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The Commonwealth of Massachusetts

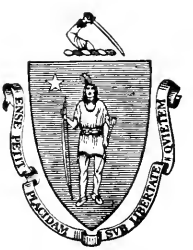
ANNUAL REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR THE

YEAR ENDING NOVEMBER 30, 1920



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The Commonwealth of Massachusetts

ANNUAL REPORT OF THE COMMISSIONER.

Introduction.

With only a few exceptions the 1920 season has been a prosperous one for Massachusetts farmers. The principal difficulty has been the securing of adequate farm help, and many farmers have found it necessary to curtail operations down to what it was possible to do with such labor as could be obtained. During the late summer and fall many of the factories began to shut down and more day labor suitable for limited kinds of farm work was available.

For several years past the Massachusetts farmers who raised specialties, such as onions, tobacco, cranberries, garden truck, etc., have been faring better than general farmers, because of the high cash prices for their products and the demand due to the war; on the other hand, dairy farmers may have received fair gross prices, but the expense for food and other important items has been so great that they have not made the net returns which specialty farmers have made. During the past year, however, men running general farms have fared better than the others, because prices for cash crops had fallen so rapidly during the fall that in most cases they were below the cost of production. The price of milk, on the other hand, while at no time excessively high, has been high enough to show a fair profit where efficient production has been practiced. The result has been a slight increase in the number of dairy cows in the State during the past year.

The tendency of farmers to combine for the purpose of buying and selling in large quantities has increased, resulting

in a net saving of many thousands of dollars. This co-operative buying and selling also has trained farmers to work together in a teamwork which bids well to have important economic results in this State. Good markets have been so near at hand to the Massachusetts farmer that he has not been forced to combine with his neighbors to market his products, and the result has been that each farmer has sold ungraded the relatively small quantities of products which he himself has produced, and has not received a price for them which he might have received if he had combined with his neighbors, had properly packed and graded his products, and had placed them on the market in sufficiently large quantities to attract large buyers.

The long and patient work of many educational agencies, such as the Agricultural College, and the work of the farm bureaus, which is now becoming effective, is doing much to educate the farmer in the line of economic production and co-operative marketing. I do not believe there is a class of men in the Commonwealth which is attempting to do more to improve their methods of doing business than Massachusetts farmers. This is evidenced by their interest in the various agricultural agencies of the State, their attendance at lectures, demonstrations and other educational helps at the Agricultural College, and at various points scattered over the State.

Massachusetts Crops in 1920.

The low temperatures of the winter 1919–20 killed nearly all the peach buds, but did not hurt apple fruit buds seriously, nor was there very serious weather injury to trees. However, the long-continued deep snow caused destructive girdling of thousands of younger apple trees by mice. This snow was, however, favorable to fall sown crops, meadows and pastures.

The situation confronting farmers, as regards supply of farm labor and wages, supply and prices of fertilizer, machinery and implements, and transportation, grew steadily worse until well into May. All signs and reports from the farmers indicated a disposition to reduce crop acreages rather heavily. In the face of this a countermove resulted in agitation to give the farmers all possible assistance in the matters mentioned in

the hope of keeping crop production up to the usual amount. Early in June the corner in the farmer's difficulties had been turned and conditions gradually improved, with the result that in most cases only nominal changes were made in acreages of crops planted.

There was enough rain in most sections the first half of the season, but the last half brought a long, severe drought to the eastern end of the State, especially north of Boston. But little frost damage occurred and damage by hail was not large. Late blight and rot injured potatoes considerably, and the season was not favorable to a large cranberry crop. With these and perhaps a few other exceptions the final yields of crops as a whole were fairly good. The unusually long, warm fall, with abundant moisture, allowed crops, especially corn and tobacco, to yield better than was expected earlier.

The big drop in prices of many farm products, together with uncertainty as to the future, has caused farmers to go slow with plans for 1921. However, the open fall weather and the healthy undertone of Massachusetts agriculture, together with the feeling that agriculture is obtaining better organization and more effective leadership, have overcome much of the discouragement which otherwise must have prevailed.

It is in the interest of farmers and the entire public that prices of supplies which farmers must buy be reduced as promptly as possible in proportion to reductions in prices of farm products.

The agricultural crop of apples, *i.e.*, the entire crop, is estimated at 3,680,000 bushels against 3,240,000 in 1919. The crop of commercial apples is put at 375,000 barrels against 335,000 in 1919. Early varieties were a big crop in the eastern part, while Baldwins were a good crop farther west. Quality was fair to good, with considerable scab on McIntosh. Peaches were nearly all winter-killed, except in a few cases in southeastern counties where a small crop was obtained.

Cranberries are estimated at 275,000 barrels against 366,000 in 1919. Prices for the early crop were somewhat disappointing, but rose as the supply decreased. Pears are estimated at 109,000 bushels against 115,000 in 1919.

Figures upon the acreage and production of the field crops

are omitted, pending appearance of the new Census for 1919. A publication containing these detailed figures by counties is contemplated.

The Present Poultry Situation.

The poultry industry of our State received a decided setback during the war period due, first, to the fact that at the very beginning of the war the price of feed almost doubled in a comparatively short time, while the price of eggs and poultry remained stationary during the same period; and, second, to the peculiar status of our poultry industry. In other sections of the country, farm flocks constitute practically the entire poultry population, but not so here. The small backyard flocks, the small commercial flocks of from 50 to 200 hens, also a side line enterprise, and the truly commercial or specialty flocks, containing 300 to 1,000 or more hens, constitute a very material part of our poultry industry. As the cost of feed is the main item of expense in handling such flocks as the first two mentioned, particularly, and since the demand for labor in the war industries was so great and bonuses offered so tempting, it is no wonder that these classes of poultry were very hard hit. On the other hand, farm flocks suffered very little because most of their feed was raised and accounts were not kept on most farms, so the owners did not know whether they were being handled at a loss or not. As long as high priced feed was not purchased they did not worry. These are the reasons, then, why our poultry industry has suffered more than that of other sections. However, it is coming back and coming fast, for the economic conditions that caused the decrease are now reversed. Prices of feeds are lower, while those of poultry and eggs are still high, and there is no great demand for labor in the industries.

There is, however, a brighter side to the business. The best poultrymen stayed in the work, and particular attention was given to culling, that is, disposing of the poor or non-producing birds. This was resorted to early in the war as a means of reducing production costs, and proved so advantageous that it was continued and is now an important factor in systematic poultry keeping. It has been adopted by practically all breed-

ers in the State, and has been the means of greatly improving the quality of poultry both in constitutional vigor and production. Again, a great many flocks during the past few years have been tested for bacillary white diarrhea, so the poultry breeders in the State are in better position to-day to distribute stock of quality than ever before. On the eve of this period of expansion in our poultry industry we find the work in competent hands, therefore the producers will be able to resist more effectively waves of adverse economic conditions. In view of these facts, we consider that the poultry industry of our State is on a sound business basis. There was a decided recovery the past year in some sections of the State, but in others there was apparently no increase. Our valuable soft roaster business on the South Shore was wiped out by war conditions, and the commercial duck farms were badly crippled. The latter made gains the past year, but the former has shown no revival. However, if all signs are true, the rebound in every line of poultry keeping will be much greater from now on.

The following facts show that the tendency of production the coming year will be upward: —

1. Feed prices are lower; always a stimulating factor.
2. We are in the midst of an industrial depression and labor is shifting.
3. The success of poultrymen who stayed in the business will encourage others.
4. College men and others in the instructional field are leaving to take up commercial work.
5. The requests for managers of poultry farms are increasing.
6. Our general correspondence indicates a wave of interest in poultry keeping.
7. There is an increased enrollment in poultry courses offered by educational institutions.
8. Feed dealers and poultry supply houses report a favorable outlook.
9. A prominent poultryman plans to put 40,000 chicks in his brooders this season; an increase of nearly 200 per cent over last year.
10. At a meeting of baby chick producers at the Boston show, December 28, 1920, to January 1, 1921, a poll taken showed that 9 of those present were planning to put out a total of 1,000,000 chicks this year.
11. Producers of baby chicks report larger orders on their books at this time than in previous years.
12. The price of eggs and poultry the past season has been high.
13. An abundant supply of milk, with lower price of same, will enable poultrymen to use skim milk or buttermilk for feeding chicks.

Milk Situation.

The milk situation in Massachusetts has been more satisfactory during the past year than for many years. This is reflected in the increased number of cows in the State. The reports of assessors show the greatest number of cows since 1912, an increase of 4,000 over last year. There has been more co-operation among producers, dealers and consumers than ever before. Through the educational campaigns the public has come to learn the food value of milk and has a better idea of the costs of milk production and distribution. The result has been a better understanding and a tendency to increase the use of milk even though the price has been raised. Newspapers have shown an intelligent conception of the situation and their assistance has been no small factor in securing a better knowledge of conditions.

The consumption of milk has increased notably in the various Massachusetts cities. This is true not only in homes but also in schools, factories, stores, and elsewhere. The Department of Public Utilities reports 165,000,000 quarts of milk shipped into Boston during the past year. This is an increase during the year of 10,000,000 quarts, or approximately 1 pint per person per month.

The quality of milk has increased also as evidenced by the reports of milk inspectors in the various Massachusetts cities.

Plant Pest Control.

The work in the Division of Plant Pest Control is concerned chiefly with nursery inspection, European corn borer and white pine blister rust. The usual inspections for various pests and plant diseases have been made in the nurseries and conditions were very satisfactory. Due to the fact that the Federal Horticultural Board now prohibits the importation of nursery stock, the Division has had more time to spend on the inspection of interstate shipments. A large number of these shipments have been examined, including many carload lots.

Corn Borer.

The work in connection with the control of the European corn borer has been taken over largely by the United States government. In co-operation with them we are enforcing a quarantine against this pest. A year ago this quarantine applied only to corn, but it seemed advisable this year to extend it, so that it now applies to corn and broom corn, including all parts of the stalk, celery, green beans in the pod, beets with tops, spinach, rhubarb, oat and rye straw as such or when used for packing, cut flowers or entire plants of chrysanthemum, aster, cosmos, zinnia, hollyhock, and cut flowers or entire plants of gladiolus and dahlia, except the bulbs thereof without stems. All of these products except corn are allowed to move outside the infested area providing they pass inspection. The insect has spread very little during the past year, only twelve new towns having been found infested. These were quarantined immediately. During the year new infestations were discovered in New York State and Canada, the latter infestation covering a large area and being considered more dangerous to the corn section of this country than those in New York or Massachusetts.

White Pine Blister Rust.

Work in the control of the white pine blister rust has been conducted in co-operation with the Bureau of Plant Industry, United States Department of Agriculture. This year this control work has been carried out almost entirely on the local co-operative basis, one town (Petersham), the Massachusetts Department of Conservation and thirty property owners subscribing a total of $2,377 for co-operative work. With the funds available as a result of this co-operation, field work has been in progress in sections of eleven towns in the State.

In these towns 19,389 acres of land have been examined and 1,224,306 wild and 1,421 cultivated Ribes (currants and gooseberries) destroyed, at an average cost of 54 cents per acre.

The disease is still generally distributed throughout the State, but where control work has been performed very satisfactory results have been noted.

Apiary Inspection.

The apiary inspection work was conducted along the same general lines as in previous years, but with the appropriation reduced it was impossible to do much in the suppression of the brood diseases of bees. It was possible, however, to care for most of the worst cases, and much good was done in the way of eradication. Several towns which had not been recently inspected and some which had never been examined were visited. This resulted in the discovery of serious conditions, in some cases calling for intensive work and demonstrations to aid the inexperienced beekeeper.

Division of Dairying and Animal Husbandry.

The law-enforcement work of the Division has been carried on as usual. Sixty-one cases of law violation have been found, all resulting in convictions. Because of the increased number of violations, more inspection work was conducted, totaling 10,580 inspections. In a few cases the violations were due to ignorance, but the high price of butter probably tempted many to evade the law, resulting in fifty-one convictions of restaurant proprietors, etc., furnishing oleomargarine without notifying patrons.

The members of the Division have addressed thirty-two farmers' meetings; inspected six agricultural fairs; judged live stock at two fairs and attended four pure-bred live-stock conventions. N. E. M. P. A. committee meetings have been attended, to assist with their studies and investigations on the cost of producing milk and in outlining a surplus plan.

The Division has been pleased to serve the Attorney-General and the Commission on the Necessaries of Life.

In September a special study of the condensed milk situation was made, and a review presented for the consideration of milk distributors who manufacture.

Some investigation has been made tending toward a plan to encourage Massachusetts dairymen to raise more heifer calves. The use of better sires is encouraged at all times. Record associations known as cow-testing associations, have been dis-

cussed at several meetings and will be organized where an interest develops.

At the Eastern States Exposition an exhibit was made of three calves fed varying quantities of milk, to show the effect of milk on the health and growth of young animals.

Thousands of milk leaflets have been sent out to encourage the use of more milk. The Division has published a Shepherd's Handbook, a Directory of Breeders of Pure-bred Dairy Cattle, Dairy Statistics, and has reprinted the milk leaflets.

Detailed reports were made of eighteen cattle auction sales, which showed that many of these are not herd dispersals but sales by cattle dealers, and that by-bidding is prevalent at such sales.

Studies are being made of the weekly market quotations in dairy products, feeds and live stock.

Demonstration Sheep Farms.

The demonstration sheep farms have been of considerable service in their respective territories. During the year they have had 1,160 visitors, and have given 31 demonstrations. Outside work has consisted of 321 calls, 39 demonstrations, 1,393 sheep sheared, and 215 treated for worms.

In addition to the visits, demonstrations and assistance given, there have been many calls at several of the farms for information of various kinds, inquiries for breeding stock, assistance in marketing wool and early lambs, and many inquiries about ailing sheep and lambs. They are becoming more and more centers for information.

Bird Work.

The Division of Ornithology has issued eight publications during the year, and has three more in process of preparation. A list of officers and officials of Massachusetts organizations interested in the study and protection of birds has been prepared.

The director has been interested in promoting treaties with Latin-American countries for the protection of our birds in

their migrations into or through those countries. Several investigations have been made regarding the habits and economic value of native birds. These investigations are not yet completed.

An attempt was made to secure a census of the heath hen, which was unsuccessful, owing to the inclement weather, but indicated that the species was increasing in the reservation and adjoining region.

On Marthas Vineyard in Massachusetts this nearly extinct species of game bird is now making its last stand. It was formerly abundant along the Atlantic seaboard in New England and the Middle States in all suitable places. There are no living birds of the species left now except on Marthas Vineyard. It is very important that this species be saved to posterity, and reintroduced in the region it formerly occupied on the mainland.

The Division has continued the work of collecting data on the distribution and migration of birds in Massachusetts, and has prepared monthly bulletins and notes for Division observers. A reconnaissance of western Massachusetts was made during the summer to determine as far as possible the breeding ranges of birds of the Canadian fauna in this Commonwealth.

Division of Markets.

The year's experience of the Division of Markets brings out the fact that there is a great need for investigation if progress is to be made and intelligent direction given to administering the activities assigned to us under the law which establishes the Division.

The problems are exceedingly complicated. Historical data and results obtained from long experience, which are available to indicate the course of procedure in the production of crops, are very limited in marketing problems, making the task doubly difficult. It has been only within the last six years that the individual States began to establish bureaus or divisions of markets. Twenty-one States have them, and a larger proportion of these were organized within the past three or four years.

The more efficient distribution of food, which is fundamental to our marketing problems in Massachusetts, involves not only our local agriculture and its marketing phases, but also the factors of distribution involved in the marketing of foodstuffs received from other sources contributing a large proportion of our food consumed.

The problems of marketing concern the producer, middleman and consumer, the transportation companies, auto truck owners, the cold-storage companies, our banks, brokers, wholesalers, shippers, etc., and all are involved in the complicated machinery which has developed and by means of which our food supplies are distributed. This machinery has been erected as the demand of a growing country required; although in some degree the outgrowth of chance, its development has been guided in the main by the best judgment which the experience of business men could give. As conditions and times change, improvements come. To use revolutionary methods would cause the breaking down of the whole system without accomplishing the desired results; it is necessary, therefore, to proceed with caution in our work of making an established system more efficient.

Facts, and not rumors, must be our guides. A thorough understanding must be acquired of each factor in our methods of distribution and system of marketing. They are closely woven and one cannot be adjusted without having its effect upon the other. These effects should be forecasted as far as possible in order that the results desired may be attained.

The distribution of human necessities through the most economic marketing system which can be devised and built up out of our present machinery is the just demand of the public, and this will be accomplished as rapidly as co-operation is secured among the business, administrative and educational agencies.

The elimination of deceptive practices in marketing and distribution will be a large factor in reducing the wasteful and excessive handlings from producer to consumer. Those who do not perform a necessary service can be weeded out and the present system will be benefited. No opportunity should be neglected to detect and accomplish the removal of the

menaces which work to the disadvantage of the public as well as that of the honest producer and distributor.

Business carried on by large competing units proves more efficient as they move their wares at lower costs than innumerable independent small units, each of which does a business too small to secure the advantages of buying in large quantities and economical retail distribution.

The consumer has given but little thought to marketing problems and yet he is affected by them as much as the producer. He cannot secure the benefits he desires until he gives to these problems at least as much attention as the producer is giving.

The work of the Division of Markets is outlined by the law which establishes the Department, and the limitations imposed by inadequate appropriations have made it possible to initiate during the past year only a few of the lines of work required of us by the law. The following activities have been undertaken: —

1. Studies of (*a*) the sources of supply for Massachusetts markets, (*b*) transportation, (*c*) quantities of supplies available, (*d*) total figures on Massachusetts production, (*e*) estimated figures on Massachusetts consumption, (*f*) quantity of food products in storage, (*g*) standardization, (*h*) city marketing, (*i*) roadside markets.

2. Maintenance of (*a*) a marketing news service, (*b*) an exchange service, (*c*) inspection and control work.

3. The furnishing of information and educational material on various phases of the work and on marketing in general.

Market News Service.

The collection and dissemination of reliable information relative to supply, demand, movement and prices of farm products, designed to keep buyer and seller equally well informed, is one of the most important services a division of markets can render. One of the elements inherent to the continued success of market reporting work lies in the promulgation of this information by an agency of unbiased interest, and this qualification a State division of markets is unique in being able to offer.

Operating under a system which insures the receipt of our reports only by those who are financially or especially interested, our reporting service is apparently on a sound basis. Although an extension comparable with our facilities has been made in the work this year, the field is hardly yet entered. There is an urgent need for point of production reporting, full and complete market information adaptable to consumers' needs, and the development of our system of dissemination by such agencies as daily newspapers and local organizations. Letters from organizations and individuals requesting a continuance of the market reporting in Worcester and Springfield have evidenced the service which the reports render, so unquestionably as to warrant the statement that reports of this nature are indispensable to the farmers who market locally. It may be well to add that the constructive suggestions and criticisms contained in these letters have aided greatly in gauging the trend of demand for this type of work.

Although our Boston farmers' produce market report reaches a mailing list of approximately four hundred of those to whom it is particularly valuable, yet there is still a field in Boston as well as other large cities of our State for the dissemination of valuable market information particularly adapted to the consumers' needs. Work of this nature has been started this year, but because of lack of funds has not been extended to its greatest possibilities.

Production and progress reports are necessary to the marketing plan of any business and especially to that of the farmer, whose products are subject to unusually sharp and rapid price fluctuations. Trade organizations function in the furnishing of information to their constituents. The United States Bureau of Crop Estimates has served in this capacity for our farmers. Evidence of the value of its reports and of their future possibilities is constantly before us. Because of the unity of New England geographically, and with respect to our agricultural problems, the time seems opportune to render support to a co-operative New England crop-reporting system.

City Marketing.

Large cities form marketing centers, each with problems of marketing peculiar to itself. If real concerted progress is to be made in this branch of marketing, municipal market departments seem to be almost a necessity. State legislation providing for general supervision, supported by city ordinances, would establish an organization with sufficient control to insure its unity of action and would retain all the advantages of local contact. The work of these municipal market departments would include the administration of all municipal farmer's and other public markets, and serve as publicity agents to the people of the city regarding conditions and prices in the local markets, and other market information.

Public Markets.

The better the method of marketing, the more inducement is offered the farmer to produce a greater quantity. Community markets, located in the center of the city, benefit the small producer who does not raise enough for wholesale, benefit the city by bringing business to it, and benefit the consumer by enabling him to purchase produce brought directly from the farm and therefore in a better condition.

A majority of the eighteen public markets in operation in 1920 were open from July to November for two days a week, under the control of a market master, and most of them show an increase of from 10 to 20 per cent over last year's business.

A large proportion of the produce is raised by small gardeners, while, in order to compete with the retail stores, certain commodities out of season and coming from the South have to be bought at the Boston market. As a result, five of the markets established a hucksters' row.

A thorough investigation of the public market situation in Massachusetts showed little actual reduction was made in prices to consumers, and the tendency of the farmer was to increase his prices to practically those maintained by the dealers in the retail stores, giving in return better and fresher products.

The Roadside Market.

Excellent roads in Massachusetts and consequent large travel offer a big field for roadside selling, and this method of marketing farm products has become very popular during the past year. Farmers located on a good auto road, notably those near a large town or city, have reported increased success.

The desire to buy farm products direct from the farm, thus eliminating transportation charges and the tolls of the middleman, has induced many an automobilist to combine business with pleasure, which accounts for the growth of the roadside market.

Questionnaires were sent out to owners of roadside stands throughout Massachusetts, and valuable information was received relating to the success and problems of roadside selling. In each case the biggest problem was to raise enough produce to supply the demand. To relieve this situation farmers are buying outright from their neighbors or selling on a commission basis of 10 per cent.

The chief criticism of roadside marketing concerns the price asked by the farmer. The farmer selling at his front door has not the overhead expense of a store, — no rent, no expense for heating or lighting nor transportation charges, nor dealers' profits which are a great deal more than the cost of maintaining a roadside stand; therefore, the automobilist expects the farmer to divide the difference with the buyer who furnishes the gasoline to go after his products.

Direct Marketing.

In a day when the elimination of the middleman and the plea for direct marketing is the popular cry, a marketing report would hardly be complete without reference to the direct-marketing work conducted by the New England Branch of the Woman's National Farm and Garden Association. The purpose of the marketing work of this association is to give an opportunity to the farm women of New England, particularly to those on isolated farms, to sell their food products and handiwork of various kinds to good advantage. Although members of this association have an opportunity to market during the

entire year through the association, an annual Christmas market is held every year. The gross sales for the three days' market this year totaled $7,800, showing a notable increase over the previous year's business.

Source of Supply of Massachusetts Food Products.

It is probably not an exaggeration to state that Massachusetts raises less than one-sixth of what it consumes, and it is no new or startling statement to say that the food on our dinner table comes from every corner of the world. Apples, onions tobacco and cranberries are the only crops which supply our demand.

The origin and period of supply of foodstuffs competing with Massachusetts-grown products have a very great bearing on our local farm business, in that they either function as a steadier of supply or as competitors with our local products. These facts, together with planting and progress reports, are important to the Massachusetts farmer and in a larger sense to middlemen and consumers as well.

