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FOR THE YEAR 1920

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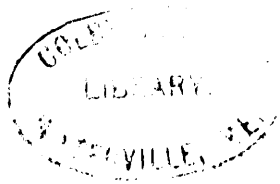

AGRICULTURE OF MAINE

NINETEENTH ANNUAL REPORT

OF THE

Commissioner of Agriculture

OF THE

STATE OF MAINE

1920

WATERVILLE
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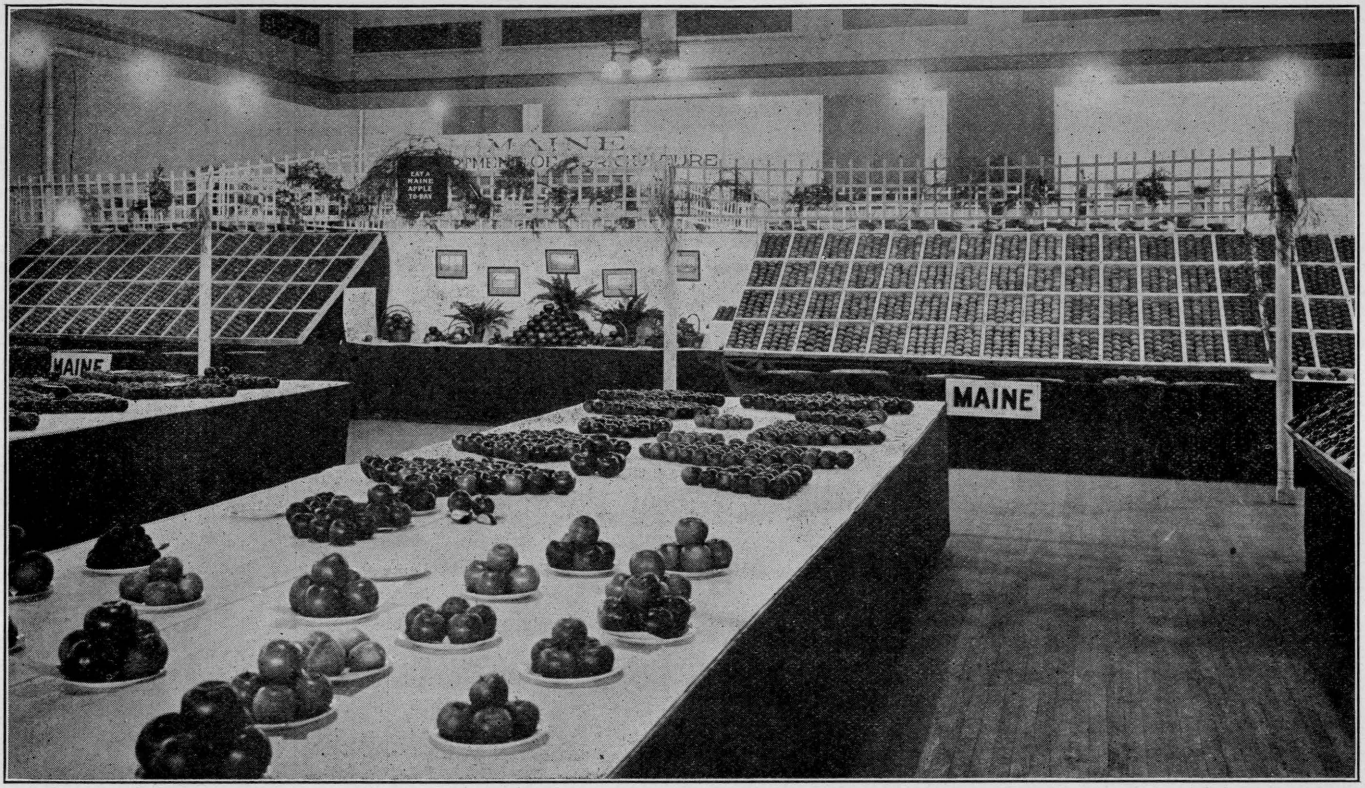
1921



Maine Exhibit at New England Fruit Show, Hartford, Connecticut, November 5-9, 1920.

DEPARTMENT OF AGRICULTURE.

To His Excellency, Carl E. Milliken, Governor of Maine, and Council:

I herewith submit the nineteenth annual report as deputy commissioner of agriculture of the State of Maine, for the year 1920 in compliance with chapter 34, section 9, revised statutes 1916.

E. E. PHILBROOK, *Deputy Commissioner.*

Augusta, December 31, 1920.

MAINE DEPARTMENT OF AGRICULTURE.

*JOHN A. ROBERTS, Norway, *Commissioner*
E. E. PHILBROOK, Portland, *Deputy Commissioner*

STAFF.

*FRANK S. ADAMS, Bowdoinham, *Director Division of Markets*
†CHARLES M. WHITE, Augusta,
Field Agent Division of Markets
HERBERT M. TUCKER, Yarmouthville,
Director Division Animal Industry
C. H. CRAWFORD, Dexter, *Sheep Specialist*
BROOKS BROWN, Dover, *Dairy Inspector*
A. M. G. SOULE, Augusta, *Director Division of Inspection*
LEVI S. PENNELL, Portland,
Deputy Sealer Weights and Measures
M. H. MCINTIRE, So. Berwick,
Field Agent Gypsy Moth Work
FRANK H. DUDLEY, Auburn, *Horticulturist*
ERLON L. NEWDICK, Augusta,
Chief Bureau Seed Improvement
GUY C. PORTER, Houlton, *Assistant Bureau Seed Improvement*

CHIEF CLERK.

‡GRACE G. MERRILL, *Skowhegan*

CLERKS AND STENOGRAPHERS.

*ANNE B. GOWER, ... *Augusta*
DOROTHY M. LIPPINCOTT, ... *Augusta*
§MILDRED L. HUMPHREY, ... *Augusta*
BLANCHE E. YEATON, ... *Augusta*
HENRIETTA F. BURNS, ... *Augusta*
GRACE M. PARADIS, ... *Skowhegan*
LOUISE G. FOLSOM, ... *Augusta*
DOROTHY E. RUNDLETT, ... *Augusta*

