu	у,	٠	-2	2.	3	185 00	121	191 00	2,302	803 77	52
ard W. Cleveland, . Cleveland, /, McLallan, ter H. Robinson, ard H. Smith, . Smith,	Viney	ard Haven,		+	8	8	1,033 00	140	140 00	2,927	404 76	41
R. Tilton, F. Bourne, Densmore, P. A. Gifford, m. A. Hammond,		Calmouth,		¥	2	2	25 00	31	49 00	626	142 00	35
n S. Hond, n A. Harr, v. Palmer, Sowie, n J. Tripp, a E. Valentine,	Westp	ort Point,			12	13	3,002 00	483	665 00	23,560	3,432 37	680
B. Whalen, J. Cain, J. Culley,	Weym	outh			3	4	730 00	280	400 00	12,864	3,081 18	44
Inteh.	Whitn	an, .			2	2	265 00	75	135 00	2,172	365 52	3
'ullerton. L. Wells. Baker. D. Mayhew.	Winth	rop,	4	-	3	7	780 00	200	260 00	16,167	3,233 48	117
W. Maybew, test & Co. T. Butler, A. Rogers,		Cisbury, .	÷	e	5	8	1,901 00	432	751 00	21,458	2,839 31	313

Proprietor.	Town.	Number of Men.	Number of Boats.	Value.	Number of Pots.	Value.	Number of Lobsters.	Value.	Number of Egg- bearing Lobsters
Walter C. Balser, Prancis J. Cook, James W. Cook, J. W. Gardiner, Robert A. Goffin, Charles R. Grinnell, Alfred M. Hilton, Oscir R. Hilton, W. L. Hower, Alfred Niekerson, W. E. Niekerson, F. I. Peterson, James K. P. Pardum, Prince M. Stuart,	Woods Hole,	18	24	\$3,182 50	362	\$442 50	18,771	\$2,391 16	238
Prince M. Stuart, Abert S. Swain, Jr., A. H. Vedeler, John J. Vesder, Autorey D. Wilde, Shiriley D. Lovell,	Yarmouthport,	-		-	60	90 00	1,398	442 00	52
		522	734	\$107,325 00	29,996	\$39,692 50	1,326,200	\$214,404 45	11,656