Potatoes from Maine and Virginia; cabbage, asparagus, lettuce from California and Florida; tomatoes from New Jersey and Mississippi; Egyptian onions from Texas; peaches from Georgia and California; strawberries from Florida and North Carolina; apples from Washington; butter from Denmark, Argentina and Canada; meats from New Zealand; and eggs from China, indicate the wide scope of our sources of supply.

Market Distribution.

As Massachusetts ranks second in density of population, it is quite natural that our cities, which are the receivers of goods in car and train load quantities, have as one of their important functions the distribution of food. Diversified as the source of supply is, our area of distribution covers nearly as far-reaching a territory. New England and northern New York receive the bulk of food sent out from our larger distribution centers, — Boston, Worcester and Springfield. Specialties in the beef and grocery trade, however, reach a much larger territory, including Canadian, middle western, southern and

even foreign cities. Boston may be said to supply almost entirely a 50-mile area inclusive of the Cape, the remainder of our New England distribution going to the larger cities and there being redistributed.

The summer resort areas in the mountains, Maine and on the Cape draw heavily on perishables during the summer months July to September. Although all New England is a territory served by Boston as a distribution center, yet very little foodstuffs from Boston reach a territory in Connecticut west of the Connecticut River, this fact being due to the competition which is met there from New York. Worcester, with the exception of specialties, has an area inclusive of Worcester County, western Middlesex County north to Peterboro, New Hampshire, and south to Providence, Rhode Island, depending largely upon the motor truck and trolley express as transportation agencies.

The influence of the use of freight transportation is a feature of Springfield's distribution. The lines of railways from Springfield extending west to Pittsfield, south to Hartford, north to South Vernon, Vermont, northeast to Athol, east to Leicester, are all outlying points of Springfield's distribution area, the arteries of which are the railroad lines.

Similar material concerning other cities in the State is available, from which one may see at a glance the section covered by the distribution from each city, and the center from which each locality in the State receives its shipped-in food supply.

Transportation.

New England, producing only a small proportion of the food it consumes, is so located with respect to the nation's food supply as to make it imperative that her supply may arrive without interruption. Our geography is such as to require the full use of our gateways to the West, and the limitations thus placed upon us make essential the thorough organization of our railway freight service. Avoidance of delays, sufficient and adequate rolling stock, improved refrigeration and better terminal handling equipment, as well as the education of shippers as to the proper methods of loading and packing, all are factors which should receive the attention of our common carriers.

The motor truck express has certain characteristics which make it the logical short-haul transportation agency. Not only is this method of transportation used in the carrying of farm products to near-by market centers or rail heads, but also as a means of short-haul distribution between our large cities.

The value of this service extends to both producer and consumer, for each producer finds it an agency which directly collects and delivers his products, thus giving him more time to devote to his specialty. To the consumer it brings a larger, fresher and, ofttimes, cheaper supply of farm products than may be found in markets without this form of service.

The size of the farmer's load and the rate at which it can travel are directly dependent upon the type of road he has at his service. With the increased use of the rural motor truck, there comes a demand for better roads from those interested in the distribution of food — and this includes all of us.

Storage.

Marketing of surplus is perhaps the most perplexing problem confronting producers and market men. Although involving all the factors of better distribution, the solution of this problem has as one of its features proper and adequate storage facilities both at points of origin and at market centers. Farm products, unlike the products of industry which may be offered for sale during practically any period of the year, have the peculiar characteristic of being ready to market in bulk during a short season. It may well be said that adequate storage facilities are a safety valve to this situation. We already have a highly developed storage system which is apparently sufficient to meet our present needs, but our work is to assure its further development to provide for future requirements.

Storage should be supplemented by sufficient handling facilities at terminals, the want of which results in extra costs, either in wastage or added handling charges for diversion storage.

Grades and Standards.

There are two elements or factors entering into the cost of any commodity, — quality and quantity. Upon them depends the making of the price, and the lack of one of these elements prevents the determination of a fair buying or selling price. One of these elements has a direct relation to grading, and the other to standard containers. The grading of products tends to eliminate unnecessary costs of handling and establish a definite basis upon which intelligent dealings may be had, — advantages which should be recognized by every one. Standard grading of Massachusetts farm products has not progressed beyond the grading of apples, although potatoes and onions as well as other agricultural commodities are under consideration.

The United States Bureau of Markets has established grades for certain of these commodities, among them being onions and potatoes. The general adoption of standard potato grades during the late war period met with general favor among growers and buyers. It is our belief that grades for these commodities should be established in Massachusetts. Such grades should conform as closely as possible to those of the United States Department of Agriculture.

The multitude of types of containers, the capacity of which is often unknown to the buyer or seller, offers an example of striking contrast to other classes of trade wherein there is a fixed standard upon which business can be intelligently transacted. We have on our produce market in Boston an example of the confusion caused by the use of containers of different sizes, namely, the produce boxes used for the sale of fruits and vegetables at wholesale. It is our belief that action should be taken by the 1921 Legislature to establish a standard bushel box for this use.

Apple-Grading Law.

Mr. Lincoln once said, "It is not so important to know where we are as it is to know in which direction we are moving." This may well be applied to the administration of the apple-grading law.

Entered on our statute books in 1915, the law has now been in effect five years, a period probably long enough to establish its adaptability to the needs of our apple-growing industry. Comprehensive enough to include all possible types of packing, the grades established by the law have superseded the multitude of trade terms formerly used to express grades of apples, and are now in practically universal use among packers of apples in closed packages. This, of course, has brought about unity and done away with uncertainty and confusion, but most important of all it has established a determinable basis for trading.

Almost universal satisfaction and favorable trade comment concerning the Massachusetts pack are strong evidence that the purposes of the law are being accomplished, and especially the primary purpose, that of the promotion of Massachusetts apple growing. Having gone through a five-year period of education only the more rigid enforcement of its requirements is necessary to bring about the enjoyment of the full benefits of its provisions.

Co-operative Organization.

It is the firm belief of this Division that a forward step towards the betterment of our agricultural conditions may be found in the word "organization." A constructive policy based upon tried and proved principles ought to promote a safe and gradual, but sane, improvement.

The elimination of existing evils and improvement of present conditions lie in co-operative organization rather than political control. Legislation is necessary only for the needed regulation and the prevention of discrimination, allowing full scope to be given co-operative effort and organization.

Generally speaking, the farm is too small a unit to market its goods successfully. Three very important conditions essential to the successful marketing of farm crops are: a uniform grade; a continuous supply; and a means of guaranteeing these two things.

Ordinarily, the farmer is not able to furnish these things by himself. Organization goes a long way toward helping the farmer store his products through the extension of credit, as well as offering him a place in which to store his crops. It

establishes uniform grading, continuous supply and a guarantee of its grade brand, eliminates duplication of effort and the employment of unnecessary agents for selling by the establishment of one large selling agency, with the resulting advantage of the development of permanent trade relationships.

Believing that the principle of co-operative organization is correct, we stand ready to assist in the promotion of sound co-operation for both buying and selling.

Co-operative Relations.

This is a day dominated by the principles of collective effort. Organization and co-operation are as essential to the successful operation of marketing agencies as are these principles to successful farming.

We are working under a co-operative arrangement with the United States Bureau of Markets, in which we exchange that portion of our market news which is useful to each other. In order that we may receive the benefits of each other's labors and thus render more complete and efficient service, plans are under discussion for the extension of this work. The Division of Markets is a member of a national body, the National Association of State Marketing Officials, which has outlined as one of its projects for the coming year a definite relationship of the work of State and national marketing departments. Our Division is represented on this committee.

Moved by a similar motive, we have met with our State Agricultural College marketing officials and framed a plan of action in which our activities would overlap as little as possible and by which we might be of mutual assistance in working out our State marketing problems.

New England, having many interests in common, seemed to call for the organization of its State marketing departments. Accordingly, our Division met with our neighboring States for the purpose of forming a New England organization. Two meetings have been held out of which has arisen the New England Marketing Officials Association, through which we hope to be able to co-ordinate our action and unify our effort for the common good of New England agriculture.

Our policy has been to maintain close contact with all the agencies concerned with marketing work, including the County Farm Bureaus and farm and trade organizations, in the belief that the greatest benefit will be accomplished when those vitally interested present directly the problems in which they are concerned.

Information in Marketing.

We have sincerely welcomed every opportunity to be of service to any individual or group of individuals, whether it be to assist them in selling their produce or in expediting their shipments of goods, and although the opportunities for big and broad service stand out as we look to the future, yet we hope we may continue to be of service to each and every one coming to us with a question or problem.

The daily conferences and correspondence of this Division contain questions on general agriculture, requests for information on marketing conditions, prospects, crop conditions, supply, prices, grades, standards, market legislation, lists of producers, brokers, distributors and many other inquiries and requests of a similar nature.

Investigations have been conducted on the following: sugar for canning purposes; transportation facilities at times of interstate commerce rulings; trade satisfaction with Massachusetts-packed apples; cider manufactured by farmers; tracing and expediting shipments, and others of a similar nature.

The Division has been called on at times to speak and write on marketing subjects. Some forty addresses have been made, and ten articles for publication have been released.

Four exhibits have been conducted at agricultural meetings or fairs during the past year, demonstrating the work of our Division, the most extensive of which was held at the Eastern States Exposition, Springfield, Massachusetts, in which was featured a modern roadside stand, with educational material relating to this method of marketing. Demonstration of grades and standards and information relative to the work of this Division formed a large part of this exhibit.

DRAINAGE BOARD.

The director of the Division of Reclamation, Soil Survey and Fairs was appointed by the Department as its representative

on the State Drainage Board (chapter 289 of the General Acts of 1918). While the Drainage Board has three petitions filed, no action has been taken beyond tentative investigation because of proposed changes in the above act by the recess committee. Now that the revised act has been authorized, the petitions will be acted upon.

Division of Reclamation, Soil Survey and Fairs.

Soil Survey.

In co-operation with the United States Department Bureau of Soils, a soil survey of the State is being taken, county by county.

In 1919 the counties of Bristol and Barnstable were surveyed and this year the county of Norfolk. Plymouth County was surveyed in 1911. As soon as the Bureau of Soils can complete its field notes, copies of the soil survey map, together with the published key, will be available.

In addition to the regular soil maps, the agent of this Division has prepared a set of notes and photographs which will make a valuable soil manual of each county.

Fairs.

The sum of $25,000 was appropriated for the season of 1920 to be awarded as State prize money and to pay for special exhibits for the encouragement of agriculture.

The following exhibitions were held in 1920: —

1. Franklin County Agricultural Society, Greenfield, September 14 to 16.
   Market garden display exhibit.
   Bank of McIntosh apples (50 flats).
   Apple-grading law demonstration.
2. Eastern States Exposition, State Building, Springfield, September 19 to 25.
   Exhibits by Division of Markets.
   Exhibits by Division of Ornithology.
   Exhibits by Division of Dairying and Animal Husbandry.
   Exhibits by Division of Plant Pest Control.
   Exhibits by Division of Information.
   Exhibits of fruit, cranberries, onions, tobacco, dahlias and cereal crops, model community center, high school boys' camp, mystery fountain, etc.

3. Hampshire, Franklin and Hampden Agricultural Society, Northampton, September 28 to 30.
   Cranberry exhibit, high school boys' camp.
   Apple-grading and fruit exhibits.
4. Brockton Fair, Brockton, October 5 to 8.
   Market garden exhibit.
   Bank of apples (50 flats).
   Honey and bee products exhibit.
   Publications and standard package exhibit.
5. New England Fruit Show, Hartford, Connecticut, November 5 to 9.
   Display exhibit of Massachusetts apples.
   One hundred flats and standard package exhibit on table.
6. Union Agricultural Meeting, Horticultural Hall, Boston, January 20 to 23.
   Exhibits of honey, apple-grading, publications.
   Dairying Division.

Prize money has been distributed through sixty different fairs or exhibitions during the year. These fairs were divided into four groups, according to size and general activities, as follows: —

GROUP 1.

Total number of agricultural societies in this group, 4 (Franklin County; Hampshire, Franklin and Hampden; Housatonic; and Worcester).

Total amount allotted, . . .	$4,000 00
Total amount expended, . . .	3,992 50
Amount not spent, . . .	$7 50 or .018 per cent.

GROUP 2.

Total number of agricultural societies in this group, 15 (Barnstable County, Blackstone Valley, Deerfield Valley, Essex, Highland, Hillside, Massachusetts Horticultural, Nantucket, Marthas Vineyard, Plymouth County, Union, Worcester North, Worcester Northwest, Worcester South, Worcester County West).

Total amount allotted, . . .	$8,350 00
Total amount expended, . . .	7,979 35
Amount not spent, . . .	$370 65 or 4.4 per cent.

GROUP 3.

Total number of agricultural societies in this group, 11 (Essex County, Greater Lynn, Groton Farmers and Mechanics, Hingham, Hoosac Valley, Marshfield, Norfolk County, Oxford, West Taunton, Westport, Weymouth).

NOTE. — Societies of Essex County, Greater Lynn and Norfolk County are included in Group 3, not 4, as formerly, on account of amount of allotment.

Total amount allotted,	$2,575 00	
Total amount expended,	2,270 50	
Amount not spent,	$304 50	or 11.8 per cent.

GROUP 4.

Total number of agricultural societies and fairs in this group, 30 (Acton Agricultural, Anawan, Bedford, Bournedale, Braintree, Dalton, Dedham, Great Barrington, Hamilton-Wenham, Harwich Agricultural, Heath, Hinsdale, Lawrence Horticultural, Lee, Lunenburg, Maynard, Needham, Northfield, Otis, Pembroke, Rockland, Sandwich Agricultural, Stockbridge, Templeton, Upton Agricultural, Waltham Agricultural, Ware, Warren, Westminster Farmers and Mechanics, Williamsburg Grange).

NOTE. — Dalton, Hamilton-Wenham, Lunenburg, Maynard and Great Barrington granges, Upton Town Fair and Waltham Agricultural did not spend amount awarded to them of $50 each; total, $350.

Total amount allotted,	$1,525 00	
Total amount expended,	1,059 50	
Amount not spent,	$465 50	or 30 per cent.

SUMMARY OF FOREGOING GROUPS.

Total allotment,	$16,450 00	
Total expended,	15,301 35	
Amount not spent,	$1,148 15	or 6.9 per cent of allotment.

In the foregoing summary of the four groups of agricultural society and grange fairs, Amesbury and Salisbury at Amesbury, $75, and Bristol County Farmers' Society at Segreganset, $50, were not included. Amesbury and Salisbury were allotted the $75 but did not use it. The Bristol County Farmers' Society was allotted $50 and spent it.

The two above appropriations were made from a separate allotment from the allotment for the four groups of agricultural society and grange fairs. This will account for a difference of $50 in the total expended on page 29 of this report and the total expended as given in the summary of all the societies and granges on page 31 of this report, and for a difference of $125 in the total allotment on the above-mentioned pages.

Prize money was allotted and awarded to agricultural societies and fairs, as follows: —

Name.	Allotment.	Award.
Acton Agricultural Association,	$50 00	$50 00
Anawan Grange (Rehoboth),	50 00	46 00
Amesbury and Salisbury Agricultural and Horticultural Society.	75 00	–[1]
Barnstable County Agricultural Society,	600 00	600 50[2]
Bedford Grange,	50 00	47 00
Blackstone Valley Agricultural Society,	600 00	601 75[2]
Bournedale Agricultural Society,	50 00	50 00
Braintree Grange,	50 00	40 00
Bristol County Farmers Society (Segreganset),	50 00	50 00
Dalton Grange,	50 00	–[1]
Dedham Grange,	50 00	49 00
Deerfield Valley Agricultural Society,	800 00	800 00[2]
Essex County Fair (Peabody),	100 00	100 00
Essex Agricultural Society (Topsfield),	400 00	397 50[2]
Franklin County Agricultural Society,	1,000 00	1,000 00[2]
Great Barrington Grange,	50 00	–[1]
Greater Lynn Fair,	100 00	88 00[2]
Groton Farmers and Mechanics Association,	250 00	250 00[2]
Hamilton-Wenham Grange,	50 00	–[1]
Hampshire, Franklin and Hampden Agricultural Society,	1,000 00	1,000 00[2]
Harwich Agricultural Society,	50 00	26 00
Heath Agricultural Society,	50 00	81 00
Highland Agricultural Society,	650 00	645 50[2]
Hillside Agricultural Society,	650 00	649 50[2]
Hingham Agricultural and Horticultural Society,	200 00	60 25
Hinsdale Grange,	50 00	46 00
Hoosac Valley Agricultural Society,	250 00	250 00
Housatonic Agricultural Society,	1,000 00	992 50[2]

[1] No fair held. [2] Prize medals.

Name.	Allotment.	Award.
Lawrence Horticultural Society,	$50 00	$48 00
Lee Grange,	50 00	34 00
Lunenburg Grange,	50 00	-[1]
Marshfield Agricultural and Horticultural Society,	350 00	305 50
Marthas Vineyard Agricultural Society,	500 00	523 00
Massachusetts Horticultural Society at Boston,	150 00	-[1]
Maynard Grange,	50 00	-[1]
Nantucket Agricultural Society,	600 00	565 75
Needham Fair,	50 00	49 50
Norfolk County Agricultural Society,	100 00	96 00
Northfield Grange,	50 00	50 50
Otis Grange,	50 00	40 50
Oxford Agricultural Society,	400 00	478 25
Pembroke Grange Society,	50 00	41 00
Plymouth County Agricultural Society,	400 00	392 75[2]
Rockland Grange,	50 00	50 00
Sandwich Agricultural Society,	50 00	50 00
Stockbridge Grange,	50 00	25 00
Templeton Grange,	50 00	39 00
Union Agricultural Society,	650 00	475 85[2]
Upton Town Fair,	50 00	-[1]
Waltham Agricultural Society,	50 00	-[1]
Ware Agricultural Society,	75 00	75 00
Warren Grange,	50 00	47 00
Westminster Farmers and Mechanics Association,	50 00	31 00
Westport Agricultural Society,	400 00	492 50[2]
West Taunton Agricultural Society,	275 00	-[1]
Weymouth Agricultural and Industrial Society,	150 00	150 00
Williamsburg Grange,	50 00	44 00
Worcester Agricultural Society,	1,000 00	1,000 00[2]
Worcester County West Agricultural Society,	600 00	600 00[2]
Worcester North Agricultural and Driving Association,	600 00	597 00
Worcester Northwest Agricultural and Mechanical Association,	500 00	500 00
Worcester South Agricultural Society,	650 00	720 25[2]
	$16,575 00	$15,351 85

[1] No fair held.

[2] Prize medals.

The following granges and societies did not hold fairs and did not use money allotted to them: —

Massachusetts Horticultural Society at Boston,	$150 00
West Taunton Agricultural Society,	275 00
Following granges and societies (Dalton, Great Barrington, Hamilton-Wenham, Lunenburg, Maynard, Upton Town Fair and Waltham Agricultural) allotted $50 each,	350 00
Amesbury and Salisbury at Amesbury,	75 00
Total,	$850 00

Prize money was awarded to the following poultry shows: —

Amherst Poultry Association,	$100 00	
Deerfield Valley Poultry Association,	100 00	
Eastern Massachusetts Poultry and Pigeon Association,	84 00	
Great Barrington Poultry Association,	72 00	
Holyoke Poultry and Pet Stock Association,	150 00	
Lenox Poultry Association,	99 00	
New England Poultry Association,	150 00	
Northampton Poultry Association,	126 50	
Quannapowitt Poultry Association,	150 00	
Springfield Poultry Club,	150 00	
Stoughton, Norwood and Abington Poultry Associations,	99 00	
Total,		$1,280 50
Amherst Poultry Association,[1]	$100 00	
Springfield Poultry Club,[1]	150 00	
Total,		250 00
Grand total,		$1,530 50

GRAND SUMMARY.

Boys' and girls' club work: —		
Camp expenses,	$762 03	
Ribbons, pins, books, etc.,	520 44	
State champions,	225 00	
		$1,507 47
Corn shows: —		
February 9, Union Meeting,	$321 00	
March 4,	2 00	
March 13,	5 00	
March 18,	9 00	
		337 00

[1] Two shows held during the year.

Sheep-shearing contest,	$25 00
Poultry prizes,	1,530 50
Special exhibitions (including expenses and medals),	5,391 46
Agricultural prize money,	15,301 85
Total,	$24,093 28
Total money allotted,	$25,130 00
Total spent,	24,093 28
Balance in prize money,	$1,036 72

In order to determine just what each fair accomplishes in the way of agricultural encouragement, a system of inspection has been organized whereby some member of the Department or of the Advisory Board thoroughly scores each fair and files his report at the office of the Department, so that definite information is on file as to the real activities in addition to the number of cattle, horses, swine, sheep and poultry on exhibition. We also have the number of each breed and number of thoroughbreds and grades, detailed reports of fruit, vegetables, canned goods, etc. The Department believes that more and better prizes should be offered for the commercial package instead of the plate exhibit, not necessarily doing away with the plate exhibit altogether, but paying more attention to the business end of fruit growing.

In addition to this information, we ask the inspector to look over the midway carefully and to report any objectionable shows; to investigate the eating places to see if wholesome food is being served and if at reasonable prices; and to report on the sanitary conditions; also as to the order maintained, and whether the public is properly safeguarded against accident and other things of like nature. In order to make use of this information duplicate copies of these score cards are sent to each society.

As there is no real connection between the Department and the agricultural societies since the abolishment of the old State Board, and as there were a number of conflicts between the societies as to dates, the Department was instrumental in forming the Massachusetts Agricultural Fairs' Association, made up of two delegates from each society who wished to join the

association. The first annual meeting of this association was held in Worcester, January 4, and of the thirty large associations or societies in the State eighteen were reported to have joined. Dates were fixed for the holding of different fairs, and a chance given to the director of fairs to analyze the score cards of 1919, and make suggestions for general improvement along certain lines. It is believed that the societies through the State organization will be of mutual benefit.

Agricultural Exhibition at the National Grange Session.

At the annual session of the National Grange, held in Boston, November 10 to 19, inclusive, 1920, an agricultural exhibit was held in the basement of Mechanics Hall; admission free to the public for four days. This exhibition consisted of a display from each of the New England States, and was a distinct success in proving the quality of New England products. The Massachusetts Department was responsible in many ways for the success of the display. Director Munson of the Division of Markets was chairman of the committee which had this display in charge, and Mr. Lombard, assistant director of the Division of Reclamation, Soil Survey and Fairs, was in charge of the whole lower hall, exhibit space, etc., while the director of the Division, Mr. Leslie R. Smith, as master of the State Grange, together with his executive committee, had charge of the details of the whole session. It was to the untiring energy and enthusiasm of Mr. Smith that much of the success of the meeting was due. The exhibition was a wonderful demonstration of the co-operation of different agricultural organizations of the Commonwealth.

Association of Former Members of State Board of Agriculture.