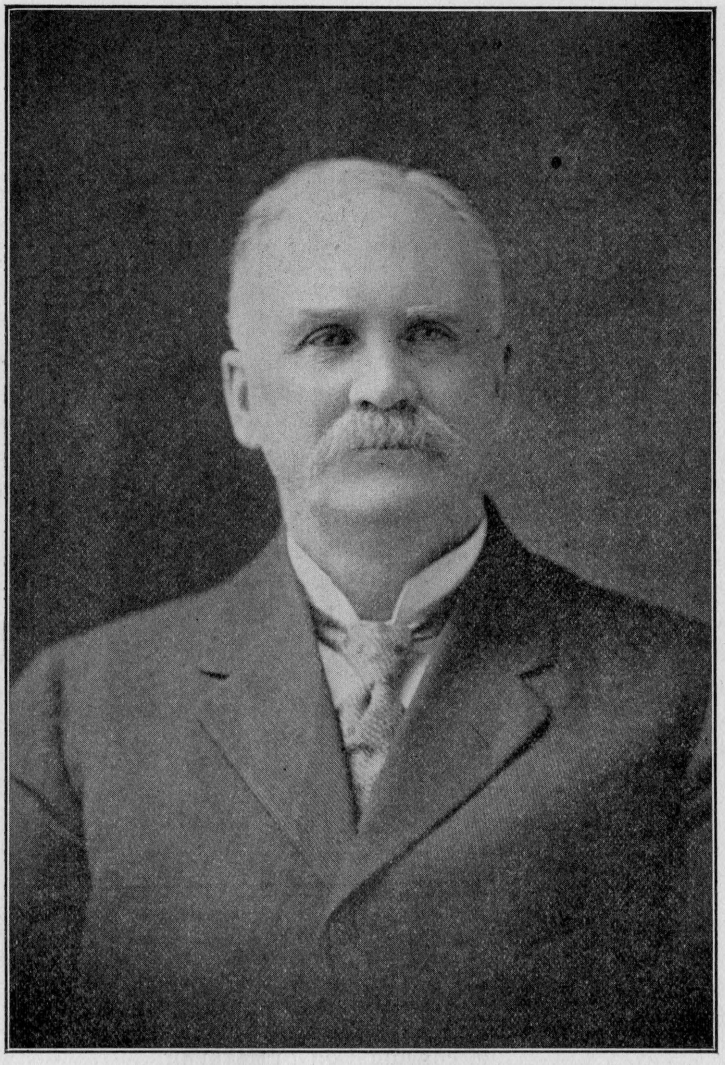
* Deceased.
† Promoted to Chief of Bureau of Markets.
‡ Up to August 14th.
§ Promoted to Chief Clerk.

ANNUAL REPORT OF THE COMMISSIONER OF AGRICULTURE.

In presenting this annual report as acting commissioner of agriculture, it is with a feeling of deep sorrow and of my own inability to make a comprehensive report, owing to the death of the commissioner of agriculture, and the chief of the bureau of markets, as well as the chief clerk of the division of inspections.

I have tried to run the department of agriculture during the past year along practically the same lines as those adopted by Mr. Roberts in the preceding year. We are able to report a good deal of progress among the farmers of the State, especially in the direction of more efficient farm management and the applying of business principles to the operations of the farm. Improved methods in agriculture are still gaining ground. Although farmers in some sections of the State have met with adverse conditions during the year and quite heavy losses have been sustained, on the whole the year has been a fairly prosperous one and they are facing the future with good courage.

We have endeavored to stimulate the farmers to increase the productive capacity of their acres by a more intelligent system of crop rotation and better methods of handling the soil. There are many acres of tillable land in our state which might be made to produce economically much larger crops than they are producing at present. With the increase in population and in the consumption of farm products, there is a greater demand upon the soil and the need of more extensive farming becomes apparent.



JOHN A. ROBERTS

The leading facts in the public life of Mr. Roberts do not touch the personal side of the man. Not only was he the soul of honor but his one great ambition was to leave the world better for his living. In this his life was a success. One of the most genial of men he easily made friends and

these he held through stress and storm as well as in the sunshine of prosperity. His was a presence that was ever welcome in any public gathering of the circles in which he moved. A ready and effective speaker, he was frequently called upon to take a part on some program and the message that he brought was always inspiring and uplifting. One of the last of these occasions was in the recent conference of the Androscoggin Fruit Growers held in Auburn and the vigor with which he spoke and the knowledge that he displayed was the subject of many congratulations from the members. Profoundly interested in the agriculture of Maine he left no stone unturned to advance that cause. He was a close student of all the varied activities of his state and lost no opportunity of declaring his faith in its future. The loss of such a man may well be called a blow to all the material interests of our State.

To the writer of these words he was a personal friend. Whenever visited in his office or at a meeting in some public assembly his greeting was ever cordial and hearty. The kindly words that he has uttered will ever remain as a pleasant spot in memory and we shall miss and mourn him as a brother. His mission in this life is by no means ended as his words and works will remain as an example for those who are to follow him in the years to come. Those works will remain as a legacy and will not be forgotten. A host of personal friends will join with the writer in saying, "Well done, thou good and faithful servant."

Mr. Roberts was born at Gardiner in 1852, but while he was a child his parents moved to Andover, in Oxford county, where he received his early education in the public schools. He graduated from the Oxford Normal Institute of South Paris in 1873, and from Bowdoin college in 1877, one of his classmates being the late Admiral Peary, discoverer of the North Pole.

After leaving college Mr. Roberts became a teacher, but soon gave up this and bought a farm at Norway, overlooking the lake. This he conducted with marked success for many years.

Mr. Roberts also read law and in 1878 was admitted to the bar of Oxford county, commencing practice at Mechanic Falls.

Owing to ill health, he left off law practice and in 1880 he moved to the farm where he had since made his home. He made extensive changes and improvements to the buildings and grounds.

For several years Mr. Roberts was employed as bookkeeper by C. B. Cummings & Sons in their extensive business operations in Norway. He was on the board of management of Norway Public library since it became a free library, served on the school committee and as superintendent of schools, had several terms on the board of selectmen.

Mr. Roberts was always affiliated with the Republican party, and by it was entrusted with several offices, which he has filled capably.

For twelve years, Mr. Roberts was a trustee of the University of Maine. He was first elected commissioner of agriculture by the legislature of 1913, and again in 1917. His last election was by the legislature of 1919, this being for a term of four years. He was elected a representative to the legislature in 1892, and to the senate in 1896. He served several years as president of the Oxford county agricultural society.

At different times Mr. Roberts served for several years successively as master of Norway grange, one of the strongest granges of the patrons of husbandry in the State. He served as master of Oxford county pomona grange, and overseer of the Maine State grange.

He died February 26, 1920.

FRANK S. ADAMS.

Frank Samuel Adams, son of Samuel and Hannah P. (Wilson) Adams, was born on September 19, 1852, and educated in the public schools of Bowdoin and Bowdoinham High School. On September 9, 1880, he married Ella C. Purinton, of Bowdoinham, and from this union have come four children, Walton S., Harold P., Helen, and Herbert K. Adams.

"A house builded upon the rock shall stand." Equally true it is that the character built upon sterling integrity, wide experience and hard work shall live to inspire young men and women to develop their best for the betterment of mankind. The Maine department of agriculture mourns the loss of the dean of the departmental force, who passed to that country from whose bourne no traveler returns, on November 22, 1920. His reputation has been securely interwoven in the agricultural activities of Maine during the last 35 or 40 years. Beginning in his home town of Bowdoin he has left a record of efficiency and progress in many positions of trust and prominence. Selectman for twelve years, county commissioner for two terms, member of house of representatives in 1895, with the State cattle commission for thirteen years, active worker in the Grange as a charter member of Sagadahoc Grange No. 31, he maintained his interest through the years, at one time being overseer of the State grange.