At the time of the Union Meeting last year all former members of the State Board of Agriculture were asked to attend a dinner at the Boston City Club for the purpose of renewing acquaintances and devising ways and means of assisting in the general program of agricultural development in Massachusetts. The meeting was very satisfactory. A permanent organization

was formed through which the former members of the Board will meet each year. All these men have been in close touch with the agricultural development of the State and are in a position to be of great assistance in all constructive agricultural activities.

Farm Labor Bureau.

Owing to the high wages and limited hours offered to workers in industrial centers following the war, the season of 1920 found the farmers threatened with a serious labor shortage.

The Adult Farm Employment Bureau assisted many of the farmers who were unable to get local help in finding men to fill the vacancies. The farmers sent their applications to the Employment Bureau with descriptions of the farm work, wages paid, hours, etc., and suitable men were found to fill the places. During the summer season, three hundred and sixty calls for farm help came directly from the farmers. Two hundred and fifty men were placed in farm positions, and it is safe to say that two hundred others who were offered positions found places on farms but failed to notify us.

It is interesting to note that in spite of the strained farm labor situation many more qualified farmers, the majority of them being married men, applied for positions than we had positions to offer. The difficulty appeared to be in the inadequate accommodations on the average farm for the married man with family.

The call of back to the farm is being answered for the most part by the married man to whom the farm life, work and compensation is making as strong an appeal as is the city to the young man who has been reared on the farm. The adjustment cannot be made, however, until the farmer recognizes the probable stability of the married man as a laborer, and considers the extra financial outlay necessary for him as a good investment.

The selection, placing and supervision of high school boys on farms, as originated and conducted by the Massachusetts Committee on Public Safety in 1917, 1918 and 1919, was made a part of the work of the Department of Agriculture in April, 1920.

All the camp equipment, files and printed material were available and delivered to this Department, thus providing the records of over 5,000 boys placed during the war. Ninety per cent of these boys were from the city high schools and were taking up farm work for the first time.

Over 90 per cent worked all of the vacation period and proved satisfactory to their employers. Several hundred have enrolled the second and third years, and over 100 returned this year to employers of previous years. Others have taken year-round jobs or entered the Massachusetts Agricultural College.

In 1918, 2,500 boys were placed on farms. They earned $500,000 and added $2,000,000 to the crops. Twenty-two camps were operated containing 1,600 boys and 900 others were placed on farms where they boarded.

Private subscriptions expended, 1917,	$11,000
Public safety appropriation, 1918,	39,000
Special appropriation by Legislature, 1919,	2,500
Special appropriation by Legislature, 1920,	7,500

Of the $39,000 spent in 1918, $22,000 was for camp equipment, tents, cots, cooking utensils, tent floors, cook shacks, etc. Much of this equipment is still available, but repairs and replacements are necessary after three years' use.

In 1919 the appropriation was not granted until July 24, too late to plan the season's work, which begins with the schools, — supervisors selected, camp sites selected and equipped, all in the early spring.

The 1920 appropriation of $7,500 has been expended as follows: —

Supervision,	$1,437 32
Medical attendance,	138 00
Opening and closing camps, equipment, etc.,	1,376 72
Railroad fare for boys,	1,351 43
Office, salary, traveling expenses, printing, etc.,	3,206 53
	$7,500 00

Boys placed,	707
In camps,	215
On individual farms,	492

These boys earned $140,000 and added approximately $640,000 to the farm crops this year.

Camps were operated as below: —

Location.	Number of Boys.	Supervisors.	Boys' Gross Earnings.	Camp Expenses.	Boys' Net Earnings.
Feeding Hills,	100	3	$15,618 65	$5,560 84	$10,057 81
Whately,	25	1	3,373 66	1,194 50	2,179 16
Southwick,	30	1	4,442 86	1,635 26	2,807 60
Hatfield,	60	1	12,764 98	3,935 00	8,829 98
	215	6	$36,200 15	$12,325 60	$23,874 55

With an earlier start next spring more camps could be established, and doubtless 1,000 boys could be sent from the city high schools to Massachusetts farms.

I believe that this work should not only be continued, but should be liberally supported by the Legislature. It is not only of great benefit to the boys themselves, but to the farmers who employ them, and it is tending to induce a considerable number of city boys to make farming their life work.

Agricultural Information.

A large part of the work of the Division of Information has consisted in supplying material on various agricultural subjects to persons who requested such information, either on personal visits to the office or by letter. At the beginning of the year the Department had on hand a large supply of some bulletins and circulars previously prepared, but other publications which had had a considerable circulation were out of print and unavailable. It soon became evident that many of the Department's former publications, including some still on hand and others which were out of print, were no longer in demand and it therefore became necessary to dispose of those which remained either by distribution or otherwise. A considerable number were distributed at agricultural exhibitions, especially at the Eastern States Exposition at Springfield and at the Brockton Fair, and others were turned over to the superintendent of buildings to be sold as waste paper.

Publications.

The Division determined to work toward a policy of printing a small number of large publications practically in textbook form on the principal types of farming practiced in Massachusetts, and to supplement these with shorter bulletins on various phases of these same subjects and on additional subjects in which there might be interest. Work was immediately begun upon a new edition of the book on "Apple Growing," for which there was much demand. Arrangements were made with recognized authorities on various branches of the subject to prepare articles for the new book, in some cases by revising articles which had appeared in the previous edition and in other cases by writing articles entirely new. Since the Department had no literature on the growing of peaches or on the culture of pears, an effort was made to secure articles on these subjects with appropriate illustrations. The article on peaches was secured but the article on pears could not be arranged for in time to be included in the new edition. Since the subject-matter of the book was extended beyond the field of apple growing, the title was changed to "Orcharding."

The annual Union Meeting brought out a number of instructive papers on special subjects, and by arrangement with the authors nine of these articles were printed as circulars and distributed by the Department during the year. These circulars dealt with phases of the following subjects: —

General farming,	1
Fruit growing,	3
Apple grading and marketing,	2
Small fruits,	1
Peach growing,	1
Agricultural fairs,	1

A new circular on birds was prepared by the Division of Ornithology and printed during the year, and revised editions of several other circulars previously prepared by the same Division were also printed. The publications prepared by the Division of Ornithology are among the most popular published by the Department, and two or three of them probably have a wider circulation than any other Department publication.

The Department formerly had a series of large bulletins of one hundred and fifty pages or more on —

No. 1. Poultry Culture.
No. 2. Apple Growing.
No. 3. Grasses and Forage Crops.
No. 4. Small Fruits and Berries.
No. 5. Vegetable Growing.
No. 6. Dairying.

According to the present plans all of these, except No. 3 and possibly No. 6, will be revised and reprinted as rapidly as possible and kept on hand hereafter. The demand for No. 3 is now comparatively small and may possibly be met by publications from other sources, and an attempt is being made to secure publications from other sources to meet the demand for No. 6, but if this proves impossible a new edition of No. 6 will be undertaken. It is generally agreed, however, that the first book in this series should deal with farming opportunities and conditions in Massachusetts under the title of "Farming in Massachusetts," or something similar. Material is now being collected for this bulletin under the headings Geography, Climate, Soils, Markets and Transportation, Agricultural Organizations and special types of farming, such as Dairying, Orcharding, Market Gardening, Poultry Keeping, Cranberry Growing, Tobacco Growing, etc. Data should be available from the 1920 agricultural census to provide recent statistics, and arrangements are being made to get detailed information about local conditions in each county from county farm bureaus and improvement leagues and some leading farmers in each of the important lines of agricultural work. Illustrations are also being secured for this book to show the topography of the different parts of the State, some of the important crops, thoroughbred herds, and the like. Brief information was contained in the list of farms published by the Department in 1911 and earlier, but it seems certain that a more extensive and detailed account of the agricultural resources of the State will be of value and will obtain a wide circulation. In order to have some material about agricultural conditions in the State which could be distributed before the publication of the pro-

posed book, a short statement on the subject was written and multigraphed. Several hundred copies of this statement have been sent out during the year in answer to inquiries.

The possibility of a co-operative arrangement for getting out publications with the Agricultural College was discussed and a plan is being worked out whereby this can be done.

Press Notes, Co-operation with Newspapers.

The principal contact of the Department with the daily papers of the State has been through the "State House News Service," to which items have been furnished during the year. One of the reporters connected with the service is also correspondent for the "New England Homestead," to which he sends a summary of the Department's work each week. Early in the year certain inquiries were made by one of the Boston daily papers for detailed information about the effect of daylight saving on farm operations, and this was followed by inquiries about other special topics of interest at the time. The information supplied was used in the preparation of editorials for this paper. Requests by the other Boston papers for information on special topics have been rather frequent, and the Division has endeavored either to supply the information wanted or to refer the inquirers to the source from which it could be secured.

Since there was no general information in the farming sections of the State about the reorganization of the Department and the work of the several divisions, a series of articles was prepared for the various county farm bureaus to be used in their monthly publications. This series consisted of seven articles, the first giving an account of the Department as a whole and each of the succeeding six describing the organization and the work of one of the divisions. These articles were printed in full by the Middlesex County Bureau and largely by the Hampden County Bureau, and extracts were made from them by other county bureaus. Statements about other matters of interest have been sent to the county bureaus from time to time. It is the intention of the Division to continue supplying notes about items of interest to all the county bureaus so that

these notes may be included in the county publications, and thus give a wider circulation to accounts of the work of the Department.

Meetings of the Department.

Soon after the reorganized Department began its work a suggestion was made that something should be done to bring the Department into closer touch with the feelings and wishes of practical farmers in all parts of the State. With this object in view the Department decided to hold a series of meetings in all the mainland counties as early in the spring as possible, and all but one of the meetings were accordingly held between March 15 and April 10. Places, dates and estimated attendance at these meetings were as follows: —

Spring Meetings.

Place.	Date.	Approximate Attendance.
New Bedford,	March 16	25
Brockton,	March 18	125
Hathorne,	March 23	60
Lowell,	March 24	35
West Acton,	March 25	60
Framingham,	March 26	30
Haverhill,	March 30	100
Worcester,	March 31	100
Gardner,	April 1	40
Greenfield,	April 6	65
Springfield,	April 7	25
Northampton,	April 8	40
Pittsfield,	April 9	30
Brewster,	May 9	250
Total,		985

In addition to the regular sessions Mr. Forbush, director of the Division of Ornithology, gave special talks to pupils of the high and graded schools in Springfield and to pupils of the graded schools in Northampton. At Springfield he spoke before audiences of at least 2,500 and at Northampton to 300 or more.

Practically all these meetings were devoted to talks and discussions about the Department's work. The Commissioner and the Directors of the several divisions explained the powers and duties of the Department, its new organization, and its projected program. By invitation of the Department representatives of the Agricultural College participated in all the meetings. After the speaking the meetings were thrown open for questions and discussions and in several places illustrated talks were given by Mr. Forbush and others.

Some of the meetings were not largely attended, partly because it was impossible to arrange them so as not to interfere with the spring work necessary on some farms, and partly because many of the farmers in the State felt rather discouraged last spring and were not in a frame of mind to attend meetings. Those who did come, however, were generally satisfied with the speaking and discussions, and some of them made valuable suggestions for the work of the Department.

The meetings had a definite value in almost all the places in which they were held, and resulted in action being taken upon specific problems in some of these places, as, for example, in Lowell, where they stimulated the establishment of a wholesale market for farmers, and at Worcester and Springfield, where they brought about the establishment of a market-reporting service which was continued from early summer until November.

At Greenfield the meeting was conducted as a part of an open meeting of the Greenfield Grange, and at Brewster the meeting formed a part of the program of the monthly meeting of the Cape Cod Pomona.

Commissioner's Travel.

The Commissioner has attempted to do a good deal of traveling inside the State during the past year so as to become thoroughly acquainted with farming conditions and farmers themselves. A few trips have been taken outside the State, notably to Washington in connection with quarantine and other departmental matters; a trip to Chicago to attend the annual conference of commissioners of agriculture of the United

States; and a trip to Indianapolis to attend the annual meeting of the Federated Farm Bureaus. The agricultural work of Massachusetts is naturally closely related to that of other States, and conferences of this sort are invaluable.

Changes in the Staff.

Mr. J. Howell Crosby of Arlington, a member of the Advisory Board, resigned in July, and Mr. Edwin H. Priest of Littleton was appointed by Governor Coolidge to fill Mr. Crosby's unexpired term.

On March 15, Miss Hylda M. Deegan entered the Department to act in the capacity of confidential secretary to the Commissioner; on April 15, Miss Dorothy Goodwin, formerly statistician with Harris, Forbes & Co., took over the statistical work of the Division of Markets; and on April 15, Miss Helen W. Grant, formerly with the United States Food Administration, and later with the mayor's Employment Bureau for Returned Soldiers and Sailors, assumed the duties connected with the Adult Farm Labor Bureau of the Division of Agricultural Information.

On April 26, Mr. Stephen R. Dow was added to the Division of Information and appointed supervisor of the Boys' Farm Placement Bureau in charge of placing and supervising school boys on farms and in camps. Mr. Dow was director of this work during the war for the Massachusetts Committee on Public Safety and Federal State Director of the United States Boys' Working Reserve.

The Department suffered a severe loss in the resignation on September 30 of Miss Josephine W. Riley as executive clerk. Miss Riley has served the Department faithfully and well for many years. She became the wife of Mr. R. Harold Allen, director of one of the departmental divisions. Our loss is, therefore, his gain.

Mr. Leland H. Taylor resigned as assistant Director of the Division of Plant Pest Control on November 30 to continue his graduate studies at Harvard University. Mr. Taylor was an efficient and faithful worker.

Rearrangement of the Office.

The Department and its predecessor, the Board of Agriculture, had for many years occupied Room 136, State House, and a small room opening into it, the latter being used by the secretary of the Board or the Commissioner as a private office. These rooms had become very much crowded and it was immediately evident that the Department should have more space and should rearrange its office in order to secure better working conditions and to make its files, records and papers more easily accessible. As a part of the rearrangement of the offices in the building the Department was allotted a storeroom off the corridor, near its main entrance, which had previously been used by the Department of Public Health, and two rooms formerly occupied by the Commissioner of Animal Industry. By moving its inactive files and its publications into the new storeroom, and by tearing out the wooden partitions which separated the rooms used by the Commissioner of Animal Industry for offices, a better storage arrangement for publications was secured, and an additional office room nearly two-thirds as large as its old office room was added to the space occupied by the Department. A small room formerly used as a part of the entrance corridor to the offices of the Board of Conciliation and Arbitration was also allotted to the Department and arranged as a library. These changes in the arrangement of the office, with the additional space and the elimination of a large quantity of useless papers and books, made the material carried by the Department much easier to store, and also increased the amount of space available for storage purposes. A room formerly used partly for storage has been rearranged into a machinery and supply room, additional space being secured by tearing out shelving on three sides.

The work of renovating the office was completed by moving the furniture so as to bring the desks of the principal officers near the windows, by cleaning and painting the walls and ceilings, installing a new lighting system, and replacing the carpet on the main office floor with linoleum. As a result of this work the Department now has a much more commodious of-

fice with a systematic arrangement and good lighting, the change being so complete as to transform the appearance of the office in every respect.

Advisory Board.

The Advisory Board has been of very material assistance to the Commissioner with advice and counsel on agricultural matters during the past year. They have considered carefully the various plans put forth, particularly in the light of their application to the average farmer and the average farming conditions of the State.

The provision of the Legislature in the consolidation act for an Advisory Board consisting of at least three farmers is proving to be a wise one.

Trespass Signs.

The cloth trespass signs which the Department is required by law to furnish to applicants had become so expensive that the free distribution of these signs was no longer advisable. The privilege of obtaining the signs had also been abused by some owners of real estate who had secured several lots by making application through different persons. The Legislature was therefore requested to provide for the sale of these signs at not less than cost and an act passed accordingly. During the year about two thousand signs were sold under this law and at the end of the year the Department's supply was exhausted. The cost of the signs to the Department was practically 20 cents each so that the signs were sold at that price. The cost of signs is very largely in the heavy cotton cloth on which they are printed, and as the price of cotton declines the charge for the signs can be correspondingly decreased.

Legislation of the Year.

The Department did not propose a large number of bills for the consideration of the General Court, partly because its organization was not established in time to consider much legislation and partly because it is not the policy of the Department to advocate a large volume of legislation on agricultural subjects. The bill to provide for the collection of certain agricultural statistics, particularly those of areas to be planted,

by local assessors, which had been proposed in preceding years, was proposed again in a new form (House Document No. 756). This was done partly at the request of the local representative of the Bureau of Crop Estimates of the Federal Department of Agriculture, and partly because the Department believed it desirable to secure more information about agricultural conditions in the State and to establish the collection of such information upon a systematic basis. This bill was reported favorably by the Committee on Agriculture, but was referred to the next General Court upon the recommendation of the Committee on Ways and Means.

The Department also proposed two bills to provide for the sale at cost of posters warning against trespass on farm and forest land, and against thefts of poultry. The former type of posters is much the more important, and the action upon them is described elsewhere in this report. The posters required to be printed to warn against thefts of poultry, which were made up almost entirely of a reprint of the law on this subject, were not in demand, and when it was suggested by the Committee on Ways and Means that it might be desirable to repeal the law requiring that such posters be printed, the Department agreed to this action. A bill to provide for such repeal was accordingly passed and became chapter 231 of the Acts of 1920.

Beside the bills which it initiated on its own account were other bills of interest to agriculture which the Department followed and in some cases actively favored or opposed. The most important of these were the group of bills to provide for daylight saving, which are dealt with in another section of this report. Other important bills may be thus summarized: —

House Document No. 401 was a resolve to provide for an investigation of the agricultural resources of the Commonwealth. This bill was believed by the Department to be unnecessary, because existing law gives the Department sufficient authority to make such an investigation if money is provided for the purpose. The Department believes that a systematic investigation of such resources should be made, but not by an independent authority.

House Document No. 1329 was a bill to establish a Massachusetts standard for bushel and half-bushel boxes. This bill was introduced late,

and though supported by the Department was ultimately referred to the next General Court. It was in accordance with the Department's purpose to promote the standardization of containers used for agricultural products, and a similar bill will be urged during the next session.

Various bills to provide for the financing of county farm bureaus, particularly House Document Nos. 269 and 995, were supported. The act finally passed (chapter 103, Acts of 1920), places the burden of financing the county bureaus upon the several counties.

The Commissioner, like the other heads of departments, was authorized by chapter 44, Acts of 1920, to designate another person in his Department to perform his duties during his absence or disability.

Several bills (House Document Nos. 595 and 1188 and Senate Document No. 9) were proposed to provide for State assistance to soldiers and sailors in buying farms, but none of these bills were passed.

A bill (Senate Document No. 145) would have created a new division in the Department to supervise farms at State institutions. The Department advised with the committee to which this bill was referred and this committee reported a new bill in somewhat different form (Senate Document No. 348). The possibility of difficulties arising from the employment of the supervising agriculturist in one department to work on farms under the control of other departments, and possibly certain other considerations, led to the rejection of the bill.

The Department also followed the progress of bills relating to the continuation of the Commission on Necessaries of Life, but did not actively favor or oppose any of these.

In its report made to the General Court the Commission on Necessaries of Life recommended a strengthening of the law providing for the establishing of public markets and market places. This proposal was supported by the Department, but the law ultimately adopted was much weaker than the bill recommended by the Commission and the Department (chapter 508).

The department also advocated the passage of bills (Senate Document Nos. 457 and 458) to provide for increasing the indemnities for tuberculous cattle, slaughtered by official order, and to provide for co-operation between the State and the Federal authorities in eradicating tuberculosis from herds in the State. The first of these bills passed as chapter 470, but the Senate Committee on Ways and Means, after considering Senate Document No. 458, recommended a resolve providing for a further study of the control and eradication of tuberculosis in cattle. The resolve provided for an *ex officio* commission consisting of the Commissioner of Agriculture, the Commissioner of Conservation and the Director of the Division of Animal Industry to make the proposed study. This resolve was passed as chapter 81 of the resolves.

In addition to its work upon bills relating directly to agriculture the Department supported bills intended to increase the forest resources of the State and certain other bills which seemed likely to be of indirect advantage to farmers.

Recommendations for Legislation.

A meeting was called in September by the master of the State Grange to arrange for organization and co-operation in legislation and possibly in other matters of interest to farmers. This meeting, held at Worcester in October, resulted in several recommendations for new legislation or amendments to existing laws, and the Department was requested to recommend some of these to the General Court of 1921. The Department therefore submits these recommendations and some other bills which its experience during the past year indicates to be necessary, as follows: —

1. An amendment to the trespass laws in the form of an additional section which will provide for the arrest without warrant of trespassers upon farm, garden, orchard and other agricultural land in fruiting season and for a penalty for such trespassing. This bill is presented in accordance with the vote of the Worcester conference and also because the Department believes such legislation to be necessary.

2. A bill to provide for the marking of cans used as wholesale containers of milk to show their capacity. Evidently these distinguishing marks cannot be placed upon cans immediately, so that the bill provides that all new cans shall be marked from the first day of September, 1921, and that no unmarked cans shall be used as wholesale containers of milk after the thirty-first day of December, 1923.

3. Certain amendments to the apple-grading law seem to be necessary because the law does not now give the Department authority to inspect apples in the course of shipment from one point to another. Another addition to the act is made necessary because the act now provides no penalty upon a person who interferes with the inspectors of the Department in the performance of their duties.

4. The necessity of some arrangement to improve the crop-reporting service in this State has become more and more evident throughout the year. A bill is therefore submitted authorizing this Department to co-operate with the proper bureaus of the United States Department of Agriculture and to expend such sums as may be appropriated for this purpose. Crop estimates are proving more and more desirable because

of their usefulness in informing producers, dealers and consumers of the probable supply of the various crops in all parts of the country. The Bureau of Crop Estimates of the Federal Department already has a service which covers Massachusetts, but the Bureau desires to extend and improve this service. With co-operation it will be able to secure better results and to supply this Department with more information about crop conditions for its own use and for distribution to the citizens of the State.

5. Partly in connection with the previous recommendation the Department repeats its recommendation made last year that assessors be required to collect statistics about probable crop acreages. Since the bill of last year was referred to the General Court of 1921, it can be brought up by a motion to take it from the files. Consequently, it does not appear necessary to file it again.

6. The Department has received many complaints during the year about thefts of poultry which have become very frequent in some sections. The Department is not now prepared, however, to present a specific bill so framed as to strengthen the present law.

7. Some applications have been made to the Department to reimburse owners of currant and gooseberry bushes destroyed prior to the year 1918. According to the resolve passed at the last session, reimbursement can be paid by the Department only for bushes destroyed during the years 1918 and 1919. Bills to provide for such reimbursement and to authorize the necessary appropriation will, the Department understands, be introduced by others. The Department is willing to consider cases which arose prior to 1918 and to provide for paying reimbursement if authorized and required to do so.

Daylight Saving.

One of the principal pieces of legislation in which farmers were interested last year was the question of daylight saving, and a bill was introduced into the Legislature providing for a change in time of one hour from the last Sunday in March to the last Sunday in October, inclusive. The farmers of the State object to this measure because it interferes with their

business, and the general feeling among them was that the advantages gained by city people in the form of additional recreation, etc., was not sufficient to offset the disadvantages and losses which farmers suffer. The average Massachusetts farmer is already under such extreme handicaps and disadvantages that it was felt that no further burdens should be imposed upon him. It was thought, on the other hand, that every possible help should be given to the Massachusetts farmer to assist him in producing more food near by, thereby helping to assist in maintaining the supremacy of New England industry, and that a move such as daylight saving was distinctly contrary to this end.

The Chambers of Commerce, who favored daylight saving, however, were thoroughly organized and expended considerable sums of money in the campaign, and both branches of the Legislature voted in favor of it by a large majority.

From the experiences of last summer farmers are convinced more than ever of the hardship placed upon them by this legislation and are determined, if possible, to repeal the law during next year.

It is believed, also, that a daylight saving regime is injurious to the health of women and children, inasmuch as it brings about an abnormal day and the health of children suffers because of lack of sleep.

Co-operation of the Six New England States with the Bureau of Crop Estimates.

A plan has been devised, and it is hoped will be extended to all of the New England States this year, whereby the New England States and the United States Department of Agriculture can work together to have a common crop-reporting system.

The present is a favorable time for the six States to take action in response to the offer of the United States Department for co-operation. Experiments prove that the making of crop estimates that will be within a few points of the facts is a matter of having proper kinds and sufficient amounts of data. The agricultural departments have pushed their marketing service in co-operation to the point where it is seen by all that

participation in crop reporting is now a proper and a necessary line of work. It is proposed to merge the crop-reporting and marketing services of the United States Department of Agriculture, and this will facilitate the proposed co-operation in crop reporting, — the two services should be conducted as one.

Fundamental Importance of Crop Reports.

Every successful line of business in laying out its marketing plan finds production and progress reports for that line of goods essential, and a main function of the trade association is the furnishing of this information. Similarly current, reliable crop reports and statistics are essential to successful marketing of farm products. Business men dealing with farmers in turn find the reports of great value in enabling them to distribute their goods more in accord with probable demand. New England agriculture is dependent in several ways for its markets and for its supplies upon regions outside its borders; hence, the double usefulness of the reports.

Reports and Statistics must be Timely and Reliable.

Clearly these reports must be both timely and substantially accurate so that they may be accepted with confidence. With a view to improving and extending its reports to important crops not now covered, the United States Department of Agriculture asks the six New England States to join forces with it in establishing a co-operative crop-reporting service for all New England. The chief arguments for having the six States act together are that their combined area is about equal to that of an averaged sized State; that the commercial crops grown here come from several of the States and find their markets throughout all six; that crop reports and statistics covering only part of the States would have very limited usefulness; that a service covering all six will cost much less than six independent services; and that the six States together form the smallest efficient crop-reporting unit. The United States Department offers to pay half the cost if the six States together will pay the balance. This makes the cost to any one State relatively small. The reports on commercial crops would cover each State here and every other important

competing region in the United States, Canada and elsewhere. Each year there would be issued a summary of each State's agriculture, by counties, which would be ready for distribution by the close of the year.

Tuberculosis Commission.

A bill was introduced into the Legislature last year to provide for a co-operative relationship with the United States Department of Agriculture in the payment of indemnities for animals slaughtered which react to the test for tuberculosis. More than forty States already co-operate in this way.

The Legislature was not ready to pass upon this legislation at the last session, but provided for a commission of which the Commissioner of Agriculture is chairman, and the Commissioner of Conservation and the Director of the Division of Animal Industry are the other two members. This commission is instructed to make a careful study of the whole matter and report to the 1921 session of the Legislature. Such a study is now being made and it is hoped that the Legislature will pass a bill at its next session.

Commission for the Study of Massachusetts Resources.

During next year a very careful study should be made of the agricultural resources of Massachusetts and the types of farming followed. The increased freight rate and the enlarged New England market have brought to Massachusetts farmers a new opportunity, and the types of work which they should be induced to follow should be carefully studied and laid out along thoroughly economic lines. It is certain that Massachusetts land can be used much more extensively than at present if the types of farming which are employed here are made to fit the conditions for which our markets, soils and other facilities are particularly adapted.

The extensive development of the farm bureaus and other agricultural agencies would point toward having an agricultural program which follows sound economic lines. I recommend that a commission be appointed, consisting not only of representatives of farmers' organizations but of some of

the best industrial minds in the Commonwealth, to make a careful study of the entire situation and to see wherein industry and agriculture may be of greater mutual assistance in developing the entire resources of the State.

Advertising Massachusetts Farms in the West.

The current price of land in the West during the war and the many opportunities in the East are causing a large number of young men in the West to look eastward again to agricultural advantages. Inasmuch as there are a considerable number of farms for sale in this State, it seems advisable to make this fact known to the better type of western young men and to give them an opportunity to purchase farms in the East, if they wish. In this way young farmers may be helped because at present a considerable number of farms can be bought in Massachusetts at reasonable prices. These are fully equipped and do not require the expenditure of large sums of money; and it would also help to develop in the best possible way those farms in the State which are not now being fully used.

Increased Freight Rates.

The increases in freight rates made by the railroads from time to time since the beginning of the war are making a notable change in eastern agriculture. For the last two or three decades, when rates have been low, the food products which can be grown in the West at a cheaper cost than here have been shipped into New England in large quantities at prices lower than the cost of production here. This has had a depressing effect upon Massachusetts farming for some time, and the only farmers who have been successful have been producing specialties where their operations have been conducted on an intensive basis, such as the raising of tobacco, onions, truck, cranberries and the like.

The increased freight rates inevitably increase the price of food in Massachusetts and throw upon the eastern farmer a responsibility and an opportunity to raise greater quantities of food at home that he has not had for many years. It also places the responsibility upon industry to assist the eastern

farmer in every way possible to raise greater quantities of food and at less cost, so that the eastern industrial centers may not suffer because of their distance from the great food centers or for a market for their own manufactured products.

The development of eastern agriculture and its consequent prosperity for all persons living in rural districts opens a home market for eastern manufactured goods. The more money that comes to farmers for their products the more money is available with which to buy manufactured products.

Looking Ahead.

The principal lines of advancement which we look for during next year on the part of farmers are a more careful study of the cost of production, with special reference to the use of labor-saving devices; an increase in volume of business on each farm, so that the overhead costs may be cut down; a greater co-operation in purchasing supplies and in marketing products. The Agricultural College and the farm bureaus are thoroughly alive to this situation and are doing everything possible to be of assistance. The State Department of Agriculture will be of greater assistance to the extent of its financial resources in developing the agricultural resources of the State, developing markets, grading and labeling products, procuring a more adequate supply of farm labor, eradicating insects and diseases, and offering encouragement to young men and women to make farming as remunerative and attractive as other lines of business.

We look forward to a gradual rise in land values during the next few years and to a steady demand for the products of the eastern farmer.

A. W. GILBERT,
Commissioner.

REPORT OF PLAN AND EXPENSES OF THE BOYS' AND GIRLS' CLUB WORK.

Fifteen hundred dollars was allotted by the Department for this work in 1920, and the following plan was adopted: —

1. A pin was given to each boy or girl who undertook and completed a project.

2. Expenses were paid for a week in the prize winners' camp at Amherst for the boy or girl who did the best work in each project, to the number of seven in each county. Since in some counties more than seven projects were being carried on, other prize winners came to the camp from several counties, having their expenses paid by their respective counties.

3. A book was sent to the second prize winner in each project, to the number of seven in each county. These books were chosen from the works of standard authors, so that they are a valuable addition to the young people's libraries.

4. A banner was presented to each local club in which every member completed the projects undertaken. Each local group of boys and girls who began the work was organized into one of these clubs.

Details of Expenditure of $1,500 allotted by State Department of Agriculture.

Date.	Item.	Amount.
1920		
June 25,	Bastian Brothers Company, for pins,	$63 94
July 23 to 30,	Camp at Amherst,	762 03
October 1,	W. M. Young Regalia Company, for banners,	124 50
November 19,	W. M. Young Regalia Company, for banners,	125 00
November 22,	Bastian Brothers Company, for pins,	49 50
December 2,	Nine State champions ($25 each),	225 00
	Total,	$1,349 97

Note. — Books not included in this report.

Number of Towns carrying on Club Work in Each County.

County.	Massachusetts Agricultural College Extension Service.										
	Poultry.	Garden.	Potato.	Corn.	Handicraft.	Pig.	Calf.	Sheep.	Onion.	Home Economics.	Canning.
Barnstable,	6	14	6	3	–	8	–	–	1	10	15
Berkshire,	–	3	5	2	2	8	6	–	–	8	11
Bristol,	–	17	9	5	–	14	11	–	1	2	12
Dukes and Nantucket,	–	–	–	–	–	1	–	–	–	2	1
Essex,	9	17	8	3	–	15	2	1	–	9	20
Franklin,	5	22	20	12	2	20	12	6	5	15	18
Hampden,	2	8	1	1	–	2	3	–	–	9	13
Hampshire,	3	15	8	7	4	16	11	1	3	8	15
Middlesex,	14	34	25	–	1	23	–	–	–	16	40
Norfolk,	5	5	1	–	–	2	1	–	–	14	16
Plymouth,	1	8	3	1	–	6	1	–	–	4	6
Suffolk,	–	1	–	–	–	–	–	–	–	1	1
Worcester,	2	25	5	9	1	10	12	–	–	16	20

REPORTS OF THE STATE INSPECTOR OF APIARIES

FOR THE YEARS ENDING

NOVEMBER 30, 1919, AND NOVEMBER 30, 1920

LELAND H. TAYLOR, ACTING INSPECTOR OF APIARIES

ANNUAL REPORTS OF THE STATE INSPECTOR OF APIARIES FOR THE YEARS ENDING NOVEMBER 30, 1919, AND NOVEMBER 30, 1920.

To the Commissioner of Agriculture.

As no report of the Inspector of Apiaries was published last year, the report for that year is herein combined with the report for the year just ended.

No State Inspector of Apiaries having been appointed to the position left vacant by the resignation of Dr. Burton N. Gates, the apiary inspection work for the past two years has been carried on by the State Nursery Inspection service and its successor, the Division of Plant Pest Control. In general, the work has been conducted according to the plan followed by Dr. Gates in previous years, the belief being that no more efficient scheme could be devised with the limited funds which have been available.

During the past two seasons it has been possible to secure the services of three former deputy apiary inspectors, Messrs. O. F. Fuller of Blackstone, Edwards Thorne of Worcester and Ivan Rawson of Richmond. It has also been possible from time to time to call upon Dr. Gates, former State Inspector of Apiaries, for his highly valued advice and assistance, always willingly given. The acting inspector wishes to express his appreciation of the services of these men, who are responsible for whatever good results may have been accomplished.

Winter Losses, 1918–19.

As might be expected, the very mild winter of 1918–19 proved a very favorable one for the bees. The records of this office show the lowest percentage of winter loss which has ever been recorded in these annual reports.

The figures on somewhat less than 1,000 apiaries show that

out of 2,840 colonies which started the winter, 2,479 survived, giving a loss of 361 colonies. The proportion of loss was therefore slightly less than 13 per cent, as compared with 57 per cent in 1918. In the two other recorded cases of low winter loss the percentages were 17 in 1913 and 19 in 1915.

Work of the Year ending November 30, 1919.

Brood Diseases of Bees.

The following figures briefly show the results of the season's work in the suppression of European and American foul brood: —

Number of apiaries visited,		1,260
Number of colonies examined,		2,877
Number of colonies found free from disease,		2,704
Number of colonies found diseased,		173
With American foul brood,	37	
With European foul brood,	136	
Number of apiaries quarantined,		72
Number of apiaries released from quarantine,		76

Table of Current Quarantines.

Date.	American Foul Brood.	European Foul Brood.	Totals.
1912,	–	1	1
1915,	1	4	5
1916,	1	5	6
1917,	2	4	6
1918,	4	10	14
1919,	2	20	22
Totals,	10	44	54

It will be noted from the above figures that the number of apiaries visited was somewhat less than in 1918. The number of colonies examined, however, exceeds that of last year. This may be accounted for by the very intensive work which was done in certain parts of the State where disease was unusually prevalent. The number of colonies found diseased was about the same as last year. The proportion of American foul brood was greater, owing to its prevalence in the northeastern part

of Essex County, where this disease has been very destructive in recent years. As it had been impossible to inspect in this locality since 1916, the disease had gained some headway. The time spent here by the inspector was of great advantage, as the inspection of 1920 showed but 1 case of American foul brood remaining in this section.

But few colonies were treated or destroyed by the inspectors as a result of the failure of the owners to do so. Demonstrational treatments and assistance in treatments were given in cases where it seemed desirable.

Educational Work.

This work consisted chiefly of exhibits of bees, bee products and beekeeping materials. At the winter meeting of the Department of Agriculture in Horticultural Hall, Boston, an exhibit was prepared and shown by Deputy Inspector O. F. Fuller. Other exhibits were made by Dr. Burton N. Gates at the following places: New England Fair, Worcester; Eastern States Exposition, Springfield; Franklin County Fair, Greenfield; Hampshire, Franklin and Hampden Fair, Northampton; New England Fruit Show, Providence, Rhode Island.

Publication.

But one publication was issued, the Ninth Annual Report of the State Inspector of Apiaries for the Year 1918, by Dr. Burton N. Gates.

Winter Losses, 1919–20.

The prospect of a large winter loss in the winter of 1919–20 was apparent at the beginning of the season. The long period of wet weather during late summer and early fall prevented the bees from laying up the required stores for the coming winter. The sugar supply was limited, and while the efforts of the Department secured a small quantity for beekeepers, only a small proportion of the necessary quantity could be obtained. The unusually severe winter augmented the loss.

Statistics collected, covering a total of 2,812 colonies of bees which were living in the fall of 1919, showed that only 1,390 survived. This gives a total winter loss of 1,422 colonies, or slightly more than 50 per cent.

Work of the Year Ending November 30, 1920.

The appropriation for apiary inspection was cut from $2,000 to $1,500 for the year 1920. This made it necessary to revise the plans for the work in proportion to the reduced allowance. It was thought advisable under the circumstances to visit certain towns where foul brood has been very prevalent in the last few seasons, limiting the inspections to those apiaries known to be or suspected of being in poor condition. There were about 40 such towns, located in Barnstable, Berkshire, Essex, Hampden, Hampshire and Worcester counties.

When this essential work had been accomplished, the season was not too far advanced and there still remained a part of the appropriation, so that it became possible to devote the remainder of the time and funds to work in towns which had never, or at least not recently, been inspected. Such towns in Franklin, Hampden, Hampshire and Middlesex counties were visited and several important new or recurring infections were discovered.

Brood Diseases of Bees.

The following figures indicate in brief form the work done during the season of 1920 in the suppression of brood diseases of bees: —

Number of apiaries visited,		736
Number of colonies examined,		1,377
Number of colonies found free from disease,		1,270
Number of colonies found diseased,		107
With American foul brood,	6	
With European foul brood,	101	
Number of apiaries quarantined,		46
Number of apiaries released from quarantine,		43

Table of Current Quarantines.

Date.	American Foul Brood.	European Foul Brood.	Totals.
1912,	–	1	1
1915,	–	2	2
1916,	1	4	5
1917,	2	4	6
1918,	4	5	9
1919,	2	8	10
1920,	2	17	19
Totals,	11	41	52

These figures show that considerably fewer apiaries were visited than last year. The cause of this may be assigned both to the decreased appropriation and to the increased cost of travel. The proportion of American foul brood is far less than in 1919. This is doubtless due to the results of the intensive work done in Essex County last year, this disease having been nearly eliminated from this section. Most of the cases of American foul brood found in 1920 were in the vicinity of Framingham. The disease occurred here in 1911; in 1916 it had apparently been suppressed; this year's inspection is the first since that time. The percentage of colonies with European foul brood is slightly greater than in 1919. This does not necessarily mean that it is on the increase, but merely shows that in the small part of the State inspected this year the proportion was greater than in another small part of the State inspected last year.

In most cases instructions were given to beekeepers to treat or destroy their diseased bees. In several instances, however, the inspectors gave demonstrations or destroyed the bees themselves.

Educational Work.

On account of the reduced appropriation but one exhibit was made by the Department this year. This one, at the Brockton Fair, attracted much notice and added many new names to the list of beekeepers. Exhibits of this kind furnish a good opportunity for getting in touch with beekeepers who are not otherwise reached, and a large amount of information can be dispensed in this way at a small cost.

Retrospect, 1910 to 1920.

The apiary inspection service has been established for over ten years. We may now profitably look back at the work accomplished during that time with the view of studying comparative conditions and of laying plans for the future.

The following table illustrates some of the important phases of the work. For convenience the figures are tabulated by counties. The work is not done by counties, however, and the figures may be misleading unless considered in connection with the amount of work done in the respective counties as indicated by the number of towns which have been inspected.

County.	Number of Apiaries listed.	Number of Towns and Cities inspected.	Number of Towns and Cities not inspected since 1915.	Number of Towns and Cities never inspected.	Number of Towns and Cities in which Disease has occurred.	Number of Apiaries with American Foul Brood.		Number of Apiaries with European Foul Brood.	
						Maximum.	At Most Recent Inspection.	Maximum.	At Most Recent Inspection.
Barnstable,	52	4	-	10	1	-	-	2	2
Berkshire,	277	26	1	7	21	3	-	97	16
Bristol,	324	17	4	3	9	15	3	21	4
Dukes,	-	-	-	7	-	-	-	-	-
Essex,	433	18	4	15	12	25	1	26	7
Franklin,	288	6	-	20	5	2	-	6	2
Hampden,	314	19	2	4	19	27	-	62	10
Hampshire,	248	17	6	6	12	5	-	32	-
Middlesex,	916	41	10	13	28	43	6	78	33
Nantucket,	2	1	-	-	-	-	-	-	-
Norfolk,	364	19	6	9	14	7	4	25	6
Plymouth,	348	22	7	5	17	23	6	41	13
Suffolk,	108	-	-	4	-	-	-	-	-
Worcester,	927	55	6	4	52	73	5	179	48
Totals,	4,625	245	46	107	190	223	25	569	141

These figures show that there are listed in the records of this office 4,625 beekeepers. That these figures do not represent the whole number is indicated by other figures in the table which show that 107 towns and cities have never been visited by an inspector and that 46 more have not been inspected for the past five years. Thus over 40 per cent of the towns and cities of this State have been practically neglected as regards apiary inspection. Conditions in these towns are but little known, though the office has received no reports that there is an unusual amount of disease present.

The figures in the last four columns will give some idea of the control work on American and European foul brood. Comparison of the maximum number of diseased colonies with the number found on the most recent inspection shows that the prevalence of both diseases has been reduced considerably.

Conclusions and Recommendations.

That considerable good has been accomplished by the apiary inspection will be evident to one who has read the above figures. American foul brood has ceased to be as prevalent as in former years, while there are also far fewer cases of European foul brood. That this may be the result of inspection is indicated by the prevalence of disease in localities which have been necessarily neglected for a few years, such as the section near Framingham and the northeastern part of Essex County.

Other neglected localities should be taken care of as soon as possible after the known infections are under control. Bad conditions will doubtless be discovered in such places. While the tendency has been to take care of the known infections, and to allow the unknown places to go without inspection, this should not go on indefinitely, as brood diseases will be allowed to run their course if not watched periodically. An attempt should be made to cover the whole State and to follow this up by regular inspections in such places as are found to demand it.

In many cases it has been found that ignorance of the methods of disease prevention and control is responsible for the loss of a large number of colonies. Demonstration of preventive and control measures by the inspector has often insured the beekeeper against further loss. It is therefore recommended that inspectors make demonstrations among beekeepers who are able to profit by them. In apiaries where disease persistently appears in spite of such assistance, it is recommended that the apiary inspection law be strictly enforced if negligence on the beekeeper's part is apparent.

Since the abandonment of the courses of instruction in beekeeping at the Massachusetts Agricultural College, there has been little educational work for the benefit of beekeepers of the State, except such information as the inspectors could dispense on their visits. It appears to the writer of this report that there is a demand for such educational work, particularly in the form of lectures and public demonstrations of beekeeping methods. Improvement of beekeeping methods will facilitate

immensely the suppression of disease. It is believed that this Department, as the only public institution in the State interested in beekeeping, could legitimately undertake such work.

To carry out these recommendations it is recognized that it will be necessary to have an Inspector of Apiaries who can give his entire time to the work during the season when bees are active. The acting inspector has found that it is impossible to give adequate time to this work without interfering with other duties. The need of the Department is for a man thoroughly qualified as an inspector, a beekeeper of experience and of some executive ability who can conduct the work during the six months from May to October. During the remainder of the year he should be able to give some time to lectures and other educational work, plan the inspection for the next season and keep up the inspection records. In fact, it is believed that the beekeeping industry would profit much by the appointment of a permanent Inspector of Apiaries at such a salary as would be required to obtain a man of the desired qualifications.

It is evident to the acting inspector that larger appropriations should be made if this work is to continue to be of service. The little work which has been accomplished is useful, but its permanent value can be assured only by following up disease from year to year. Under present conditions inspection has to be abandoned in certain sections of the State to take care of more serious trouble elsewhere. This abandonment often brings about disastrous results, but is necessary in order to render equal service to a maximum number of beekeepers. The writer of this report therefore recommends that a sum of not less than $4,000 be devoted to carrying out the provisions of the apiary inspection law. He believes that only in this way can the full benefit of this law be obtained for the beekeepers whom it was designed to serve.

Financial Statements.

Year ending November 30, 1919.

Appropriation,		$2,000 00
Expenditures: —		
Services,	$907 50	
Expenses,	840 20	
Supplies, printing and postage,	54 53	
		1,802 23
Balance, November 30, 1919,		$197 77

Year ending November 30, 1920.

Appropriation,		$1,500 00
Expenditures: —		
Services,	$708 00	
Expenses,	656 48	
Supplies, printing and postage,	110 59	
		1,475 07
Balance, November 30, 1920,		$24 93

REPORT OF THE DIVISION OF PLANT PEST CONTROL

R. H. ALLEN, DIRECTOR

REPORT OF THE DIVISION OF PLANT PEST CONTROL.

The work of the Division of Plant Pest Control during the past year has been concerned chiefly with the (1) inspection of nurseries and nursery stock, (2) white pine blister rust, and (3) European corn borer.

The inspection of nurseries and nursery stock consumes approximately nine months of the year, during which time especial attention is given to San José and oyster-shell scale, European pine shoot moth and the white pine blister rust. There has been a very marked decrease in the amount of San José scale found in the nurseries during the last few years, and the present season disclosed only a very small amount. This decrease is probably due in a large measure to the fact that the nurserymen are more familiar with methods of control as well as with natural enemies. Oyster-shell scale, however, was found to be more prevalent, especially on some of the more susceptible varieties of shrubs. In most cases the infested stock was destroyed at the suggestion of the inspector with the approval of the nurserymen. The inspection of the pines both for blister rust and European pine shoot moth again brought out the fact that careful inspections have practically eliminated both from our nurseries. There is considerable blister rust scattered throughout the entire State, so that it would not be surprising or alarming if the rust were found occasionally in a nursery. However, precautionary measures are being taken each year and a careful inspection made of the surroundings in order that the alternate host (Ribes) may be destroyed wherever it appears to be dangerous.