Mr. Adams' official connection with the department of agriculture began in January, 1913, upon his appointment as dairy instructor. His constructive policy in this position resulted in the organization of several cow test associations and breeders' associations. Upon the creation of the bureau of markets in 1917, he became its head, and immediately recognized the necessity of an active development of better marketing for Maine's agricultural products. He was energetic in developing the N. E. M. P. A., sweet corn growers' association, fruit growers' associations, farmers' unions and other marketing organizations to increase the financial returns for Maine products.

Many and varied demands upon Mr. Adams' time and energy failed to dim his vision for bettering community life or to diminish his clear judgment and genial personality that so often smoothed the way for cordial understanding and progressive action.

The pages of history, not only of the department of agriculture but also of the State of Maine, are brightened and ennobled by the influence of such men as Frank S. Adams.

Anne B. Gower.

Miss Anne Branscomb Gower was born in Winthrop, December 21, 1879, the only daughter of the late Judge John and Mrs. Mary M. S. Gower of Winthrop. She was educated in the schools of her native town, graduating from the high school in 1899; in 1901 she graduated from the stenographic department of Gray's Business College.

For a time Miss Gower was employed in the law office of Judge Symonds, in Portland. She was first employed in the Maine department of agriculture in 1910, remaining until 1912, and again returning to the department in 1914 as chief clerk in the division of inspection, being thus engaged until the end.

During one session of the legislature she served as assistant reporter to the senate, under reporter Fred W. Lee.

Miss Gower was a fine musician, an expert pianist, receiving her musical education at Kent's Hill and Portland under the late William Kimball. Formerly a member of the Methodist church at Winthrop, she later joined the Green Street Methodist Church, Augusta, and for some time had charge of the kindergarten class in the Sunday School. She was a charter member of the Patience Stanley Chapter, D. A. R. at Winthrop.

Miss Gower passed away March 8, 1920, which saddened the department and in fact, the whole State House family.

Hay.

This, the most commonly grown crop in Maine as to quantity in 1920 is about 300,000 tons less than last year of 1,201,000 tons. Generally, the crop was cured and put into the barns in better condition than last year.

Corn.

The acreage of this crop for grain shows little change from year to year, 4,677 acres or thereabouts being the average.

However, it should be borne in mind that the use of silos is steadily increasing, and the best farmers are using the larger types of flint corn for silage purposes. 9,121 acres were devoted to ths crop as against 8,300 last year. This is an excellent practice and should be encouraged. All the feeding value of the plant is thus preserved for winter use in a much more palatable form than is possible with dry grains and corn stover. The per acre yield of shelled corn is encouraging, being 45.1 bushels as compared with 43.5 bushels for the ten year average.

The crop of sweet corn fell slightly below last year in yield, but nevertheless was much above the ten year average. The acreage was slightly smaller than last year, 12,615 acres to 12,800 acres. The quality, owing to very favorable climatic conditions the latter part of the season, was excellent. Cordial relations between the canners' associations and that of the growers is having a beneficial effect upon this branch of farming. Similar recognition of common problems between dependent industries in other lines are bound to result in mutual benefit.

Apples.

The crop as a whole in the country this year is a large one which, with a decrease in foreign demand, has greatly depressed the market. The cost of barrels has reached a new level, in some instances being $1.10 each. On this account, Maine may either be considered fortunate or unfortunate in having a small crop, 33 per cent. as compared with the ten year average of 62 per cent. The total crop is estimated at 1,930,000 bushels compared with 4,680,000 bushels last year. The fruit growers' organizations are demonstrating their good management by disposing of members' fruit at highly satisfactory prices. From $5.00 to $8.00 per barrel being realized for number ones and twos. This is in bright contrast to the days gone by when apples were put up with little regard to their true grade, and in a flush season like this the returns were decidedly unsatisfactory.

POTATOES.

Potato raisers face a discouraging situation this year. In spite of a 16 per cent. increase in acreage last spring, the total crop will be more than 4,000,000 bushels less than last year. Weather favorable to the development of late blight greatly reduced the per acre yield (180 bushels). This positive loss coupled with depressed markets throughout the country is making the price to the farmer way below production costs. Some relief will be afforded those growers who have developed high yielding strains free from disease. Through the extra guarantee of quality made possible by the blue tag certification of the bureau of seed improvement these growers are receiving a substantial return for their seed stock compared with table stock prices.

WHEAT.

The stimulus given the growing of this cereal by the war has ceased to maintain production. This year sees a crop of about 151,421 bushels compared with 500,000 two years ago.

BARLEY.

Many dairymen use this for a green feed. This year's threshed crop will be in the vicinity of 93,210 bushels.

BUCKWHEAT.

The total yield shows a gratifying increase over that of 1919. This year the acreage is 16,000 and the yield 279,315 bushels as compared with 17,000 acres and 213,336 bushels last year.

OATS.

A better and larger crop of this grain is noted than last year. Many farmers are increasing their yield per acre and weight per bushel through using the pure line seed developed by our agricultural experiment station at Highmore Farm. This is our most important cereal, and its improvement and increase of acreage is desirable. The acreage was about 119,228 and the total yield will approach 5,000,000 bushels, nearly 1,000,000 bushels more than 1919.

Livestock Statistics.

Horses	108,652
Oxen	5,024
Sheep	104,734
Swine	47,903
Cows	152,781
Three year olds	27,493
Two year olds	46,285

There has been a loss of 3,418 in horses and colts, 7,327 in sheep, and 426 in swine, and a gain of 531 in cows and three year olds.

Sheep.

Since April 1, 1918, the sheep industry has received special attention from this department. Previous to this, sheep had been rapidly declining in numbers.

At this time a sheep specialist was employed who at once took up the work of eliminating as fast as possble the various parasitic diseases which were the princpal cause of tremendous losses in many sections of the State. Personal work among individual flocks has been continued and instructions given in the treatment of diseases, also in the care and feeding. The use of pure bred rams, more care in selecting ewe lambs and thorough culling of old ewes has been encouraged. As a result of this work, and high prices during the war, sheep owners throughout the state are takng on new courage, the flocks are improving physically and the percentage of production in both lambs and wool has met with a substantial increase.

In March, 1920, the Maine sheep and wool growers' association was reorganized and incorporated for the purpose of marketing the wool and surplus lambs and sheep for its members. The present method of marketing wool through local buyers has cost the farmers of our State millions of dollars. By marketing through their association these profits will be saved to the producers. The work of this association should have the approval and support of all who are interested in the welfare of our State. It is recommended that the next legislature appropriate a sufficient amount to the division of

animal industry to not only continue the work already being done, but to increase it until the sheep industry is placed on a permanent and satisfactory basis.

POULTRY.

There are no comparative figures to show the increase of poultry in the State. That there has been an increase, no one interested in this line will deny. In 1918 the State assessors gave figures showing that the value of Maine's poultry products were $4,390,821.62. During the past few years even with the high price of grain and labor, the price of eggs and market poultry has been such that the profits have been good. Many poultrymen of the State who have given this work special care and attention have found it the most profitable line of animal industry, and the outlook for increased interest in poultry is certainly very good at the present time and should receive greater assistance from the State.

SEED CERTIFICATION.

This year 76 farmers applied for field inspection of their crops. The total acreage was 577, of which 462 acres passed inspection and will be entitled to the use of the blue tag on the seed. This bureau, besides attending to the field work, has attempted in every way possible to create a market for Maine seed stock, especially seed potatoes. Some encouragement is noted in the fact that up to the end of the year more than twenty cars of certified seed potatoes have been sold out of the State. In years past the orders would hardly begin to come in before December or January. The price obtained from this stock has been considerably higher than that of the table stock market. The certified acreage was increased slightly over 1919, and with the maintaining of high standards in this work we hope to show a larger increase for 1921.

CONCLUSION.

When the farmers prosper, all other pursuits likewise prosper. The results of the steady progress and development in the

science of agriculture which have been greater during the past ten years than in the twenty years preceding them, are seen in all farming communities. The necessity of acquiring a knowledge of the principles underlying their farming operations, and conducting their farming operations on a business basis, is well recognized by the majority of farmers. The idea of co-operation in their efforts is constantly gaining ground and many co-operative associations have been organized within the past year. The principles of co-operation are as applicable to the farmer as to the members of any other pursuit, and much benefit is sure to accrue from uniting their efforts.

With all the aid the United States Government is giving to the agricultural population, directly and indirectly, and with that received from the State and the many organizations in the interests of agriculture, there is no reason why the farmers should not take courage and avail themselves more of their opportunities.

That there is an increase in the interests of agriculture in this State is manifest from the numerous inquiries received by this department from parties all over the country for information in regard to procuring Maine farms, the best sections for different lines of farming, etc. It is evidently a widespread opinion that Maine is a good state in which to follow the pursuit of agriculture.

At this time I wish to acknowledge the assistance rendered this department by the university of Maine, the agricultural experiment station and all other farm organizations in the State for the promotion of agriculture. I am also under deep obligation to all of the members of this department for the assistance they have rendered me this year. Each and every member of this department is without doubt the right man in the right place. Each man knows his line of work thoroughly and I consider these men the best that can be obtained in this State or elsewhere. Many of the men in this department have received offers to leave and become connected with other organizations with an increased salary, but through my efforts they have remained in the department; and I sincerely hope that in the coming year, the legislature may see fit to increase the salary of each one, for to them is due

in a large measure the success we have achieved during the year 1920. Great harmony and co-operation have prevailed. Maine agriculture is steadily advancing, and continued united efforts on the part of all who have its interests at heart will place and keep our State in the foremost ranks among the agricultural states, where it rightfully belongs.

I submit this report,

EDWARD E. PHILBROOK,

Deputy Commissioner.

REPORT OF SEED IMPROVEMENT BUREAU.

To E. E. Philbrook, Deputy Commissioner of Agriculture:

I respectfully submit the folowing as the report of the bureau of seed improvement for 1920.

During the first three months of the year the usual shipping inspections were made and required extra work owing to the severeness of the weather and many bins were found to contain frosted stock. During this period two carloads of potatoes were frozen in transit. This stock was especially good and some that we had taken pains to place in a good growing section. A new start has been made this season, however, and it is hoped that a better strain than the first one will be placed in that section.

During March and April some time was spent with growers helping to make bin selections of seed stock for the season's certified seed work. In the spring personal calls were made on several farmers trying to interest them in the growing of better seed and, as the summer's work will show, some of them grew stock that passed our field inspections. The spring was ideal for planting in most sections and at the time of our usual preliminary survey in June the plants had a good start. This survey is to determine which fields to take on when actual field rogueing begins. Early in July we started the rogueing with four men in Aroostook county and two in central Maine. There were 76 individual applications for inspection, having a total acreage of 577, of these 42 applicants with an acreage of 462 passed and became eligible for the shipping inspection. 34 applicants were disqualified with a total of 115 acres. The above figures would show much larger but for the preliminary survey in June at which time we were able to advise many growers that it was no use for them to apply because the diseased condition of their field was apparent at once.

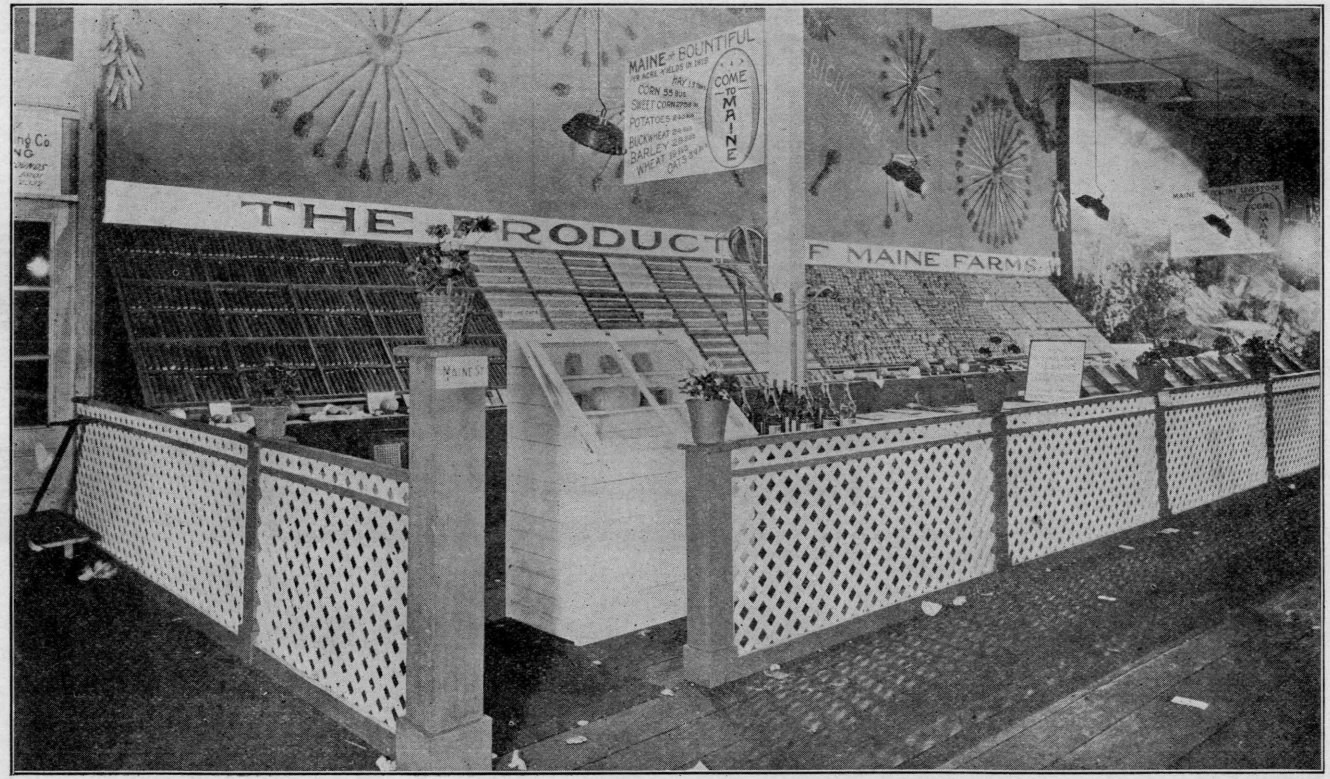
Inspection work was carried on in Aroostook, Penobscot, Piscataquis, Waldo, Somerset, Kennebec and Oxford counties and a few visits in the other counties. The object in working in several counties is to locate, if possible, a superior strain that may be used for local distribution. In this we have been only partially successful, for some growers seem to feel that it is necessary to go a long way from home to get seed sufficiently good to warrant trying out. We have, however, been able to get some local growers interested each year and reports on file will show an increased yield on these acres at a slight increase in expense for the seed.