Because the nurseries in the western part of the State are outside of the gypsy and brown-tail moth areas, we are able to issue certificates to them early in the fall. The smaller nurseries in the eastern part of the State where the stock is so limited that it can be cleaned easily are also granted cer-

tificates early. The larger nurseries in the eastern part of the State, however, are more difficult problems on account of the prevalence of the gypsy moth. As the shipping season starts just about the time that the gypsies are through laying, it is almost impossible, certainly impracticable, for the nurserymen to clean their stock until the fall orders are filled. To meet this situation the Department must have a sufficient number of inspectors available to examine all shipments made from nurseries not holding their certificates. This condition has been met without serious inconvenience to the nurserymen. Frequently when the nurseries are not too far distant, one inspector can readily care for two or three satisfactorily. Naturally, an inspection in the packing shed as is made under these circumstances is more efficient and thorough than can be made in the field, and if it were financially practicable it would be an ideal way to carry out the inspection at all the nurseries. It would assist the nurserymen and perhaps bring out an infestation unobserved in the field. An occasional brown-tail nest was found in some of the nurseries near the New Hampshire line, but these were easily taken care of.

A gypsy moth infestation was discovered last summer in New Jersey, an investigation of which has already shown that the infested area is over 100 square miles. In past years certain outbreaks of this pest have been traced to nursery stock originating in Massachusetts, but in this instance the infested stock is supposed to have been imported from Holland several years ago.

The time devoted to the inspection of foreign shipments until quarantine No. 37 became effective has been used to good advantage examining shipments of nursery stock from other States. In most cases these shipments have been in good condition, but a few, including one carload of fruit stock, have not been up to the Massachusetts standard and were in consequence returned or destroyed.

There has been an unusually large number of shipments of stock from private parties, especially from some of the larger estates, where choice and rare specimens of plants are sent from one estate to another. All such shipments are required by law to be inspected. These are a constant source of danger,

for in many cases the shipper is not familiar with insect pests or plant diseases, and would unknowingly cause their spread.

With the idea of assisting the nurserymen and also as a protection to the public, special visits have been made to the nurseries in order, if possible, to detect any new or dangerous pests. By these inspections certain conditions have been brought to the attention of the nurserymen and, when possible, control methods recommended. In a few instances, pests which were not readily identified were brought into the laboratory for further study, with an idea of learning their habits, so that measures for control in the field may be practiced. It is believed that inspections of this nature are especially valuable, and the danger of serious infestations is greatly reduced.

Miscellaneous Insects.

Juniper Webworm (*Phalonia rutilana* Hübner and *Ypsolophus marginellus* Fabr.).

Damage to junipers by web-making Lepidopterous larvæ was quite prevalent in one nursery. Adults reared from material brought into the laboratory proved to be of two different species, both, however, of European origin.

The webs made by these two insects are very similar. Leaflets and small twigs are webbed together by the caterpillars, forming an irregular nest, the leaves and twigs presenting a brownish appearance. Damage was most serious on Swedish junipers.

Pine Webworm (*Benta melanogrammos* Zell).

Webs of this insect were brought in from several nurseries at different points in the State, showing that it must have been quite widespread last season. This insect was found particularly on red, Scotch and Mugho pine. The webs were brought in the last part of September, at which time the larvæ were apparently full grown. Soon after this time the larvæ entered the soil and spun rather tough, thick cocoons.

The webs are constructed of needles lightly spun together and made up largely of fine green larval excrement, which forms an irregular mass in which the larvæ live. Webs vary from 1 to 5 inches in length and each usually contains several caterpillars.

Strawberry Crown Girdler (*Otiorhynchus ovatus* Linn.).

The strawberry crown girdler is injurious to arbor vitæ.

The latter part of May our attention was called to the girdling of twigs of arbor vitæ in one of the larger nurseries. An examination of the plants showed that many of the twigs of the season's growth had dried up and turned brown. In each case of this drying up the twig was found to be nearly or entirely girdled at a point 3 or 4 inches from the tip. At the time it was impossible to discover the cause of the injury, though it was evidently an insect. However, several small beetles were collected on the plants. By the middle of August the amount of girdling had increased so that in one variety of arbor vitæ nearly every plant showed signs of injury. Numbers of the small beetle previously observed were then on the plants, but none were observed in the act of girdling the twigs. A number of beetles were collected by jarring the plants. These were brought to the laboratory and confined on uninjured arbor vitæ plants. It was then possible to observe the beetles feeding, and in a few days every twig was girdled. The beetles continued to be active during several weeks, all having died by the end of September.

This injury to twigs of arbor vitæ is apparently the first recorded. The beetle, however, is omnivorous and has been recorded a number of times as injurious to the roots of young evergreens. Its injury to strawberry plants is of wide occurrence.

Unfortunately, the identity of the insect was not determined until late in the season, and the roots of the arbor vitæ were not examined for injury by the larvæ, as the possibility of such injury was not considered. At that time no eggs or larvæ could be discovered on the plants under observation in the laboratory. Either the egg-laying season was over by the middle of August or the beetles did not find conditions favorable for oviposition.

Further observations should be made on this pest to determine whether the immature insects are injurious to the roots of arbor vitæ or to different plants. The girdling habit is of some importance in nurseries as it makes the plants unsightly.

Currants and Gooseberries (Ribes).

The Department is very glad to issue permits to nurserymen for the importation of Ribes from other States, providing they co-operate as far as possible in ascertaining that the Ribes are not destined to towns where we are trying, in connection with the white pine blister rust work, to eradicate all currants and gooseberries. At present we prohibit the shipping of Ribes into the towns of Hanover, Marshfield, Duxbury, Pembroke, Hanson, Halifax, Topsfield, Ipswich, Lee, Lenox, Stockbridge, Warwick, Orange, Athol, Petersham, Phillipston, Barre, Dana, North Andover and Newburyport.

Certificates and Licenses.

One hundred and fifty-four nurseries have been inspected and one hundred and forty-five certificates granted, a few certificates being withheld until the gypsy egg masses have been cleaned up. Agents' licenses were issued upon filing at this office the names and addresses of the firms from whom the agent would purchase his stock.

European Corn Borer.

The European corn borer work has been carried on in co-operation with the United States government. Experiments showed the insect to be present in a large number of new host plants, and under certain conditions, especially where the plants were grown near corn or badly infested weeds, it was almost certain that they would be infested. As these conditions could not always be corrected, it was thought advisable to supplement the quarantine of last year, which prohibited the movement of corn, so as to include other commonly infested plants, allowing them, however, to move out of the infested area, providing they passed inspection. This inspection is made either in the field or shed, usually depending on the degree of infestation present, and applies to the following plants: celery, green beans in the pod, beets with tops, spinach, rhubarb, oat and rye straw as such or when used for packing, cut flowers or entire plants of chrysanthemum, aster, cosmos,

zinnia, hollyhock, and cut flowers or entire plants of gladiolus and dahlia, except the bulbs thereof without stems.

New towns have been placed under quarantine as soon as they have been found infested. To date, the borer has been located in 126 towns, although in many of these the infestations are very light.

The Department has co-operated with the United States Department of Agriculture in the enforcement of the quarantines, the inspectors of both departments having been deputized by each other, thereby increasing the efficiency of the inspection.

White Pine Blister Rust.

The white pine blister rust is quite generally distributed throughout the State, but wherever control work has been performed very satisfactory results have been noted. This fungous disease is peculiar, in that it cannot spread directly from pine to pine but must pass through intermediate stages of development upon the leaves of its alternate host; that is, any species of a currant or gooseberry which is technically known by the Latin generic name of Ribes. This characteristic offers a method of preventing the spread of the disease, namely, the eradication of one of the hosts, the less valuable in most localities in this State being the Ribes.

In protecting stands of white pine from this disease, therefore, it is necessary to remove all wild and cultivated Ribes in the immediate vicinity of the pines to be protected; in other words, to establish a Ribes-free zone or area. The width of this protective zone is a variable factor and depends upon many conditions, such as exposure, relative elevations and the presence or absence of a screen of vegetation. Recent extensive experiments conducted for the purpose of determining the necessary extent of such a protective zone have demonstrated that the disease can be effectively controlled locally by destroying all Ribes within a radius of from 200 to 300 yards from pine.

Control work has been conducted by this Division in co-operation with the Bureau of Plant Industry, United States Department of Agriculture, the government matching dollar for dollar all expenditures by the State and its co-operators for

this work. The policy followed was to continue the eradication of Ribes (currants and gooseberries) in important pine-growing sections of the State through the co-operation of towns, timber owners, associations and other interested parties.

The work this year has been carried on almost entirely on this local co-operative basis, one town (Petersham), the Massachusetts Department of Conservation and thirty individuals expending $2,377, representing approximately one-quarter of the total cost of the work in each case. With the funds made available as a result of this co-operation, control work has been in operation in sections of the following towns: Carlisle, Hubbardston, Newburyport, North Andover, Petersham, Princeton, Royalston, Templeton, Topsfield, Uxbridge and Winchendon.

In the work in these towns, 19,389 acres of land have been examined and 1,224,306 wild and 1,421 cultivated Ribes destroyed, at a total cost of $10,422.87, or an average cost per acre of 54 cents. Of this cost, 46 cents has been expended for labor, 3 cents for supervision and 5 cents for transportation and other expenses.

One supervisor, 1 scout, 7 foremen and 49 linemen have been employed during the season in maintaining the personnel of the field crews. Labor conditions have been but slightly improved over those of last year, good men preferring to work nearer industrial centers where the prevailing rate of pay was much higher than that paid on this work. This scarcity of suitable labor greatly handicapped the work and it was necessary to secure most of the labor locally.

The usual crew methods have been employed again, a scout supplementing the work of the crews in some areas by working in advance and locating Ribes habitats. This advance scouting work was very instrumental in keeping down the costs. Another added feature of the work last year was the use of a two-man crew to examine all roadside areas, stone walls, fence rows, etc., around open areas and for the removal of cultivated bushes. This method fixes responsibility, eliminates much lost motion experienced in the use of the larger crew in such situations and results in more efficient work.

The State Department has not undertaken any extensive

scouting for the disease since the campaigns of 1916 and 1917. Last spring, however, representatives of the Federal department made some extensive examinations in the towns of Topsfield and Ipswich. In those towns, on approximately 5 miles of strip line, they found 14 per cent of the pines infected with the disease. Similar examinations were made in Duxbury, Hanover and Pembroke, where the reports indicate that the eradication of cultivated Ribes in 1917 had without question served to check the further spread of the disease from infection centers existing in that section. In Lenox and Sandisfield very intensive examinations were conducted during the summer and the results demonstrated very clearly that the eradication of Ribes in Lenox in 1916 and 1917 had unquestionably retarded the progress of the infection in that town, the number of new infections being very low in comparison to the number of recent infections in Sandisfield, where no Ribes eradication has been undertaken.

During the course of the regular field work, infection on Ribes has been reported in all the projects except two, in which cases no Ribes were found at all. Pine infection in some considerable degree was also found during the Ribes eradication work in Newburyport, North Andover and Topsfield and in a limited area in Petersham.

Educational work has been carried on by the division through the distribution of an illustrated circular, the use of circular letters, warning notices, etc., and a special exhibit illustrating the work of the fungus was exhibited at the larger county fairs during the fall months.

The Legislature of 1920 passed an act providing compensation for all Ribes destroyed in the years 1918 and 1919. Three claims have been received and settlement allowed to the amount of $301.25, or 46 cents per bush.

The blister rust work has been carried on under the direction of Mr. C. C. Perry. To his thoroughness and faithful work much of the success which has been attained is due.

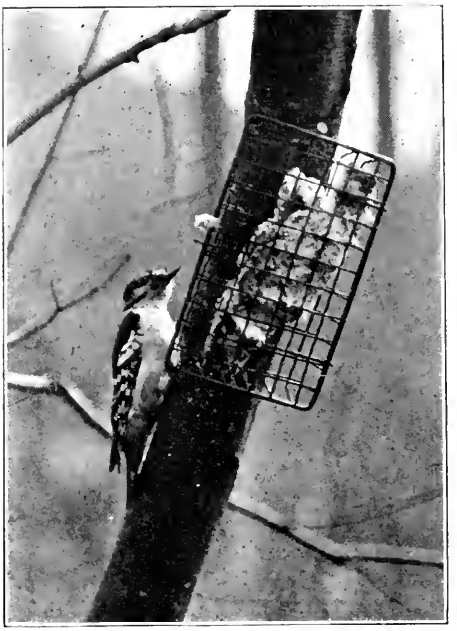
A detailed summary of the field work of the season is given in the following table: —

Summary of Co-operative White Pine Blister Rust Control Work, Massachusetts, 1920.

Project.	Crew Number.	Acreage examined.	Number Ribes destroyed.					Cost Detail.					
			Wild Gooseberry.	Skunk Currants.	Wild Red and Black Currants.	Cultivated Ribes.	Total Ribes.	Supervision.	Pulling Ribes.	Rain.	Expenses.	Total Cost.	Total Cost per Acre.
Carlisle,	3	75	–	–	–	1	1	–	$30 40	–	$10 00	$40 40	$0 54
Hubbardston,	7	650	7,896	696	–	7	8,599	$28 62	340 60	$20 96	33 97	424 15	65
Newburyport,	3	1,705	4,055	–	13,824	752	18,631	–	729 39	15 57	158 84	903 80	53
North Andover,	3	367	2,557	–	1,818	–	4,375	–	212 13	10 99	37 36	260 48	71
Petersham,	1, 2, 5, 6, 7	14,812	207,388	558,932	22,647	638	789,605	573 87	4,411 04	875 82	380 84	6,241 57	42
Princeton,	7	100	7,260	43	21	–	7,324	9 50	137 52	43 52	27 50	218 04	2 18
Topsfield,	3	200	1,432	–	2,129	23	3,584	–	167 68	25 20	11 95	204 83	1 02
Uxbridge,	7	150	–	–	–	–	–	–	64 00	–	18 00	82 00	55
Winchendon,	4	1,330	28,177	365,428	3	–	393,608	28 75	1,734 50	113 65	170 70	2,047 60	1 54
Total,	–	19,389	258,765	925,099	40,442	1,421	1,225,727	$640 74	$7,827 26	$1,105 71	$849 16	$10,422 87	$0 54

REPORT OF THE DIVISION OF ORNITHOLOGY

EDWARD HOWE FORBUSH, DIRECTOR



Downy Woodpecker. (Photograph by Harry G. Higbee, Sharon, Massachusetts.)

Sapsuckers and their work. (Photograph by Harry G. Higbee, Sharon, Massachusetts.)

FIRST ANNUAL REPORT OF THE DIRECTOR, DIVISION OF ORNITHOLOGY.

Publications of the Year.

The great interest in birds manifested by the people of this and other Commonwealths continues to increase. This accession of interest in the living birds, their utility and their protection is exhibited in numberless insistent inquiries in respect to these subjects and in the great demand for literature regarding them. Current literature on birds, issued by this office, is eagerly sought, and the demand increases for reports, circulars and leaflets, some of which have been out of print for years. To meet this want certain publications must be issued and reissued. Following is a list of the prints and reprints of the year: —

Twelfth Annual Report of the State Ornithologist, December, 1919.

Department Circular No. 2, Third edition, revised, February, 1920. Food, Feeding and Drinking Appliances and Nesting Material to attract Birds. 33 pp., 10 half-tones, 21 line cuts.

Department Circular No. 12, second edition, revised, February, 1920. Outdoor Bird Study, Hints for Beginners. 51 pp., 4 half-tones, 26 line cuts.

Arbor and Bird Day, April, 1920. Prepared by Edward Howe Forbush and Harris A. Reynolds. Approved by Payson Smith, Commissioner of Education. 12 pp., 2 half-tones, 8 line cuts.

Department Circular No. 25, August, 1920. The Farmers' Interest in Game Protection. 11 pp. Supplants Circular No. 31, 1915.

Department Circular No. 45, third edition, revised, August, 1920. The Starling. 23 pp., 3 half-tones.

Nature Leaflet No. 14, sixth edition, August, 1920. Owl Friends. 6 pp., 3 line cuts.

Department Circular No. 10, second edition, August, 1920. Bird Houses and Nesting Boxes. 28 pp., 12 half-tones, 29 line cuts.

Economic Ornithology, Bulletin No. 4, October, 1920. Two Years with the Birds on a Farm. Second edition, 42 pp., 3 half-tones, 6 line cuts. Revised and reprinted from Fiftieth Annual Report of the State Board of Agriculture.

Material in Preparation for Publication.

The fourth edition of "Useful Birds and their Protection" was exhausted in 1919, and as the law under which it formerly was reissued was repealed when the Department of Agriculture was reorganized, further editions cannot be published without legislation for that specific purpose, although the demand for the work still continues. To fill this demand in part and to answer many questions of correspondents regarding the utility of birds, material has been collected during the past year for a bulletin on this subject. Material also has been gathered for a preliminary list of the birds of Massachusetts, with annotations, which, if published, will be the first paper from this office to deal with the distribution of the birds of this Commonwealth. In November, Dr. John B. May, who was temporarily employed as assistant in this office, prepared an index of the twelve reports of the State Ornithologist. Mr. Arthur J. Parker has prepared a list of officers and officials of Massachusetts organizations interested in the study or protection of birds.

Matters regarding International Bird Protection in America.

There are few laws for the protection of birds in the Latin-American republics. It would be quite possible for the people of any one South American country to exterminate certain species of North American birds that pass through their country or winter there, and it seems imperative that something should be done to protect all such birds in those countries as soon as may be.

In 1919 the writer was named as a member of a committee appointed by the National Association of Conservation Commissioners. It was made the duty of this committee to bring influence to bear for the promotion of conventions with Central American and South American countries under which migratory birds might receive such protection in those countries as now is afforded them in the United States and Canada under the treaty of 1916 between the United States and Great Britain. On December 8, 1919, a letter was received by the

writer from the chairman of the committee, Hon. John H. Wallace, Commissioner of the Alabama Department of Conservation, asking that a paper be prepared bearing upon the migration of birds from the United States to the Latin-American republics. Such a paper was prepared at once, giving in brief a statement regarding the migration of many species of North American birds to or through these republics, and was forwarded to Chairman Wallace. This paper was used as an argument for international bird protection, and also was printed by Chairman Wallace and given wide circulation. On December 19 another letter was received from Mr. Wallace in which he said that he had received a communication from Senator Bankhead of Alabama, enclosing a letter from Senator Lodge, who asserted that the committee on foreign relations probably would report Senator Bankhead's resolution (No. 656) requesting the President to propose a treaty between the United States and the Latin-American republics for the protection of birds which migrate between the United States and such countries. On January 9, 1920, the United States Senate agreed to send to the President Senator Bankhead's resolution.

March 20, 1920, the resolution proposed by Senator Bankhead had received the attention of the President. On that day he sent a message to the Senate transmitting also the report of Frank L. Polk, acting Secretary of State, to whom he had referred the resolution for consideration. Mr. Polk not only gave his ideas on the matter, but also the views of the Secretary of Agriculture, to whom he had turned for further information. In brief, the Secretary of Agriculture stated that in view of existing conditions the time did not seem opportune to undertake the negotiation of a treaty for the protection of migratory birds with the Republic of Mexico, and that in the case of most of the republics of Central and South America such treaties are unnecessary at present. In the case of Brazil and Argentina, such treaties might be of advantage. But before the negotiation of conventions with these countries was undertaken, the Department desired more definite information than was then available; therefore, no further action on this matter will be taken by the Department of State at present. In the meantime, Dr. E. W. Nelson, chief of the United States

Biological Survey, has sent an agent to Argentina, Uruguay, Paraguay and southern Brazil for the purpose of securing needed information concerning the conditions relating to such of our migratory birds as winter in those regions.

Constitutionality of the Migratory Bird Treaty Act affirmed by the Supreme Court of the United States.

On January 12, 1920, a letter was received from Louis Marshall, Esq., of the firm of Guggenheimer, Untermeyer & Marshall of New York City, in which it was assumed that the writer was in favor of sustaining the constitutionality of the migratory bird treaty act, which under the treaty with Great Britain extends protection to our game and insectivorous migratory birds throughout the United States. Mr. Marshall, at the instance of the Association for the Protection of the Adirondacks, of which he was a trustee, had prepared a brief on this subject, to be presented before the Supreme Court of the United States on March 1, upholding the constitutionality of the migratory bird treaty act. He enclosed the proofs, in which he had quoted extensively from "Useful Birds and their Protection," and requested further information, particularly in regard to the insect food of wild fowl. The material for which he asked was furnished on January 23. On Patriots' Day, April 19, the Supreme Court of the United States rendered a decision sustaining the constitutionality of the migratory bird treaty act, thereby fully legalizing both Federal and international protection of migratory birds and bringing to an end a fight for such protection which had been waged for more than a decade by bird protectionists. It now remains to provide means for enforcing the Federal migratory bird treaty act, as the present appropriation for its enforcement is inadequate.

Constitutionality of the Migratory Bird Convention Act affirmed by the Supreme Court of Prince Edward Island.

On December 8, 1920, a letter was received from Commissioner J. B. Harkin of the Department of the Interior, Canada, enclosing a copy of a judgment given by the Supreme Court of Prince Edward Island, sustaining the constitutionality of the

migratory bird convention act, which in Canada performs a similar office to that of the migratory bird treaty act in the United States. This will tend to sustain in Canada the enforcement of regulations under the treaty similar to those now in force in the United States.

Complaints of Law Breaking.

During the past year many complaints have been received that the State laws for the protection of birds and game and the migratory bird treaty act had been violated. Wherever there seemed to be good grounds for complaint the matter has been brought to the attention of both the State and Federal authorities and in most cases immediate action has been taken. It is suggested, however, that such complaints, requiring quick action, should go direct to the authorities who have the enforcement of the law in charge, *i.e.*, Mr. William C. Adams, director, Division of Fisheries and Game, 321 State House, Boston, Massachusetts, and Dr. E. W. Nelson, chief, Bureau of Biological Survey, Department of Agriculture, Washington, District of Columbia.

Inquiries from outside Massachusetts.

Many inquiries come to this office not only from Massachusetts but from other States and other countries. Most of them relate to birds, but some have no relation to the work of this Division. In such cases the matters are duly referred to the proper authorities, but there seemed to be no official to whom to refer a request from the National Research Council at Washington. The executive secretary of the Division of States Relations, Dr. Albert B. Barrows, wrote on January 10, 1920, asking information on the present scientific functions of the State departments of Massachusetts and their relations to each other, to the government, to the Legislature and to educational institutions in the State. The information was desired particularly in view of the recent changes in the organization of State boards, commissions and departments in Massachusetts.

Considering the many duties laid upon this Division by law, it did not seem proper for us to undertake the inquiry, and

the request was turned over to Mrs. Angeline D. McKee, who has been employed not only by the Department of Agriculture but by other State departments from time to time, with the request that she secure the information and put it in shape for the use of the Council. On March 5 Dr. Barrows acknowledged the receipt of the report on the scientific work in progress in the various departments of the State government of Massachusetts, and expressed his great appreciation of the report submitted by Mrs. McKee.