If the number of acres inspected was confined to a smaller territory, the work would be easier, on the other hand it has been possible by covering more territory to locate several desirable strains of different varieties of potatoes. As an example, the nearest disease free Cobbler potatoes were found in northern Aroostook county while the best Mountains were located in Oxford county. It is therefore impossible to limit the territory and expect the same results. The potato varieties passing both field inspections and the estimated yield is as follows:

Variety.	*Acres.*	*Estimated Yield.*
Cobblers	316	94,800 bushels
Spaulding Rose	73	21,900 "
Green Mountains	34	10,200 "
American Giants	34	10,200 "
Wellingtons	5	1,500 "
Total	462	138,600 "

The inspection of oats was only attempted in two counties and at this time it is possible for this bureau to put anyone who desires them in touch with some good seed oats. Owing to the low prices prevailing in the grain market we have not been able as yet to make the usual sales to good advantage but expect a demand as usual along towards spring. The number of acres of oats eligible for certification, is 24 of the Maine 340 and Maine 357 varieties.

Owing to the weather conditions in the fall we were able to visit more fields than ever at harvest time. This saves us some



Part of the Maine Exhibit, Springfield, Mass., Sept. 19-26, 1920.

trouble at shipping time because it is possible to eliminate all fields carrying more than a minimum of late blight rot. Some sections of the state suffered heavily from this trouble this year and as a result many farmers had hardly more than two-thirds of their crop to offer for sale. In the sale of superior seed stock late blight is the stumbling-block when the potatoes are being graded and only hand racking with sufficient light will come anywhere near giving satisfactory results. Green Mountains and Spaulding Rose potatoes seem to be more susceptible to this trouble than Cobblers or the Rural Russets.

Beside the growing and certifying of the crop this bureau considers it a part of its duty to advertise the fact as much as possible that there is available and for sale certified seed. With this in mind and with your co-operation we were able to have an exhibit at the eastern states exposition in Springfield, Massachusetts, in September. A space 16 by 12 feet was allotted to us, in which to arrange our exhibit and the potatoes were contributed by Aroostook county growers for the most part. At this time it was possible to talk with many growers from different states and also distribute hundreds of lists of Maine growers having certified seed for sale. Judging from the correspondence with our growers since that time we believe that they have had many inquiries as the result of this method of advertising. We tried to show potatoes that our growers could deliver in car lots rather than a fancy lot that no one could expect to receive when they ordered Maine certified seed. Other seed producing states were represented at Springfield telling about their stock and if Maine is to be an active competitor this bureau should be represented there each year. This bureau was also able to assist in putting up a potato exhibit at the national grange held in mechanic's building, Boston, in November. This was a commercial exhibit, the potatoes being furnished by the Aroostook federation of farmers, and from the letters which we receive each day it is believed that these exhibits are a very creditable method of showing the buyers of other states what we have for sale.

During the week of November 15th the annual meeting and exhibition of the Maine seed improvement association was held in city hall, Portland, and as this bureau is definitely interested in the work of the association we try to do everything

possible to make the meeting a success. Some time is required both before and after the meeting in arranging details and settling premiums, both for the regular premium list and the boys' and girls' clubs. In the number of exhibits this year's show was far ahead of previous years. The quality was very good, more especially the corn owing to its fine maturity. It was noted that exhibits were made from several counties of the Ashmont Golden Flint corn showing that this strain is becoming more universally used. This corn is easily the best show corn in the State, but as to its value for feed and silage we do not feel that we have sufficient acquaintance with it to make a definite statement. Several of the county farm bureaus assisted in making the exhibit a success this year and it is hoped that another year they may be better represented than ever.

I wish it were possible to enumerate in a definite form the results of the year but I find that seed improvement work from its very nature must proceed slowly with the object in view of avoiding mistakes and, therefore, it seems impossible to enumerate results in terms of figures. The following may, however, take the place of any figures which we could get together.

It is encouraging to note that our shipments of certified seed started earlier this year than ever and up to date 14 cars have gone out and several others are booked for spring delivery. Our growers have been getting a much better price than the table stock market and this is a fact to be considered. Some sales have been made at $4.50 a barrel f. o. b. Aroostook, while one sale has been made at $5.50 a barrel f. o. b. Aroostook spring delivery. It will be a part of the work from now on to get as many farmers as possible to purchase certified seed this winter for next spring's planting. It is also hoped that we may offer the county farm bureaus a definite proposition for some work in each county, and that they will adopt certified seed work as a definite part of their program.

In order that we may keep abreast of the times the Maine seed improvement association has named a rules revision committee which will meet in January 1921, to draw up a new set of rules and regulations for inspection work for the coming season. This bureau will aid the committee in every way possible, and is now gathering information on the standards maintained in other states which carry on certified seed work.

Besides the field work carried on this bureau has handled the numerous inquiries which come to the department on all subjects pertaining to agronomy, and has tried to keep abreast of the times on crop statistics as far as possible. We have attended meetings of farm organizations wherever we have been invited and have tried to spread the old gospel of better seed.

In conclusion let me thank you personally for the support and encouragement which I have received during the year. My duties have brought me in contact with practically all of the agricultural workers of the State, and to them also I wish to express my thanks for their kind co-operation.

Respectfully submitted,

E. L. NEWDICK,

Chief Bureau Seed Improvement.

REPORT OF THE STATE HORTICULTURIST.

To Major E. E. Philbrook, Deputy Commissioner, and Director, Division of Plant Industry:

I hereby submit my fourth annual report as state horticulturist, this being the ninth report since the bureau was established.

The September estimate of the apple crop of the United States was 33,891,000 barrels. After attending the different apple shows in New England it can be readily seen that the fruit shown this season greatly excels in quality that shown in previous years.

APPLE CROP.

The year 1920 ends with 40 per cent of a crop for the State of Maine or 60 per cent of the crop for the last ten years. The estimate crop being 986,800 barrels. Orchards which have been cared for have produced excellent fruit this year.

As Dr. Reddick told us at the Auburn convention three years ago, dusting plants to protect them from disease is not a new idea. The method was first used extensively in France in 1850 and subsequent years for the control of powdery mildew disease of grapes. Sulphuring of vineyards is still a regular practice in Europe, about 100,000 tons of sulphur being used annually for this purpose.

Bordeaux dust was used up to about the year 1907, at which time the sulphur and arsenate of lead took its place. Later the duster was improved, and this, together with the perfecting of materials used, wrought great changes in the dusting proposition, so that today we believe the dusting of orchards has passed its experimental stage.

The dusting method consists essentially in combining a fungicide,—sulphur and an insecticide,—arsenate of lead in a powdered state so fine that 95 per cent. of it may be sifted through a screen of 200 mesh to the inch, and blowing the

mixture over the trees at the proper time, instead of using the same materials in water and applying them as a spray.

Some of the mixtures of dust for orchard work are sulphur and arsenate 85-15, 90-10, 40-45-15. Some of the fillers for the last 40 per cent. are tobacco dust or powdered gypsum, the last named is used wholly as a carrier, but the tobacco dust as a dust for aphis.

Dusting may be done when the foliage is either wet or dry—in the morning or evening—in fact, it is thought *best* by some to dust in the morning and evening when there is apt to be little or no wind, and the work may be done in a more thorough manner as at this time the dust can be blown into and above the trees and will then settle back over the same trees being dusted. Some operators prefer to dust when there is a light breeze, and by working with the breeze the dust is blown away from them, dusting only one side, and in case of large trees waiting until the breeze has changed to dust the other side. By so doing little or no discomfort is experienced from the dust. If the dust is blown back on the operator it will cause his eyes to smart, and for this reason it seems best to wear goggles.

The dust rig being considerably lighter than the spray rig, chiefly because of the absence of water, it is often possible to get a duster on ground in which a sprayer would be mired. Being lighter in weight, it is much more easily hauled through orchards situated on hilly ground. Another advantage is in case of scarcity of water, none being required in the use of the duster.

Numerous reasons have been given by owners of orchards for not spraying, some of which are:

1. Too much trouble.
2. Too expensive.
3. Too busy.
4. Hard, dirty work.

The latter may be true, especially if the work is not done with the proper equipment. Too busy, and too much trouble, seem to be the most valid reasons why they should not spray.

The dusting method, therefore, will appeal very strongly to such people, for the work can be done very quickly and with little trouble and without interfering to any great extent with other farm work.

The dusting method has been under trial for nine years in various New York orchards, and one year with another, the results thus far have shown that the dust controls the Codling Moth even better than the liquid spray.

Up to the year 1920, no dust had been put on the market to take the place of the dormant spray, but experiments are now being conducted with a view to remedying this deficiency.

In order to be economical, greater care is necessary in the use of the dust than the liquid spray as material alone is used. The machine should be in good working order, so as to be able to shut off the dust instantly. In orchards where there are solid blocks of 20- to 30-year old trees, the shut-off is not required, for as soon as one tree is passed the funnel should be directed to the next. The horse continues walking, stopping only for the hopper to be filled after dusting about 100 trees.

The apple scab, however, is not controlled quite as well by dust as by liquid. This is accounted for by the fact that the particles of sulphur are not so fine in the dust as in the liquid, therefore do not stick on as well.

The dust mixture is applied with an outfit depending on a rotary fan to furnish an air current, and provided with a hopper and feeding device with which to drop the mixture slowly into a tube from which it is blown onto the trees.

The dust may be so rapidly applied that it is not necessary to stop the horse as one comes to the tree, therefore, the time consumed in dusting an acre depends on how fast the horse travels. By a little movement of the dust regulator, one can put on the required amount.

The secret of obtaining apples free from disease and insect injury lies in the timeliness of the application of the proper materials. The materials should be applied four or five times during the season, as experiment after experiment has proven. These periods are:

1. The dormant.
2. The pink bud.
3. The calyx.
4. In about three weeks the fruit and foliage, and then again about four weeks later. While the last two applications are necessary for the control of the apple scab and sooty blotch, we

are at the same time protecting the fruit from the curculio and railroad worm, as well as the late broods of codling moth.

Prof. Whetzel of New York tells us that during the four years' experiments the average of scab on unsprayed trees was 43 per cent, on sprayed trees 11 per cent, and on dusted trees 12 per cent, a difference of only one per cent between the dusting and spraying methods.

On the codling moth, spraying gave 7 per cent worms as against 5 per cent dusted, while on unsprayed trees there was 21 per cent. In other words, the dust gave better results than the spray.

Three years experiments in Nova Scotia gives an average of 50 per cent scab on unsprayed trees, which is reduced to 10 per cent on sprayed, and 6 per cent on dusted.

Wishing to demonstrate the effectiveness of the dusting method in orchards for disease and insect control, I secured a duster and two tons of dust with which to demonstrate, and last spring with the assistance of my inspectors, dusted orchards in Gardiner, Augusta, Winthrop, Monmouth, Green, Auburn, Mechanic Falls, Poland, New Gloucester, Standish, Sebago, Jefferson, and Union. The total number of demonstrations held was 28, covering four counties.

Several local orchards were dusted for the pink bud, calyx, and fruit foliage spray. This was after the orchards had received the dormant spray. The work was thoroughly done and gave universally good results.

As a time saver there is no comparison between the liquid and the dust. In one orchard we dusted 300 trees in 64 minutes, covering six acres and using 300 pounds of dust. In another orchard we dusted 118 trees in 28 minutes with 100 pounds of dust. These trees covered four acres of ground. Another 150 tree orchard was dusted in 28 minutes with 100 pounds of dust.

This year while dusting several days after the petals fell, which we had to do in order to get around to the number of orchards that we wished to, we examined the calyx and found dust inside where it would have been almost impossible for the liquid spray to have entered. One ton of dust applied per day is equal to 40 200-gallon tanks of liquid spray.

In the McIntosh Red orchard of Fred H. Smith of East Winthrop, where the trees were set close together about 70 to the

acre, and where only cider apples were gathered previous to 1920, this year a dormant spray was given, then we took up the dusting, giving the pink bud, the calyx, and then about the first of August dusted for the third time. When picking time came Mr. Smith, as well as his neighbors, was amazed to find most of his apples free from scab or blotch, while on undusted trees hardly a perfect apple was found. This in spite of the fact that only last year the scab covered the foliage which dropped to the ground ready to send spores back into the trees this year.

Henry Wentworth of Skowhegan purchased a duster this season and used it with marked success on his McIntosh Reds and other trees.

L. W. Staples of Bowdoinham purchased a duster in 1919 and for the first time dusted his orchards. Upon examination in the fall he found that after three dustings, has apples were much freer from scab and sooty blotch than his neighbors' who used the liquid spray. Mr. Staples was able to sell his crop as fancy and No. 1 when many of his neighbors had only No. 2.