Special Investigations.

During the year the assistance of the official observers connected with the Division of Ornithology has been enlisted in investigating some questions relating to bird life. The result of only one of these investigations can be reported here.

Sapsucker Work and Similar Work by Other Woodpeckers.

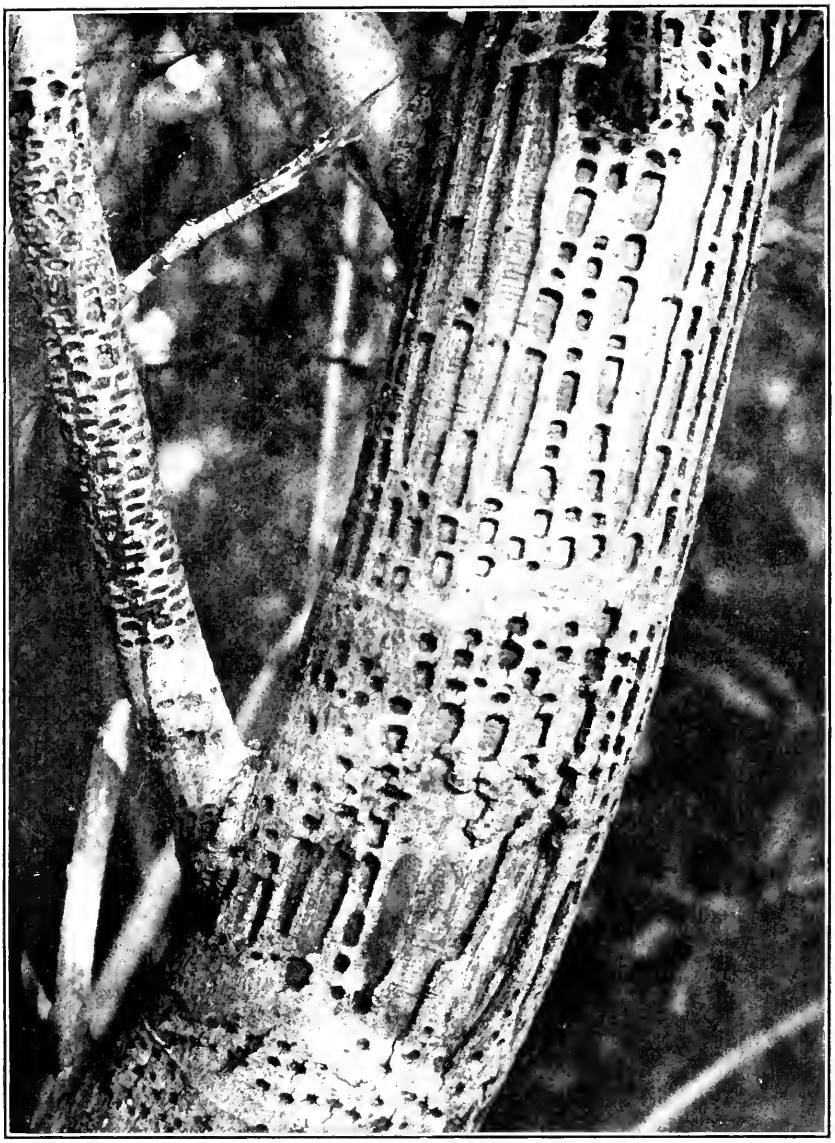
It might seem that there could be little in dispute at this late date in respect to habits of common birds, but such is not the case. There is a difference of opinion among ornithologists regarding the habits of common woodpeckers. Many assert that Sapsuckers of the genus *Sphyrapicus* are the only species that make transverse rings of small rounded punctures, such as are numerous on the trunks and limbs of apple and other trees. Others declare that the Downy Woodpecker is responsible for such borings, while still others believe that these pits are attributable to several species.

The writer is responsible for the following statement regarding the Downy Woodpecker, an assertion which has been questioned more than once: —

> In many cases it perforates the bark of apple trees with small roundish holes less than an inch apart, disposed in parallel, horizontal rings.[1]

Last year when asked to substantiate this assertion, the writer had to confess that while he had seen the Downy Woodpecker working on trees having fresh perforations, he had not seen the bird actually make a row of such holes. Recently in a search through old notes the only reference to the subject

[1] Useful Birds and their Protection, 1907, p. 251.



TYPICAL SAPSUCKER WORK ON WILLOW.

Such work may kill trees. (Sierra Sapsucker, *Sphyrapicus r. daggetti*.) (Photograph by J. G. Grinnell.) (From Biological Survey Bulletin No. 39, by W. L. McAtee.)

that could be found was a memorandum to the effect that Chester A. Reed had seen the bird in the act.

Sapsuckers are now known to decorate the trees with little round holes in the manner described above. This habit has been observed and recorded by many people. Within the past two years the following persons have noted this habit of the Yellow-bellied Sapsucker in Massachusetts and reported it to this office: Messrs. F. B. Currier, A. A. Cross, A. C. Bagg, C. A. Clark, Arthur J. Parker, H. A. Torrey, Mrs. Viola F. Richards, Miss Mabel R. Wiggin and Mrs. W. F. Eldredge. The principal object of the bird seems to be to eat the cambium[1] or to drink the sap. In "Useful Birds and their Protection" there appears the following sentence: "The holes made by the Sapsucker are different in shape, being square rather than round." This is an error, as the evidence shows that the Sapsucker makes both round and square holes. Many ornithologists defend the Downy and Hairy Woodpeckers, which often are called Sapsuckers by the country people, and assert that these woodpeckers never take sap or eat cambium.

An inquiry was begun in 1919 and continued through the past year to determine whether both the Sapsucker and the Downy Woodpecker could be held responsible for the rings of small rounded punctures. The principal objects of the inquiry were to examine the evidence concerning sapsucking habits of other Woodpeckers than the Sapsuckers, to determine what nutriment was sought by these species and to learn whether any injury to the tree had been known to result from the habit.

Mr. W. L. McAtee was the first to assemble the published evidence regarding this and the sapsucking habits of Woodpeckers other than Sapsuckers. This information appears in Biological Survey Bulletin No. 39, "Woodpeckers in their Relation to Trees and Wood Products." Wilson, who is quoted by McAtee, says in regard to this habit of the Downy Woodpecker: —

> In fall he is particularly fond of boring the apple trees for insects, digging a circular hole through the bark, just sufficient to admit his bill, after that a second, third, etc., in pretty regular horizontal circles round

[1] The cambium layer is the soft substance, underlying the bark, through which the sap flows.

the body of the tree; these parallel circles of holes are often not more than an inch, or an inch and a half, apart, and sometimes so close together that I have covered eight or ten of them at once with a dollar.[1]

Nuttall says: —

These perforations made by our Sapsuckers, as the present [Downy] and Hairy species are sometimes called, are carried round the trunks and branches of the orchard trees in regular circles.

Nuttall followed Wilson and perhaps did not depend entirely on his own observations, for he says: —

The circles of round holes which it makes with so much regularity around the . . . trees are no doubt made for the purpose of getting at the sweet sap which they contain.

He says also: —

In the month of February, 1830, I observed these borers busy tapping the small live trunks of several wax myrtles (*Myrica cerifera*); and these perforations were carried down into the alburnum, or sap-wood, but no farther. . . . On examining the oozing sap I found it to be exceedingly saccharine, but in some instances astringent or nearly tasteless.[2]

Dr. Henry Bryant of Boston published the following in 1866: —

It has long been known that some of our smaller woodpeckers pick out portions of the sound bark of trees, particularly of apple trees, where there are no larvæ and apparently no inducement for them to do so. . . . They [the holes] are generally seen in circles round the limbs or trunks of small irregularly rounded holes, and in this vicinity are made almost exclusively by the downy woodpecker (*P. pubescens*) aided occasionally by the hairy woodpecker (*P. villosus*).[3]

Dr. J. A. Allen, in a memoir of the Boston Society of Natural History, says: —

The perforations made in the bark of trees by woodpeckers, forming transverse rings, and sometimes so numerous as to do serious injury to the trees, have of late been very commonly attributed almost solely to

[1] Wilson, Alexander, and Bonaparte, Charles Lucien: American Ornithology, or the Natural History of the Birds of the United States, 1832, Vol. I, p. 161.

[2] Chamberlain, Montague: A Popular Handbook of the Ornithology of the United States and Canada, based on Nuttall's Manual, 1891, Vol. I, pp. 453, 454.

[3] Proceedings, Boston Society of Natural History, 1866, Vol. X, pp. 91, 92.

this species [Yellow-bellied Woodpecker], especially in the West, where it is so numerous. That it is, from this habit, often greatly injurious to fruit trees is not to be denied, but that this species — now commonly called the "true sapsucker", to whose depredations it is said should be assigned the general ill repute attached to the whole family by most agriculturists — is the sole author of this work, which so often amounts to mischief, there is abundant evidence to disprove. In most parts of Massachusetts, particularly in the Connecticut valley, this species is so extremely rare that I have never seen more than half a dozen specimens in a year, and oftener none at all, and then always during its migrations; while other expert collectors have searched for it unsuccessfully for years; yet our orchards always present these perforations in profusion, though seldom to an injurious degree; and now and then a forest tree is observed so thoroughly girdled as to be thus destroyed. For this our spotted woodpeckers, *Picus pubescens* and *P. villosus*, are chargeable, being in many sections the sole authors of it; they may be, in fact, very often seen engaged in it. I do not, however, suppose their object to be the same as that assigned to the *Sphyrapicus varius*, that of sucking sap or feeding on the inner bark.[1]

Dr. Allen writes on December 8, 1920, that he cannot now recall whether or not he actually saw either the Downy Woodpecker or the Hairy Woodpecker making these holes, and that he has not now any manuscript notes of his observations made half a century ago, but that he has perfect confidence that his statements as quoted above were based on thoroughly convincing evidence.

Minot, 1895, says of the Downy Woodpecker: —

. . . they extract wood-borers and other insects from the wood. For this purpose they dig out small circular holes of about the size made by a large awl, and with these often encircle a large tree.[2]

Miss Blanchan says of the Downy Woodpecker (1899): —

It has been surmised that he bores the little round holes close together so often seen with the idea of attracting insects to the luscious sap. . . . The Downy actually drills these holes in apple and other trees to feed upon the milky inner bark of the tree, the cambium layer.[3]

In American Ornithology (1903) Chester A. Reed makes the following statement: —

You have probably noticed rows of tiny holes extending nearly around some apple trees. These are the work of the Downy in his search for the

[1] Memoir, Boston Society of Natural History, 1869, Vol. I, p. 499.
[2] Minot, H. D.: The Land-Birds and Game-Birds of New England, 1895, p. 336.
[3] Blanchan, Neltje: Bird Neighbors, 1901, p. 56.

insects which, if left to do their work unhampered, would soon increase in numbers so as to devastate every orchard.[1]

In the biennial report of the Commissioners on Fisheries and Game, Indiana, 1905–06, Charles K. Reed, the well-known naturalist of Worcester, Massachusetts, is credited with the following statement: —

> Last fall I watched a Downy busily at work hammering on the trunk of an apple tree. He would pound away for half a minute steadily in one spot and then hitch sideways about an inch and repeat the operation; when he had completely encircled the tree he dropped down about his length and made another ring around the trunk. The marks left on the tree were identical with those that I had supposed were made by the Sapsuckers. The Downy did not appear to find anything to eat, and I concluded that he was doing it in play, or that he wished to sharpen his bill.[2]

It will be noted here that the bird having made one line of holes backed down the tree and started another. Mr. Stephen P. Brownell watched a Sapsucker making similar rings of holes in an alder in summer, and he says that the mother bird in making the pits, out of which the young took sap, always worked upward.[3] Frank Bolles and C. Hart Merriam also noted this: at that time of the year sap flows from the upper holes, or the last row made.

A note to Mr. C. K. Reed elicited the reply that he did not write the article referred to, but that he supplied the cuts that went with it. Also that he never had observed this habit of the Downy Woodpecker, but he says that Chester Reed wrote this, as well as other unsigned articles in the magazine, and that Chester's statement of what came under his personal observation could be depended upon as an accurate chronicle of the facts. Charles K. Reed was the publisher of the magazine entitled "American Ornithology," and Chester Reed was its editor. The latter died in 1912. He wrote all the material in this magazine not credited to others. The article in the Indiana publication was evidently made up by some one in Indiana by taking excerpts bodily from American Ornithology written by Chester Reed, and illustrating them with

[1] Reed, Chester A.: American Ornithology, Vol. III, 1903, p. 94.
[2] Biennial Report, Commissioners Fisheries and Game, Indiana, 1905–06, p. 733.
[3] American Ornithology, Vol. VI, 1906, p. 78.

cuts taken from the same magazine, and crediting C. K. Reed with the authorship of the article as it appeared in the biennial report. This was a very natural mistake, as the name of Charles K. Reed the publisher appeared prominently on the cover of each number of the magazine.

The assertion regarding the habits of the Downy Woodpecker quoted above, and written by Chester A. Reed, appeared first in American Ornithology, Vol. VI, No. 2, February, 1906, page 39, under the heading "Yellow-bellied Sapsucker," and was written to show that the Downy Woodpecker was responsible for a part, at least, of the lines of pits ordinarily seen on fruit trees in Worcester County, Massachusetts, and generally attributed to the Yellow-bellied Sapsucker. This is the first definite statement recording actual observation of this habit in the Downy Woodpecker that I have been able to discover.

Now for the evidence of eyewitnesses that the Downy and other Woodpeckers take both sap and cambium. In the "Food of Woodpeckers of the United States," by Professor F. E. L. Beal, the stomach contents of 3,453 Woodpeckers, including sixteen species, were recorded. Professor Beal reported that nearly all members of the Woodpecker family ate some cambium.[1] The quantity found in the stomachs of Sapsuckers, however, is apparently much greater than that found in other species. There seems to be little evidence available about other woodpeckers, regarding the habit of taking sap, but in 1873 Mr. C. A. White wrote as follows: —

> Upon the Iowa University campus we have a number of grand old aboriginal oaks, a favorite resort for red-headed woodpeckers (*Melanerpes erythrocephalus*). Among the young and growing trees that have been transplanted upon the campus are some sugar maples (*Acer saccharinum*) the bodies of which are 6 to 8 inches in diameter. Seeing the woodpeckers busily tapping upon them, I examined the trunks and found them perfectly sound, but the birds had pierced many holes of the usual size through the bark and into the cambium layer, where they stopped. The sap was flowing freely from the holes, and, watching the movements of the birds afterwards upon the trees, I became convinced that they were sucking the sap and that they had pecked the holes for the purpose of obtaining it.[2]

[1] United States Department of Agriculture, Biological Survey, Bulletin No. 37, 1911, p. 11.
[2] American Naturalist, 1873, Vol. VII, p. 496.

Mr. F. Stevens makes (1895) the following statement in regard to the California Woodpecker: —

At one of my camps in the pine region of Smiths Mountain, a family of this species developed the sapsucking habit. I had noticed some fresh holes in the bark of two live oaks, a foot or two from the ground, from which sap was flowing, and later I saw the birds drinking; in one case three were seen drinking at the same time. This is the only instance of the habit of this species that has come under my observation.[1]

Joseph Grinnell records the following observation in 1908 regarding the same species: —

At Seven Oaks, June 24, 1906, we had been watching a Sierra Sapsucker (*Sphyrapicus v. daggetti*) industriously running a line of bark pits around the branch of an alder, when a California Woodpecker . . . flew down and drove off the sapsucker . . . then went the rounds of the borings himself, "dipping" from each.[2]

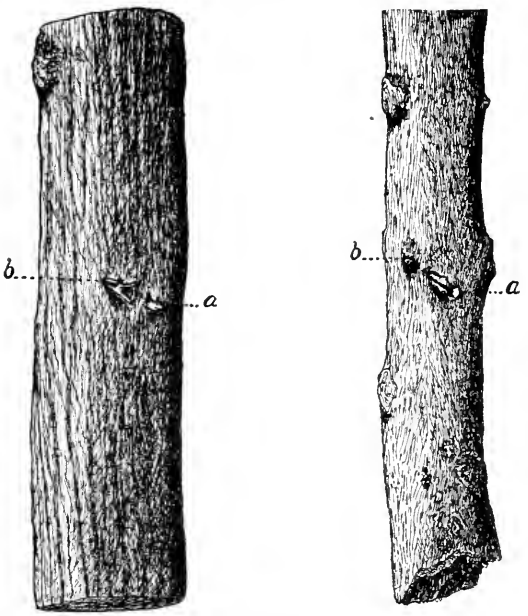
Farmers operating maple sugar orchards in New England assert that the Yellow-bellied Sapsucker, Downy Woodpecker Hairy Woodpecker and the Nuthatches all take sap from the trees when it is running. There is no reason to doubt this, as squirrels and insects, such as flies, wasps, hornets and butterflies, are known to have similar habits when the sap is flowing. In "Useful Birds" it is proved by the observations of the late C. E. Bailey, a very careful and accurate field ornithologist, that the Downy Woodpecker sometimes taps trees for the sap alone.[3] Mr. Bailey followed a Downy Woodpecker from 12.30 until 2.45. He saw the bird tap two small maples 4 and 6 feet from the ground, after which it spent most of the time taking sap. The tree was tapped by pecking it a few times. The perforations made by the bird are figured from the specimens brought in by Mr. Bailey. The bird clung to the tree and took the sap out of the lower cut. It then sat for a long time in another tree, when it came back and took more sap. This was done three times while Mr. Bailey was watching it, and he was able to get within 6 feet of the bird while it was actually engaged in taking sap. The illustration

[1] Bendire, Charles: Life Histories of North American Birds, 1895, p. 115 (Smithsonian Institution, special bulletin).

[2] University of California Publications in Zoölogy, 1908, Vol. V, pp. 65, 66.

[3] Useful Birds and their Protection, 1913, p. 256.

shows that the apertures made for taking sap were quite different from those to which reference has been made in the foregoing pages.



Section of two small red maple trees tapped for sap by Downy Woodpecker. The bird while making the cuts was watched by C. E. Bailey. It came back three times in two hours to take sap from the lower holes *a–a*. The upper incisions *b–b* were not used.

In the investigation made during 1919 and 1920 by our official observers, several people who actually saw the Yellow-bellied Sapsucker in the act of making horizontal lines of holes and feeding from them, described their observations. Mrs. Viola E. Richards of South Deerfield writes on October 18, 1920, that she watched a Yellow-bellied Sapsucker make two round holes in an apple tree. He drilled one shallow hole and then began on another, which he frequently left to return to the first, as if sap had gathered in one hole while he worked at the other. There is a recrudescence of sap in maple trees sometimes in autumn. The Indians are said to have drawn sap in October.

Mrs. William F. Eldredge of Rockport, Massachusetts, writes

that on October 8, 1920, she saw an immature Yellow-bellied Sapsucker drilling small holes low down on a girdled apple tree, and the bird allowed her to come very close. It had bits of "pulp" in its beak; the larger pieces were apparently discarded and the smaller ones swallowed. It drilled a few strokes, with its head turned to the left, and then turned it to the right, and in the midst of its labors it seemed to drink from the last completed boring. She reports that her husband saw it eat the inner bark. Others report similar observations. It seems probable that the Downy Woodpecker and possibly the Hairy Woodpecker may, at times, have the same object as this Sapsucker.

Miss Florence W. Rockwell of Montague writes, June 3, 1920, that she has watched the Downy Woodpeckers evidently drinking sap from such holes, but has not seen the pits in the making. Miss Nina G. Spaulding writes from Jaffrey, New Hampshire, on March 12, that she watched a Downy Woodpecker on an old apple tree evidently pecking some small round holes. After he left she found fresh holes. Some were increased in size, evidently by pecking at the same place until a large space was cleared of bark. She writes that she has seen but one Sapsucker in that region, but that there are quantities of round holes in apple trees. Many others report the prevalence of Downy Woodpeckers and the scarcity of Sapsuckers, but this cannot be accepted as conclusive proof that the Sapsucker did not make the holes.

Major Mark Robinson writes from Mowat post office, Ontario, that on February 2, 1920, he saw a male Downy Woodpecker in a small yellow birch making a ring of holes along one side of the trunk about 6 inches below a knot hole, or "cat face," and watched the bird for some time about 8 feet distant. On April 11 he writes that he has examined carefully the holes that he reported as made by the Downy Woodpecker, and found that some insect had bored into the trunk of the tree. It was hoped to get a photograph of this Woodpecker's work, but it was learned that Major Robinson had destroyed the specimen by tearing off the bark in making his examination. He asserts that this work was "not in the same class" with that of the Sapsucker. The Woodpecker evidently was drilling for insects.

Mr. William J. Cartwright of Williamstown, Massachusetts, writes, October 28, 1920, that he flushed a Downy Woodpecker from an apple tree having holes in circles about its trunk, and found some freshly cut holes, while others showed signs of various stages of weathering. He did not actually see the Woodpecker make the holes, but the point he makes is that the holes he has found made by Sapsuckers always have gone deeper into the sapwood than those found on this ash tree. He noticed, however, that the individual holes in both cases were about the same distance apart. The bird did not come back to the tree while he was present.

Mrs. Susan K. Squires of Fredericton, New Brunswick, writes, November 11, 1919, that in October of that year when picking apples she saw two or three Downy Woodpeckers going over and over an old crabapple tree. She examined the tree and found it had rows of new holes and some that looked like old ones newly opened, but most of the new ones were on spots where loose bark had fallen, or where the woodpeckers had pecked it off.

Mr. Norman P. Woodward of Worcester, Massachusetts, writes, November 17, 1919, that there is an old pear tree in his yard that is full of holes made by Woodpeckers. He has often seen the Downy Woodpecker drilling these holes, but never long at one hole. It runs from hole to hole, and gives half a dozen pecks with its bill. He has never seen in either spring or autumn any signs of sap running from these holes. He has sugar maples at the door, but so far as he is aware, they are not visited by these Woodpeckers.

Mr. J. K. Jensen, a Danish field ornithologist of long experience, formerly of Westwood, Massachusetts, but now of Santa Fé, New Mexico, says that he has seen the Downy Woodpecker make the small holes so often seen in apple, maple and birch trees, and believes that it is the author of most of these holes. Trees with the bark punctured are very common near his old home in Westwood, where the Downy Woodpecker was common and the Sapsucker scarce. In fact he had never seen the Sapsucker during his eleven years' residence in that region. He spent much time studying birds and investigating their habits, and believed that had there

been Sapsuckers enough to make 10 per cent of these holes, he would have met with one or more of the birds.

He states that during the latter part of August, 1919, he was camping near the ranches of Taos, New Mexico. On the bark of several large and healthy white birches he found at least 100 punctures forming lines at even heights one line above the other. What first called his attention to the trees was seeing a bird he believed to be Nelson's Downy Woodpecker alight on a tree just above what seemed to be the freshest row of holes. The bird stayed on the spot about twenty minutes, every little while picking up one of the ants which was attracted to the flowing sap. For several hours the bird could be seen, apparently catching ants on this tree, remaining on the tree from fifteen to twenty minutes at a time. He asserts that in Denmark he has seen similar holes in the bark, mostly in apple, maple and linden trees.

Mrs. Wilhelmine Seliger of Hartford, Connecticut, writes: —

> The small holes in the apple trees I have seen made by the Downy Woodpecker, who curiously turns his head from side to side and then begins to pick again for the purpose of getting the juice out from under the bark.

Mr. C. J. Maynard of West Newton, Massachusetts, in a letter dated October 24, 1920, says that he has actually seen the Downy Woodpecker making rings of holes about a tree, and that there was an old wild apple tree back of Prospect Hill, Waltham, on which he remembers seeing the Downy at work. This, he avers, is the habit to which he refers in his "Birds of Eastern North America," in which he says: —

> I do not think that this is in the least injurious to the trees, nor that they are drilled by the birds with the intention of eating bark, but that they are simply following the promptings of what we may call inherited instinct.[1]

He asserts that these holes are drilled one-fourth inch or little more in depth, that he never saw one that penetrated the "fresh bark within," and believes that they serve as a sort of storehouse for the birds, as insects enter them for con-

[1] Maynard, C. J.: The Birds of Eastern North America, 1896, p. 377.

Work of Yellow-bellied Sapsucker on apple tree at Huntington, Massachusetts, October 10, 1920, observed by Albert A. Cross. The bird was watched while it was making these bark pits.

Work of Downy Woodpecker on apple tree at Huntington, Massachusetts, November 13, 1920. Observed by Mr. Wm. J. Trudell, who watched the bird make the three rows of pits—*a*, *b* and *c*.

venient hiding places, and are thus readily found by the "sagacious Woodpeckers."

Recently, Mr. A. A. Cross of Huntington, Massachusetts, wrote that Mr. William J. Trudell of that town had seen a Downy Woodpecker in the act of making a row of holes in the bark of an apple tree. In response to an inquiry Mr. Trudell sent the following: —

> On November 13, 1920, while rabbit hunting, I came into a small apple orchard on the Russell watershed, known as the Ritch Farm. I was standing under one of the apple trees waiting for a sign of game, when I heard a Woodpecker at work over my head. I took my glasses and saw it was a Downy. It was about 8 feet from me and I plainly saw it make a series of round holes horizontally on the limb, and I am positive it was making the original holes and not opening up old holes. I am not sure whether the bird was securing food, but I think it was, as there is no sap in the tree as late as that.

The Sapsucker does not always follow any definite plan in making these perforations. Sometimes they are spotted over a tree like a charge of buckshot. The Downy Woodpecker also sometimes makes these pits in a very haphazard manner. In a recent letter from Mr. R. A. Gilliam of Dallas, Texas, there appears the following: —

> December 5, 1920, I saw two Downy Woodpeckers on the stem of a honey locust, just below where the first limbs branch off, industriously boring into what I knew, even without a glass, was perfectly good bark. They kept at this for at least twenty minutes before I was compelled to disturb them. I found they were going entirely through the cambium, the incisions or holes being about one-eighth inch in diameter, and possibly one-fourth inch apart up and down the tree, then one would start another run about one-fourth inch to the side.

Apparently these incisions were made in a vertical line, as was the case once with a Sapsucker watched by Frank Bolles.[1] The main point in the observation, however, is that they were made in sound bark. Two correspondents assert that the Hairy Woodpecker also is responsible for the rings of punctures that appear on apple trees, but do not say that they have actually seen the bird make such pits.

[1] Auk, July, 1891, Vol. VIII, No. 31, p. 258.

In the foregoing observations we find the following motives attributed to the Downy Woodpecker: —

It is said to make rings of punctures —
(1) to secure insects from beneath the bark.
(2) to catch insects that come to seek the sap.
(3) to prepare hiding places for insects, in which it later seeks them.
(4) to take sap.
(5) to take cambium.
(6) to take the inner bark.
(7) to sharpen the bill.
(8) to exercise, as in play.

There is sufficient proof found in stomach examinations alone to show that the bird takes cambium. Small pieces of the inner bark often are found in the stomachs of Woodpeckers, taken purposely or accidentally while swallowing their chief food, which consists of destructive insects. Undoubtedly the Woodpeckers hammer much in play, and this serves to wear down the end of the bill, which otherwise because of its rapid and continuous growth would become so elongated as to be useless for its main purpose.

The reader may judge for himself whether the above evidence is sufficient to convict the Downy Woodpecker of making circlets of pits. In any case further evidence is needed regarding the depth of the holes usually made, the prevalence of the habit, and what nourishment, if any, the bird secures in the operation. There is hardly sufficient testimony to convict the species of injuring the trees. So far as the writer's observation goes, the vigor of the trees seems to be increased by these small rounded holes, whether made by the Downy Woodpecker or Sapsucker, although McAtee has shown that the Sapsucker holes injure the wood of timber trees, causing defects in the lumber. The large rectangular holes made by the Sapsucker sometimes destroy limbs or entire trees by girdling.

The series of small holes made by Woodpeckers on sound apple trees may have the effect of stimulating growth. Scraping off the outer bark of fruit trees or slitting it vertically often produces a similar effect.

On the whole, the Downy Woodpecker is one of the most

beneficial birds of New England, a persistent enemy of borers, bark beetles, codling moths and other destructive tree pests; and the Sapsucker, which may be more or less destructive in the northern forests, apparently does little harm to orchards in Massachusetts.

The Heath Hen.

In April an attempt was made to take a census of the Heath Hen on Marthas Vineyard, but, owing to inclement weather during the only time when a visit to the island could be made, it was impossible to get a reliable census or even a close estimate of the numbers. Nevertheless, information acquired then and since indicates that under the present management of the reservation the birds are increasing. A more definite report probably can be made next year. There are now no birds of this species anywhere on the mainland, as all that have been distributed there have died; therefore, the saving of the species depends on the success of the colony on Marthas Vineyard.

Exhibitions.

In September the Division prepared an exhibit for the Eastern States Exposition at Springfield, which was visited by more than 100,000 people. A prominent part of the exhibit was a case showing the different forms of the gypsy moth and the birds that destroy the pest. On children's day the booth was largely given up to an exhibit of living birds from the Bird Hospital, the unique undertaking of Miss Mary C. Coburn of Seven Acres School, Springfield. About 18,000 people saw this exhibit on that day. Below is a brief report of the hospital for the year: —

The Bird Hospital.

During the past year more than a hundred of our common birds have been or are at present inmates of our hospital. All the patients are interesting, but especially so are the Black-crowned Night Heron (victim of a steel trap), the European Goldfinch (blinded by illicit game poachers), an Albino Red-eyed Vireo, a normal Red-eye with dust shot in back of head, a Baltimore Oriole, a Catbird, Barn Swallows, and a prize-winning Pigeon with shorn wings.

We found the English Sparrows to be suffering from a kind of lockjaw,

thirty being brought in badly emaciated with jaws shut fast. No other variety of birds seemed to be so afflicted.

This year but two birds were found suffering from the European blowfly, — a Song Sparrow and a Red-eyed Vireo; the tumors developed more slowly in captivity than when the birds were in a wild state.

During the summer many visitors saw our birds, and several schools came. Children often came to get help for sick Pigeons, Parrots and pet Canaries. Seventy dollars have been contributed toward the support of the birds. As a result of the interest the press has taken in our work, several retired physicians in the west have written us in regard to establishing bird hospitals.

Our school children have worked hard to get insect food for the birds. We have spent on the average two hours daily since April 19 to catch fish for our Heron. This service has been done most willingly. Several zoölogical societies have asked for some of the birds to exhibit, but the boys and girls love them too well to part with even one invalid. Feed boxes are ready for the use of winter birds. Money is being raised to buy a lantern for lecture purposes, the lecture to be entitled "Hospital Work for the Birds."

Bird Days.

As usual the Division co-operated with the bird committee of the State Grange, Patrons of Husbandry, in bird day exercises. The director was present and spoke at the exercises at Charlemont May 22, which were attended by many people from all the near-by country. This committee of the State Grange is doing an excellent educational work, among the rural population, which deserves every encouragement.

Bird Migration observed during the Year.

The study of the distribution and migration of Massachusetts birds in New England has been continued. Nearly four hundred observers have contributed notes on birds seen through the year. Some send in notes occasionally, some once or twice a month, and others more often. These reports have been filed, and the notes on migration and distribution have been entered on maps kept for each species. Valuable records have been noted and recorded. Notes on food and habits have been kept. A general summary, or bulletin of information giving a résumé of the movements of birds, has been sent out at the close of each month to these correspondents, and on the 15th notes have been sent to each giving warning of un-

usual birds and current movements. The records of migration as collated from these observations during the year may be summarized briefly here. The fiscal year which this report covers begins December 1, 1919.

December, 1919.

The first half of December was mild, with a few exceptionally cold days; but the last half was cold, with occasional light snows and few mild days. During the first period grass was still green in many places and a few wild flowers were in bloom. From the 14th to the 21st, exceedingly low temperatures were recorded, ranging from 42 degrees below zero in Maine to 10 degrees below on Cape Cod.

A Southward Movement of Wild Fowl. — The freezing of northern waters drove the river ducks southward; many appeared in the Carolinas, and winter species arrived in Massachusetts waters in considerable numbers. A few Arctic and sub-Arctic sea birds began to appear along the coast. Some Geese, which had remained very late on Prince Edward Island, began to fly south early in the month, and on the 24th a single Swan was seen flying very high, moving southward over Middlesex County, Massachusetts. All through December, land birds were few and far between, except in localities where food was abundant and shelter excellent. There was a marked absence of such northern Hawks and Owls as were numerous in 1917–18.

About December 1 an Arkansas Flycatcher was taken on Cape Cod and a Crested Flycatcher was seen from the 8th to the 14th in Essex County. A great flock of Cowbirds, a few small flocks of Redwinged Blackbirds, and a flock of about 40 Mourning Doves remained through the month on Cape Cod. Evening Grosbeaks appeared in small numbers from the northwest during the month; Siskins moved southward through New England, and their places were taken by Redpolls from the north.

Movements of Grebes and Jays. — Early in the month there was a flight of Horned Grebes, and a few stragglers were seen until late in the month. Blue Jays and Canada Jays were reported as very abundant on the 12th in northern Ontario —

an apparent southward movement. Brown Creepers appeared in New England in smaller numbers than usual, and Golden-crowned Kinglets were rare. Those northern species, the Pine Grosbeaks, Evening Grosbeaks and Snow Buntings, increased in numbers generally in the Provinces and northern New England during the month. By the end of December Crows had mostly left the Maritime Provinces and northern New England, but three large "roosts" were reported in southern New England.

January, 1920.

In January a single flock of Bohemian Waxwings was reported in the Province of Quebec, and two from Maine. January was a remarkable month, — driving gales, snow, ice and cold predominating. There were a few milder days, but nothing that could be designated by the name of "January thaw." The average thermometer readings were as low as those of January, 1918. Night temperatures averaged extremely low and there were very few bright, sunny days. The snow varied in depth from 6 inches along the southeastern coast to 2 or 3 feet in some of the western mountainous wooded sections. In early December some willow catkins had begun to bloom on Cape Cod, but late December and January were too much for them. Peach buds were destroyed throughout New England.

Observers of long experience asserted that they had not seen so few birds in winter for years. Nevertheless, there were some gatherings of land birds, principally on the southern coast of New England.

A Southward Movement of Land Birds. — A great storm occurred on the 17th, after which common winter land birds were even more scarce than before. Many were believed to have fled southward before the storm or with the cold, driving northwest wind that followed on the 18th. Many Starlings disappeared from Massachusetts, but there was an influx in New York. Chickadees appeared on Block Island. Robins drifted across the Sound to Long Island; Pine Grosbeaks, Evening Grosbeaks and Snow Buntings appeared in Massachusetts in greater numbers after the storm.

On the coast no scarcity was noted among the water birds, which had been driven out by the ice from most of the lakes and ponds. Open holes in the rivers, springs and swift-running, unfrozen streams were visited night and day by wild fowl. Murres, Guillemots, Razor-billed Auks and Dovekies were reported.

Geese Wintering. — Canada Geese were wintering in large numbers on the southern coast of Nova Scotia, and Geese and Brants still remained in large flocks south of Cape Cod. Snowy Owls appeared in the west, but very few were reported in New England. Hairy Woodpeckers were not nearly so common in New England as during the winter of 1918–19, but appeared in increasing numbers in some Canadian localities.

The great flock of Cowbirds on Cape Cod had disappeared late in December, but smaller flocks of 50 to 100 birds remained during January, and a few were noted on Block Island, Rhode Island, and Long Island, New York. Large flocks of Red-winged Blackbirds were seen on Cape Cod early in the month, a few Catbirds and some Rusty Blackbirds in other parts of Massachusetts. Bohemian Waxwings were noted in numbers in Ontario and Quebec. One or two Mockingbirds were seen near Boston during the month, and Red-breasted Nuthatches were scattered through the eastern Canadian Provinces and south to southern New England.

February.

Winter reached its climax during the first week of February, which began with the lowest temperature of the season, and ended with the greatest snowfall. On February 1 temperatures as low as 40 to 54 degrees below were reported in northern New England. On that day immense flocks of Snow Buntings appeared in northern Vermont, and great flocks of Evening Grosbeaks moved southward. In some of the valleys of northern Vermont snow was reported 7 feet deep. Snowstorms continued until in Massachusetts the snow varied in depth from 2 to 5 feet, according to locality and exposure. This succession of storms lasted generally until about the 12th and proved very destructive to bird life. Along the south-

eastern seaboard rain and snow with a final coating of ice made it almost impossible for birds to find food.

Birds destroyed by Storm and Cold. — Individuals of even the more hardy species, such as Redpolls and Siskins, perished. Bob-whites in some northern and western sections of Massachusetts were destroyed; even Ruffed Grouse were found dead, apparently from starvation and cold.

Great Blue Heron and Cowbirds Wintering. — Notwithstanding the severity of the season a Great Blue Heron was observed on Cape Cod during January and another in February. Several White-winged Juncos were reported. A flock of Cowbirds continued to come to a feeding place on Cape Cod, others were reported from Rhode Island; but Rusty Blackbirds and Red-wings which had been noted in January did not appear on the February reports. Bohemian Waxwings were reported from three different localities in Maine, but not from southern New England. Early in the month a spring movement of Robins apparently had started in the south, but this did not reach New England.

Winter Land Birds moving Coastward. — After the storm of the 12th winter birds from the north increased in southern New England, scattering along the coastal region from Essex County, Massachusetts, to central New Jersey. High shifting northwesterly and northeasterly winds seemed to have driven some into the interior and others toward the coast. At the end of this storm period birds were more scarce than ever over a large part of the hill country of New England, but had become more numerous on the coastal plains. These conditions continued for about two weeks.

March.

Probably no winter since the twentieth century came in took a greater toll of bird life in New England than the winter of 1919–20. Perhaps the greatest mortality occurred during and after the storm which swept into southern New England on the 5th and 6th of March, and continued in some of the northern sections until the 7th. High northerly and easterly gales were accompanied at first by rain, followed by sleet and snow, with rapidly falling temperature. When the skies

cleared these shifting gales were succeeded by cold, piercing northwesterly winds of nearly hurricane force. The storm was regarded in some localities as the "worst blizzard within the memory of man."

Bird Mortality. — After this storm birds of even the hardiest northern species were found dead in the snow, some of them in sheltered places, even under cover, apparently in splendid condition, and with stomachs full of food; others with empty stomachs and emaciated frames. Hardy birds, like Grebes and Loons, were cast up dead on some of the southern New England shores. For the first time in the writer's experience dead Snow Buntings were reported. When the storm ended, the few species of small winter land birds still left in Massachusetts seemed to have decreased much in numbers. Goldfinches had practically disappeared. Most of New England was now buried under from 3 to 6 feet of snow. Railroad trains were stalled for days; a large number of trolley lines were completely blocked and moved no more cars until spring. On the 13th rain swept Cape Cod nearly clear of snow, but the same storm added more in the interior. Deep snow continued throughout New England during the first half of the month. Then came a sudden change. Soon hylas were heard peeping, snakes were seen. By the 23d bullfrogs and aquatic beetles were reported; the 23d and 24th seemed like summer days. From the 26th to the 28th butterflies and moths were seen.

The Northward Movement begins. — During the month the early bird migration had progressed very slowly up the coast to the middle Atlantic States. Snow and cold on the 14th arrested this movement and only a few stragglers reached southern New England.

The First Great Bird Wave. — From the 16th to the 19th more stragglers began to filter into Massachusetts, but the great bird wave of the month came from the 23d to the 25th, when multitudes of early land birds were moving northward from Florida to Maine. From the 27th to the 30th a great movement took place. Holboell's Grebes came in numbers. Many flocks of Ducks and Geese were flying north from March 27 to 30. The Great Blue Herons known to have

wintered in Massachusetts probably died or disappeared on or before the 6th of March, but on the 28th the first spring migrant of the species was reported. About that time Ospreys appeared. The main flight of Red-winged Blackbirds began to arrive in Massachusetts on the 22d. Grackles had reached Maine by the 30th. Evening Grosbeaks decreased at this time in Massachusetts but increased in Maine. During the blizzard of March 6 Snow Buntings had appeared in immense flocks in northern Vermont. A few days later flocks were observed in Aroostook County, Maine, flying northward at a great height. Fox Sparrows appeared in southern New England on the 23d and 24th. Tree Swallows were numerous at Nantucket on the 25th. Despite the severe winter a single Hermit Thrush had wintered successfully in Bristol County, Massachusetts, and was heard singing on the 24th, and at least one Catbird survived.

April.

April was a month of cold, snow and driving rain with sweeping gales, scant sunshine, and but few days of vernal warmth. Migrants were much delayed or driven back by northerly winds; also, the birds were drifted inland by easterly gales, but they still pushed on. No great bird wave was recorded until late in the month, when spring flowers were seen, butterflies appeared, and woodchucks and chipmunks were noted. After the 15th toads, hylas, wood-frogs, turtles, snakes and bats were reported in southern New England. On the 19th there was a strong northward movement of birds, but on the 24th a high northwest gale again checked the advance.

A Retrograde Movement. — During this gale a retrograde movement of Swifts, Barn Swallows and Tree Swallows was observed in Massachusetts and Connecticut localities. From the 25th to the 26th the forward movement was resumed. During the month Blue-gray Gnatcatchers appeared in unusual numbers in the middle States.

Northward Flights of Hawks and Other Land Birds. — On the 24th, 25th and 26th great flights of Hawks were observed in Massachusetts.

In April the large Northern Hairy Woodpecker had left

northern Ontario, and the smaller or more southern race had appeared. An immense flight of Sapsuckers was reported in the west. Late in the month the numbers of Evening Grosbeaks thinned out, and Pine Grosbeaks practically disappeared from Massachusetts. Goldfinches remained scarce, but many were reported from the south. The delayed migration of Fox Sparrows reached immense numbers in southern New England, but the great majority passed northward early in the month. The Red-breasted Nuthatch was extremely scarce, and Black-capped Chickadees were much less common than in February and early March, while Golden-crowned Kinglets, as last year, appeared to be very rare.

There was an early flight of Kingbirds on Cape Cod and Marthas Vineyard this month.

May.

The first fourteen days of May were mainly cold with snow, frosts, much cold and rainy weather, and northerly or easterly winds. During this time many of those land birds which feed chiefly on the ground moved on to their northern breeding places, but arboreal birds were slower in coming. The migration of the month was peculiar. The weather was generally cold and backward from the southern States to New England. During the colder periods, with east and northeast winds and much rain, there was little evidence of forward movement, except as the birds worked northward in the daytime, feeding as they moved along; but when the wind shifted to the southward, with fair, warm days and clear nights, the northern migrants made great leaps over wide spaces.

The Spring Movement of Warblers. — On May 6 the weather moderated and a south wind brought several species of Warblers to northwestern Massachusetts that were not recorded in the eastern sections until later, where most species were reported as late and few in number. On the 17th rains and easterly winds gave place in southern New England to fair, warm weather with southerly breezes. On that day and the next, a great flight of Warblers and other land birds appeared. It reached New Hampshire on the 18th. The temperature of northern Maine at this time had attained the maximum of

the month, as from 80 to 88 degrees were reported. A Warbler flight was noted in the Province of Quebec. Another warm wave on the 27th and 28th sent forward most of the northern migrants. A large number of species was observed, but a comparatively small number of individuals. Eight Blue-gray Gnatcatchers were noted in eastern Massachusetts.

Passenger Pigeons reported. — Reports of Passenger Pigeons came in with the opening of spring and continued throughout the summer. While it is not impossible that there are a few Passenger Pigeons left, it seems extremely improbable. The only "Pigeon" that has been produced for identification thus far has been the Mourning Dove.

Nighthawks were not reported during the month in large numbers. Goldfinches continued scarce during the most of the month, but began to come in numbers in the latter part of the period, and continued to arrive in northern New England and the Provinces until June 1. The migration of Juncos and other Sparrows extended well into May. Crossbills remained on Marthas Vineyard all the month. Many birds were late in coming, and the flight continued into the month of June. The extremely warm weather and southerly wind that prevailed during the last days of May greatly accelerated the progress of migration. Northern migrants were heard passing, night after night.

June.

June in southern New England gave us only short periods of fine, warm weather; low temperatures, clouds, fog and rain predominated; local tempests with torrential downpours occurred, when branches of trees were torn off and large trees blown down. The high winds, together with cold rains, destroyed many birds' nests and young birds. In some places these storms were destructive to young game birds. Floods locally overflowed the nests of Bitterns, Rails and Sandpipers, while high tides and raging seas along the coast swept away the eggs of gulls, terns and Piping Plovers.

The Migration continues. — The migration of straggling northern transients among the land birds continued until about June 10. Many Sandpipers and some Plovers were still migrating the first week in June, and individuals were seen later

on the coast of Massachusetts. In the early evening of June 7 many small birds were heard migrating in Massachusetts and Maine.

Waxwings, Vireos, Cuckoos, Nighthawks, Purple Martins, Goldfinches, Wood Pewees, Black-poll Warblers, Baltimore Orioles and Indigo Buntings continued to appear locally in New England and Canada after June 1. The last flight of Red-breasted Mergansers noted at Block Island, Rhode Island, was June 4, and 20 Loons were reported off Cape Cod on June 7. Goldfinches and Waxwings were first noted the second week in June in some places, while a few shore birds were reported still migrating. Among the rarer birds noted in Massachusetts were Worm-eating and Mourning Warblers, and several Blue Grosbeaks were reported from Massachusetts and Maine. Notwithstanding the severe winter, which must have reduced the vigor of winter residents, there were many reports of large sets of eggs deposited by the Ruffed Grouse. The spring migrations were hardly finished when a few shore birds appeared, apparently on their southward journey, but these may have been non-breeding birds that had remained somewhere on our shores. Great Blue Herons were reported on the Massachusetts coast and on Long Island during the last week of June.

July.