Few of us yet realize the fact that our crops depend largely upon the spraying done the previous year.

This theory was thoroughly tested out by Prof. Sanders of Nova Scotia. Trees that were sprayed held their foliage late in the fall, maturing well their fruit buds, thus insuring a strong and healthy full bloom the next season.

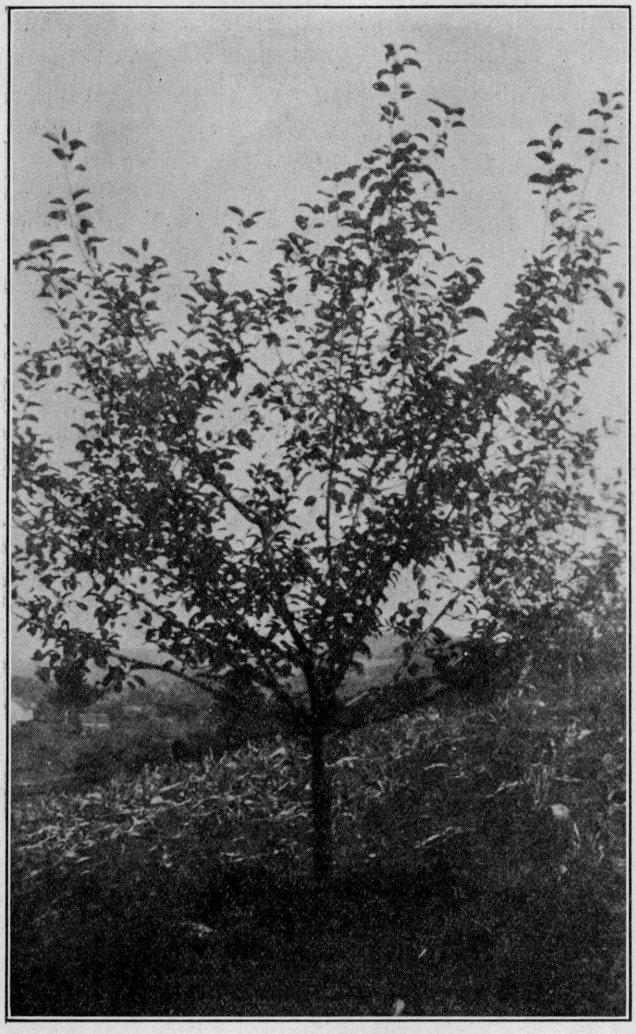
Carleton Orchard Contest.

The Third Carleton Orchard Contest started in the spring of 1920. Many orchardists who wished to enter the contest were unable to do so on account of not being able to procure trees.

I believe that this contest has been a great help to the orchardists of this State. In this contest the best fifteen or twenty orchards will receive prizes.

Pruning Demonstrations.

Several pruning demonstrations were held in different sections of the state and were much appreciated by those in attendance.



Tree in the McIntosh Red orchard of Walter L. Warren, West Baldwin.

The orchard winning first prize in the Second Carleton Orchard Contest.

Variety of Apples.

It has been thought wise by experts to advise the planting of the Wealthy as an early fall apple, since they can be picked and sold before the busy days of picking the later varieties begin. For the past two years the Wealthy apple has returned over $8.00 per barrel f. o. b. the grower.

To orchardists wishing to graft over Ben Davis, the York Imperial Delicious and the Rome Beauty are recommended as doing extremely well on that stock.

Some orchardists report success in grafting the McIntosh Red onto the Ben Davis.

Maine Fruit Growers' Convention.

The annual meeting of Maine orchardists was held at Auburn, February 17-18, and in spite of the very severe storm of the 15th and 16th more than 250 interested orchardists attended the sessions.

The following program with a list of topics for discussion was thoroughly enjoyed:

Auburn Hall.

FIRST DAY.

9.00 A. M.

Registration.

Address of Welcome, H. E. Goss, Auburn

Response, C. L. Pierce, Buckfield

"Maintaining Soil Fertility in the Orchard,"
Prof. J. H. Gourley, Dunham, N. H.

"What the Spray Gun Has Done for Me,"
Neal D. Stanley, Pittsfield

Noon Recess.

2.00 P. M.

"Small Fruit Culture," George D. Aiken, Putney, Vt.

"We Must Have the Bee,"
H. W. Matthews, Bangor, Secretary Penobscot Bee Keepers' Association.

"The Orchards and Orcharding in Washington (State),"
W. P. Frederick Robie, Gorham

6.30 P. M.

"Insects and How We Control Them," (Illustrated)
Frank H. Dudley, State Horticulturist, Augusta
Discussion.

AUBURN HALL.
SECOND DAY.

9.30 A. M.

Address,
Hon. John A. Roberts, Augusta, Commissioner of Agriculture.
"The Future of Fruit Growing," W. S. Droman, New York
Five Minute Talks by Orchardists.
"Problems Encountered in Marketing by the Maine Fruit Growers' Exchange,"
W. H. Conant, Buckfield, President Maine Fruit Growers' Exchange.

The state horticulturist has prepared a complete list of all nurseries within the state that have been inspected for the year 1920. It was intended to make this list a part of this report, but owing to the excessive cost of printing at this time, it has been deemed advisable to omit the list. Any parties desiring to refer to such a list, or to learn what nurseries have had such inspection, may do so by writing to Frank H. Dudley, state horticulturist, Augusta, Maine, and their inquiries will receive prompt attention.

QUARANTINES IN MAINE.

The following quarantines are in force in the State of Maine.

STATE OF MAINE.

County of Kennebec, ss.

September 11, A. D. 1919.

By virtue of the authority vested in us by chapter thirty-eight, section thirteen of the revised statutes of Maine, we hereby authorize the commissioner of agriculture to make the following regulations which we deem necessary to prevent the introduction into this State and the dissemination therein of the European

corn borer, a pest seriously injurious to corn and other vegetation.

EUROPEAN CORN BORER REGULATIONS.

1. For the better protection of the State of Maine against the introduction of the European corn borer and its spread over the State, it shall be the duty of any person or corporation receiving any corn or other vegetation from any area in the United States outside of the State of Maine which now is or hereafter may be quarantined by the United States department of agriculture against the European corn borer, to forthwith return the same to its source of origin outside the State or to destroy the same or cause the same to be so returned or destroyed; or if in the judgment of the commissioner of agriculture such course is practicable, to cause the same to be disinfected in such manner and under such supervision as said commissioner may direct.

2. For the more effectual enforcement of these regulations, the commissioner of agriculture is hereby authorized to appoint inspectors, whose duty it shall be to carefully watch for the presence of the European corn borer in this State, performing such duties in that respect as may be required by the commissioner of agriculture, and in particular to notify and warn all persons or corporations receiving corn or other vegetation from quarantined areas to comply with the provisions of section 1 of these regulations.