July was not far from normal generally in most of southern New England, with only one short period of abnormally high temperatures and a few very cool days the last week, but there was a heavy rainfall in some localities, particularly in the hills of western Massachusetts. In northern New England there was a favorable breeding season for the birds, with much pleasant weather.

Autumnal Migration begins. — On July 1 some of the shore birds had reached Long Island, and about July 15 some of the earlier breeders among the land birds began flocking or deserting their breeding places. Herring Gulls appeared in numbers on Marthas Vineyard by the 26th, and on the 28th five Black Terns were noted there. During this month Ruby-throated Hummingbirds were reported as feeding on small caterpillars. There seems to have been no considerable num-

ber of Egrets wandering from the south this year. The first was noted on Cape Cod July 30.

A Few Egrets move Northward. — The hot weather of late July and early August appeared to send more Egrets northward at the time when Great Blue Herons had begun moving southward. Egrets were reported in August, and several Little Blue Herons were noted on Long Island. Experience leads to the belief that Egrets and Little Blue Herons move north in small numbers through the middle Atlantic States into New York and New England after the breeding season, particularly when the weather of July or August is exceedingly hot. Snowy Herons are more rarely seen. Very few individuals of any of these species are noted in early spring or in late autumn.

An Increase of Gulls and Terns. — Reports from the coasts and islands of Massachusetts indicate that the increase of Gulls and Terns still goes on. Herring Gulls bred in at least three localities in Massachusetts and one in southern New Hampshire, near the Massachusetts line, but one of the sandspits on which they nested in Massachusetts was nearly washed away by the sea, doubtless destroying both eggs and young. The number of Laughing Gulls increases and they are seen more and more in summer along our shores at localities distant from their principal breeding place on Muskeget Island. Common Terns now breed in large or small colonies, or in pairs at nearly every suitable location on the coast. Roseate Terns and Arctic Terns are increasing in numbers, and Least Terns have settled in new breeding places, some at least on the mainland, where formerly they bred only on islands. A great migration of sandpipers and other shore birds occurred during the cold wave of the latter part of July.

August.

August was nearly normal so far as weather and temperature were concerned, with perhaps a little more rain than usual in Massachusetts and less than usual in parts of northern New England.

Southward Flights. — Early in the month night flights of land birds were noted in Maine. Soon after the 15th there

were movements of Swallows, Flycatchers and Warblers along the coast, and during the third week the frosts in the interior of northern New England started flocks of Warblers toward the south. Great numbers of birds in northern New England began moving before September 1. The early Hawk migration began during the last few days of August, and a great flight of Nighthawks appeared. Bird song continued later than usual in some places, particularly where more than the normal rainfall had been noted. Many northern Gulls appeared during the month as far south as the Connecticut coast. Shore birds were abundant in Massachusetts.

September.

September was noted for a great variety of weather and temperature. There was much fair weather in southern New England but many storms to the southward. In Massachusetts, the first part of the month was fine and was ideal for bird migration. During the first week great numbers of Sparrows, Warblers and Thrushes moved through New England southward. Light frosts occurred early in the month, and about the 20th there were severe frosts with heavy snow on the White Mountains and less in Maine. The latter part of the month was mainly clear and warm in southern New England, with only a few cloudy or rainy days. The thermometer during the month ranged from 26 to 90 degrees. Bird migration was heavy throughout a large part of the month, but, nevertheless, there were many localities where very few birds were to be seen in the daytime, although large flights went over at night. In other places flocks of migrating birds were seen in daylight. These reports cover nearly every day of the month. Practically all the fall migrants and some of the winter residents were observed.

Early Migration of Geese. — There was a small early movement of Geese, and Brants arrived in goodly numbers on Prince Edward Island, while Double-crested Cormorants came in considerable flocks. During the month there was a great migration of Gulls and an unusual flight of Wood Ducks and Blue-winged Teals in southern New England. Large flights of Black Ducks occurred in the Maritime Provinces, reaching

Massachusetts during the latter part of the month. Canada Geese also reached Massachusetts and were noted from time to time, but were not seen on Long Island or farther south.

A Large Flight of Shore Birds. — Many observers reported unusual numbers of shore birds. The flight extended well through the month. Hudsonian Curlews were more common than usual. Upland Plovers and Killdeer Plovers seemed to have increased in numbers over former years. Reports of the increase of Ruffed Grouse in Massachusetts were disappointing in many cases, but in northern New England and the Provinces the reports were more optimistic.

Hawks, Nighthawks, etc. — There was a flight of Hawks the first week of the month, but the main movement came from the 16th to the 19th. Great numbers of Chimney Swifts, in flocks, appear to have vanished from Massachusetts on the night of the 18th, as few were reported afterwards.

The main Nighthawk flight moved southward early in the month, but stragglers continued to pass over until October. Immense roosts of Starlings were reported from Essex, Middlesex and Bristol counties, Massachusetts, and considerable numbers in the Connecticut valley. During the month there appeared a definite movement of this species toward the coast. Its numbers seem to increase from season to season. Goldfinches were less in number in Massachusetts than last year, but abundant locally in northern New England; and but very few Siskins were reported. Horned Larks and Tree Sparrows arrived in New England during the latter part of the month, but in very small numbers. During September Red-breasted Nuthatches arrived in the coastal region of northern New England, and Brown Creepers were recorded south to Massachusetts. A single Mockingbird was reported on Cape Cod. As the month closed a southern hurricane was blowing up the coast.

October.

Copious summer rains in many parts of New England and the Provinces had helped to develop and mature a great crop of wild fruit and seeds. In regions where such food was plentiful certain birds remained somewhat later than usual. Birds and squirrels moved into regions where nuts or seeds on

which they feed were numerous. In many places squirrels found so much nourishment in the abundant pine seeds that they neglected the cornfields, doing little or no injury. Through the eastern coast States October was remarkable for mild and pleasant weather and high temperatures. The storm that came the last part of September continued for about two days into October, with gales on the 1st. Heavy rains fell in New England and 7 inches of moist snow in Algonquin Provincial Park, Ontario. Although these rains early in the month flooded the Connecticut River, there was very little precipitation thereafter in New England until nearly the last of the month. There was little frost in southern New England and few frosts in the northern sections. On the 10th twenty-seven varieties of wild flowers were gathered on Cape Cod. On the 18th and 25th an observer at St. Lambert, Province of Quebec, picked wild flowers of at least six species. Vegetables were still untouched by frosts in the gardens of Massachusetts and New Hampshire, and raspberries and strawberries were being harvested during the last week in the month. Trees held their foliage as long as there were few frosts, storms or high winds to strip them, and the wooded hills were clothed in wonderful colors.

A Great Flight the First Nine Days. — Land birds were moving almost daily or nightly nearly all the month, but the greatest flight occurred during the first nine days. Several Cuckoos were reported in southern New England during the first week. Most of the smaller passerine migrant birds seem to have gone south long before the close of the month. Shore birds continued to pass in some numbers, and water birds slowly increased along the New England coast. Six Swans were reported from Maine October 11. A flight of Canada Geese, unusually large for October, was noted on the Massachusetts coast from the 12th to the 26th, comparatively few being seen in the interior, and many passed far out over the sea. A flock of Snow Geese was reported. A flight of Great Blue Herons passed Block Island, Rhode Island, on October 30. There was a large flight of Wilson's Snipes the latter part of the month.

Hawks were drifting southward as usual throughout this month, but no great wave of any species was noted. There

were late stragglers of many species of land birds, which, perhaps, had been beguiled into staying longer than usual on account of the mild weather and plentiful food supply, and there was much autumnal singing by many species. On the 17th Pine Grosbeaks appeared in northern Ontario, apparently moving southward. Pipits passed through New England in goodly numbers. More Winter Wrens than are usually seen in the autumnal migration were reported. Brown Creepers appeared in larger numbers in northern New England than for the past two years, and Golden-crowned Kinglets, which had been rare for several years, appeared to have increased wonderfully in numbers. During the latter part of the month the number of land birds seemed less than usual.

November.

The weather of November was in general mild rather than severe, with occasional gales and a long storm with high winds the third week. Grass remained green, and some wild flowers were still in bloom during the first half of the month. November was notable for a great scarcity of land birds, and an abundance of water birds, Ducks, Geese, Brants, Gulls, etc. Great schools of small fishes, which remained along the shores of southern New England in October and November, brought flights of Gulls, Cormorants and Gannets. Terns remained later than usual, and a few were reported in November.

Great Flights of Geese and Ducks. — Immense flights of Geese appeared passing largely through the interior early in the month and later both in the interior and along the coast. They were reported from every New England State and from New York, New Jersey, and all the Maritime Provinces. In many localities the migration was the largest seen for very many years. The greatest flight of all came with the stormy weather which began on the 21st and continued for the remainder of the month, with only two pleasant days. Some of the heaviest flights thus came in storm, snow, sleet and rain. Geese wet, worn out and weighted down by sleet came to the ground or to roofs of sheds; others alighted in poultry yards, and some are said to have been killed by clubs. Scaup Ducks were found dead or dying upon the ground in Maine and Con-

necticut, others too exhausted to fly longer were seen walking in fields and gardens. A few Swans were reported from time to time in eastern Massachusetts, but not elsewhere.

During the storms of the latter part of the month many northern Ducks, such as Mergansers, Old-squaws, Golden-eyes and Eiders, appeared. A late flight of Great Blue Herons passed south during the stormy period. Sanderlings were still passing in small numbers up to the 26th, and there were a few Killdeers still left in Connecticut as the month ended.

A Scarcity of Land Birds. — One reason for the scarcity of land birds was that most of the summer residents and fall migrants had passed southward, and winter birds from the north had not come to take their places. Only a few winter Hawks appeared. Snow Buntings and Horned Larks had come in more or less along the coast, but Pine Grosbeaks, Redpolls, Siskins and Crossbills moved southward very slowly and in remarkably small numbers. Fox Sparrows were seen in large numbers by very few observers, many saw none, and even Juncos and Tree Sparrows did not appear generally in their usual abundance. One flock of Bohemian Waxwings was noted in New Hampshire on the 14th.

A few late stragglers among the Warblers and Flycatchers were noted this month, but the period ended with the most remarkable dearth of land birds reported at any time in the experience of the last three years.

An Ornithological Survey.

Late in May Mr. John A. Farley began an ornithological reconnaissance for the Division. The principal purpose of this undertaking was to clear up some points regarding the breeding ranges in Massachusetts of certain birds of the Canadian fauna. This work was continued through June and July, as long as the birds remained at their nesting grounds. In his search Mr. Farley traveled over parts of Berkshire, Franklin, Hampshire and Hampden counties. He intended also to visit northern Worcester County, but was delayed by continued heavy rains. While en route or later he visited and consulted with the following persons, most of them correspondents or observers of this Division, who freely gave time, advice and as-

sistance: Professor W. W. McLaren, Judge Sanborn G. Tenney, Miss Helen Hart and Mr. William J. Cartwright of Williamstown; Miss Dorothy Davies of Blackinton; Mrs. Frank Ransford and Mr. W. H. Sperry, chairman, Greylock Reservation Commission, of North Adams; Mrs. Thomas Carne of Adams; Miss Florence M. Pease of Conway; Miss Caroline E. Hamilton of Greenfield; Mrs. Julia F. A. Browning, Mrs. George Stanford and Mr. Emory Sibley of Rowe; Mr. Perley Carr of Colrain; Mr. J. W. Jackson of Belchertown; Mr. R. L. Coffin of Amherst; Mr. A. C. Bagg of Holyoke; Mr. A. A. Cross of Huntington; and Hon. Herbert Parker of Lancaster.

The notes secured by Mr. Farley during this trip, coupled with information previously obtained by him and other observers of this Division, all go to prove that certain species breed much more widely or generally in Massachusetts than previous records would indicate. Some results of the season's work are shown below: —

The Northern Pileated Woodpecker is distributed in the breeding season very sparsely through the forested regions of western and northern Massachusetts. It is even rarer now than the reports would indicate, as it is a conspicuous wandering bird, and a single individual may be seen often in different localities. It has nested in recent years as far east as Middlesex County, but has not been known to nest recently in Essex County. A nest was found this year by Mr. A. A. Cross in Hampshire County near the Hampden County line.

The Yellow-bellied Sapsucker was met with in the breeding season only in Franklin and Berkshire counties, at altitudes of 1,600 to 2,200 feet. Three nestings were noted, — one in Berkshire County and two in Franklin County.

The Olive-sided Flycatcher may breed anywhere between the western border of Massachusetts and the elbow of Cape Cod. It has been reported as far east as Dennis, and is well known in Berkshire County. It breeds from near sea level to an altitude of 1,600 feet and higher, but it now seems to be rarer in New England than it was forty years ago. It comes and goes. In Rowe, Franklin County, where Mr. Farley found six or seven pairs and two nests in June, 1918, he could not find a single individual in 1920. This bird may be found in

swamps or on mountain sides. It seems fond of a nesting location where there are tall dead trees to serve as lofty watch towers for its hunting.

The Slate-colored Junco is abundant on Mount Greylock, Berkshire County, and was noted more or less commonly elsewhere, where spruce trees grow. In fact it may be found more or less sparingly both in and out of the spruce growth in most parts of western Massachusetts. It is widely but sparingly distributed elsewhere in the State east to Middlesex County. There seem to be no records of its breeding in Plymouth, Barnstable, Dukes or Nantucket counties or in southern Worcester County. It is most common at altitudes of 1,200 feet or more.

The White-throated Sparrow is more common than the Junco in the spruce regions of western Massachusetts, and where the spruce has been cut off it remains to breed in the "slash," where it seems to increase in numbers. It is not confined to the spruce regions. In northern Massachusetts the Whitethroat is now noted locally clear down to the sea, where the Junco has not yet been observed in the breeding season. There seems to be no record of this Sparrow in summer in the southeastern region of Massachusetts.

The Blue-headed Vireo breeds in every county in the State, except perhaps in Barnstable, Dukes and Nantucket counties. It is a white pine and hemlock bird; hence, it breeds sparingly where there are few of these trees. Contrariwise, it is a common bird in Plymouth County and in similar country in other adjacent counties. In this general region there is more white pine to-day than in any other part of the State; therefore, it breeds commonly, if locally, near sea level in southeastern Massachusetts.

The Black-throated Blue Warbler breeds both in coniferous and deciduous woods over most of western Massachusetts, ranging east sparingly as far at least as north central Worcester County.

The Myrtle Warbler is much less common than the Blackburnian or Magnolia, but it has quite a wide breeding range over central and western Massachusetts; and as it has now been found nesting in one locality in southern Worcester

County near the Connecticut line and carrying food apparently to nestlings in another town a few miles away, it may yet be found nesting in eastern Massachusetts, or even in Connecticut. It has been noted in the highlands of western Connecticut in the breeding season. This species is fond of spruce, but Mr. Farley found two nests in white pines, — one high up, the other less than 6 feet from the ground. This species may be confidently looked for in the breeding season anywhere in Massachusetts where spruces or white pines grow at altitudes of 1,200 feet or more. Like the Magnolia Warbler it frequents pasture spruces, but unlike that bird it also inhabits white pine groves; therefore, it may be found casually in the breeding season almost anywhere in central or western Massachusetts, and its nests should be looked for as a possibility in the northeastern counties and also in the highlands of northwestern Connecticut.

The Magnolia Warbler is a bird of the spruce regions, and is most common in rather open country, such as pastures where young spruces, more or less scattered, are growing. It is likely to nest where such spruces are found, from Berkshire County east to northern Worcester County, but has not been noted elsewhere, or at altitudes much below 1,200 feet.

The Blackburnian Warbler is a forest bird. It is very common on Greylock, where it may be found in the tall, dense spruces and in the adjoining mixed growth as well. But it is also found among hemlocks and white pines in clear stands or mixed with hardwoods at low altitudes, and breeds from Berkshire almost to the sea. It is an equally common bird in New Hampshire, occurring anywhere in the white pines of the southern and central parts of that State. In the breeding season it seems gradually to disappear as we approach southeastern Massachusetts, but breeds sparingly elsewhere in the eastern sections, principally in white pines or hemlocks.

The Louisiana Water Thrush breeds here and there, along the banks of small streams and up their tributary brooks west of the Connecticut River and north to the Vermont line. We know very little of its occurrence in the breeding season east of the river. But the Northern Water Thrush breeds scatteringly eastward in the northern half of the State to Middlesex

County, at least, and is also colonized in good numbers in at least one locality in Plymouth County.

The Mourning Warbler is a bird of sprout-land, where timber has been cut off. It is common in such lands near the very summit of Mount Greylock, but is not confined to the top of the mountain. It has been met with in other parts of the range, and also well to the eastward in Franklin County, but apparently does not range very far east in Massachusetts. It was found in its favorite sprout-land down to 1,000 feet. A very few individuals have been reported in summer in eastern Massachusetts, apparently stragglers.

The Canada Warbler is widely distributed as a breeder over most of the State, but is more common in western Massachusetts than in the eastern counties, where it is very local. It seems to care little about altitudes or any particular kind of vegetation, but in most parts prefers cool, moist places, such as cedar swamps, for its breeding grounds.

The Winter Wren was noted in the breeding season not only in Berkshire County, where it may be seen on Greylock and at other more or less high altitudes, but in Franklin, Hampshire and Hampden counties at altitudes ranging down to 600 feet. As a rule, it was found near a brook in the woods, often in a ravine, but it is not by any means confined to spruce or even to coniferous trees, but is seen in mixed woods.

Golden-crowned Kinglets breed in the spruces on Mount Greylock, and in other stands of this tree in Berkshire County, also intermittently or sporadically elsewhere in central Massachusetts. They formerly bred in northern Worcester County in swamp spruces at an altitude of about 1,200 feet, but no one has *reported* them there recently. Mr. Farley and other observers saw them and their young this year only in Berkshire County.

Bicknell's Thrush was not recognized this season even on Greylock. It seems quite possible that the collectors have extirpated this bird here within the past few years. On the other hand, rare species like this come and go. It may appear next year.

The Olive-backed Thrush is a bird of the spruce and the fir. On Greylock it was noted down to 2,500 feet, elsewhere down

to about 1,600 feet, and not much lower. Its breeding has now been reported from Berkshire County east to northwestern Worcester County. It nests in swamps where spruce and white pine grow, and along streams shaded with spruce and hemlock.

Formerly the Hermit Thrush was regarded, rightly or wrongly, as absent or as a very rare breeder in most of the State, though always more or less common on the western highlands. Now, however, it occupies most of our territory as a summer resident, though still rare or wanting locally in southern Worcester County, seldom seen in the breeding season near Boston, and not reported from Nantucket. It is especially common in southeastern Massachusetts, as in Plymouth and Bristol counties, and on the upper half of Cape Cod (Barnstable County), where it is the forest thrush of this entire section, being known as "Wood Thrush" by many of the inhabitants. It prefers woods containing some coniferous trees and seems to have been increasing in recent years.

Recommendations.

A Report on the Birds of the Commonwealth.

During the service of the present incumbent, a demand has been manifested at this office for a report giving full descriptions of all forms of Massachusetts birds, with colored plates of all the species. There is no such work extant. The two volumes published by the Commonwealth, "Useful Birds and their Protection" and "Game Birds, Wild-Fowl and Shore Birds," having run through their several editions, are now out of print. Reprints cannot be made unless authorized by special legislation. There is nothing to take their place, and they gave only a partial view of Massachusetts bird life, with brief descriptions and only two colored plates. The Commonwealth has not published even a list of its birds since 1863. In recent years many other States have put out reports on their birds, some of them quite well illustrated with colored plates, none, however, giving full descriptions.

The writer has had twenty-five years' experience in learning what the people of the Commonwealth desire to know about our birds. With the help of many correspondents from all

parts of the State he has been able to collect a great amount of information. It is purposed to embody this material in two volumes of about 600 pages each, giving not only descriptions but also the marks by which the species may be known in the field, and notes on the life history, habits and food of each species.

The plan proposed is to print 5,000 copies of each volume, place both volumes in every free public library in the Commonwealth, and dispose of the remaining copies at a price that will reimburse the Commonwealth for the money expended. It is recommended, therefore, that the director of the Division of Ornithology be authorized to prepare for printing two volumes, of 600 pages each, on the birds of the Commonwealth, and that a sufficient sum for the preparation of the drawings to be used in illustrating this report be appropriated at the coming session of the Great and General Court of Massachusetts.

An Assistant Ornithologist.

This office was allowed $750 for an assistant during the year 1920. It is respectfully submitted that no capable assistant can be obtained for this sum. It cannot be expected that the present director will remain in office many years. It will be difficult to secure a man fit to fill the position, as most trained ornithologists have work that is more congenial or more remunerative. A capable man should be engaged immediately to be trained to fill the vacancy which will occur before many years. It is recommended, therefore, that $1,500 be appropriated for an assistant ornithologist.

A Plan for Adequate Protection of the Ruffed Grouse.

In 1919, after two years of great scarcity of Ruffed Grouse, a closed season for one year resulted in a considerable increase of the birds. At present, however, the numbers of this species in Massachusetts are rather disappointing.

In some places where the birds were common in summer they mostly disappeared during the shooting season. This is true particularly of regions about the centers of population, and also in many sections readily accessible to motor cars. On some reservations where no shooting has been allowed, and on

or near posted lands provided with caretakers, the birds are now more common, also, in some parts of western Massachusetts many birds are left over.

Reports on the present numbers of the Grouse are contradictory. One man finds no birds, while another, near at hand, finds many. There are sections where very few young birds were reared in 1920, and others where many were raised, but, on the whole, the increase of the year was disappointing.

More than 95,000 hunters were licensed last year to kill Grouse in this Commonwealth. The species has been killed off or driven out of large sections in many States. With the increasing number of hunters, motor cars and automatic guns, the clearing of more and more land, and all the accessory adverse influences due to modern civilization, the Grouse cannot stand continuous shooting year after year if we are to rely alone upon the number of birds that the woods naturally produce.

Artificial propagation never has been a commercial success with any woods Grouse. To increase this species more protection will be necessary. There is a complete remedy for the decrease of this bird which can be applied whenever it becomes necessary. Whenever the sportsmen of Massachusetts are willing to practice sufficient self-denial, we may have the Ruffed Grouse almost as plentiful again as it was in the early decades of the nineteenth century.

The remedy is a closed season for two or three years. Wherever such a law has been enacted and enforced the decimated birds have increased wonderfully. Recently, after such a season of forbearance in Michigan, Ruffed Grouse became so remarkably abundant that they were common in places where they had not been noted at all for many years. After a similar closed season in Minnesota, more than 500,000 birds were killed, according to the tabulated reports of the sportsmen as returned by them individually to the game commissioners.

There is a disadvantage, however, in leaving the protection of this bird entirely to the legislative body. The Legislature meets before the breeding season and has no means of knowing what the year's increase will be or how much protection will be required. The Department of Conservation could ascertain the facts after the breeding season and before the hunting

season, and would then be in a position to know whether the species required additional protection, and could give protection when most needed if it had the power to do so. Legislation might be enacted giving the Department of Conservation the right to declare a closed season on the Ruffed Grouse whenever, after due investigation of conditions throughout the Commonwealth, such closed season might seem necessary to protect and preserve the species.

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