3. The expense incurred hereunder shall be paid out of any appropriation made for the division of plant industry.

CARL E. MILLIKEN,
Governor of the State.
G. H. STURGIS,
Attorney General of the State.
JOHN A. ROBERTS,
Commissioner of Agriculture.
W. J. MORSE,
Pathologist of the Maine Agricultural Experiment Station.
EDITH M. PATCH,
Entomologist of the Maine Agricultural Experiment Station.

PROCLAMATION.

By virtue of the authority vested in me by section 6 of chapter 178 of the public laws of 1917, I hereby place an embargo on the shipment into the State of Maine, and the movement within said State from any part thereof to any other part, of any gooseberry or currant plants, and forbid all persons, partnerships, associations or corporations from said shipments or movements.

By virtue of the same authority, I hereby place a further embargo on the shipment into said State or movement within said State from any part thereof to any other part, of any five leaved pine, commonly known as white pine, and forbid all persons, partnerships, associations or corporations from said shipment or movement, without obtaining a permit from the forest commissioner under the provisions of said Section 6.

Violators of this regulation will be subject to prosecution under the provisions of said section.

Given under my hand this twenty-sixth day of April in the year of our Lord one thousand nine hundred and twenty, at Augusta, State of Maine.

(Signed) FORREST H. COLBY,
Forest Commissioner.

The state horticulturist directs the inspection of the nurseries of this state, and has promulgated the following about the shipment of nursery stock or forest trees:

"All shipments of nursery stock must bear an inspection tag. Those wishing to ship nursery stock or forest trees will be governed by the following:

"Those living south and east of Ripley, Salem, Atherton, Greenbush, Aurora, Eastbrook and Gouldsboro may obtain a special permit tag from the state horticulturist, Frank H. Dudley, Augusta, to send west as far as Barnet, Corinth, Sharon, Woodstock, Chester, Townsend and Hinesdale, Vermont; Northfield, New Salem, Ware and Monson, Massachusetts; Union, Chaplin, Griswold, Preston and Westerly, Connecticut, and all the state of Rhode Island.

"All shippers north of quarantine area in Maine may obtain tag from state horticulturist Dudley to ship anywhere in the United States.

"All those wishing to ship trees from within the named quarantined area outside same, must obtain a permit from the nearest inspector, four of whom are located in Maine, as follows: A. C. Ward, Box 982, Bangor; Garrett Galvin, 1074 Washington Street, Bath; Lowie Noble, Box 361, South Portland; Frank Keene, Ogunquit."

Insect Pests.

The European corn borer. This serious pest is now well established over considerable areas in New York, Massachusetts, New Hampshire, and one infestation has been found in Maine in the town of Eliot. There has been severe injury in restricted areas about Boston, Mass., and a slight damage in New York State with its one brood. The widespread occurrence of such conditions, certainly a possibility if not a probability, would mean serious injury; the situation justifies a general repressive campaign in the infested territory in an effort to check the pest before great losses are caused. The department recommends that corn growing in the infested areas and other portions of the State should not be curtailed, except it is suggested to those who wish to grow corn within the quarantined areas that plantings should be limited to such areas as the farmers themselves will be able to handle by following the recommendations made for the control of the European corn borer. All communications in regard to the European corn borer should be addressed to the state horticulturist, bureau of plant industry, state house, Augusta.

The Gypsy Moth.

The gypsy moth situation in the State of Maine is indeed a serious one and will require this coming year a great deal of work in order to handle the same. The situation is such at the present time that it is impossible for the State to make suitable appropriations for the handling of this pest, but with the assistance of the different towns and cities within the infested sections, we are able to do a great deal toward eradication. The towns this

year have done a great deal to assist, and we are under great obligations to them for the methods that they have employed for the reduction of the pest.

Beneficial Insects.

Contrary to general opinion not all insects are destructive; quite a variety of insects called parasites are very beneficial to the orchardists and farmer, since they feed upon and destroy many insect pests. To bring to your attention some of these desirable little workers is the object of this article.

Two Spotted Ladybug.

One of the most common is the two spotted ladybug (Adalia bipunctate) this little insect is reddish in color, having two black spots on the back, one on either wing cover, and is often found in houses during the autumn where it hibernates. This little beetle feeds on aphis and scale insects. There are several varieties of this family, bearing similar markings, and different species of this beetle have been imported from Australia and other countries for the purposes of controlling scale insects.

The Calosoma Beetle.

The calosoma beetle preys upon caterpillars such as gypsy moth and saddled prominent. The native is about one and one-half inch in length and dark in color while the imported specimens are irridescent.

The Podisus Modestus.

The podisus modestus is a predacious insect preying upon caterpillars, potato bugs, etc. This bug is about five-eighths of an inch in length, with a spine-like process projecting from the posterior prothorax which is capable of being folded under the body. The body is yellowish red, edged with dark spots, the central portion of the body is marked with one dot and two short lines running crosswise of the body.

The Lebia Grandis.

An interesting species of ground-beetle from one-fourth to one-half inch in length with bright blue wing covers and yel-

lowish thorax and head, has won an important reputation because of its success in destroying the soft bodied insects which go into the ground to pupate, namely curculio, cutworms, etc.

Ichneumon Flies.

The ichneumon flies are long and slim bodied, the tail being attached to the body by a small thread. These flies do considerable work in control of the red humped caterpillar.

The Thalessa Lunata.

The thalessa lunata is a wonderful parasite with body two and one-half inches long and with a flexible ovipositor six inches long, with which it drills into the tree and lays an egg in the tunnel of the borer; the larva when hatched crawls along the tunnel and fastens itself to the larvæ of the borer which it destroys by sucking out the life blood. The larvæ changes to pupa within the burrow and the adult gnaws a hole through which to escape.

Pimpla Conquisitor.

This is one of the most common parasites of the tent caterpillar but has been bred from several other species. It lays its eggs on the pupae.

Pimpla Inquisitor.

This is a parasite on the tussock caterpillars.

The Tachina Fly.

This parasite is a representative of the housefly which it somewhat resembles. It attaches its eggs to the skin of young caterpillars. The larva, when hatched burrows into the body of the caterpillar and feeds on its tissues. The caterpillars usually pupate, but the fly emerges instead of the mature insect of the pest.

Wishing to ascertain if the parasites were working on the cherry ugly, I secured a few nests and placed them in confinement. Nests from some locations produced as many parasites (ichneumon and tachina flies) as the cherry ugly moths.

Sometimes it happens that a parasite of one host is parasitized by a parasite of another host.

An important natural control of the European corn borer has developed in a little parasitic fly (trichogramma minutum) which destroyed fully 43 per cent of the eggs of the second generation in the Massachusetts area of infestation. The activity of this parasite greatly restricted the damage which would otherwise have resulted to the late sweet corn crop.

Damage Done by Ants in Lawns.

Many complaints have been received of the damage done by ants in lawns and by covering walks with earth from their tunnels. These pests may be killed in the tunnels by pouring kerosene into them, and in the hills are best handled by making three or four holes six or eight inches deep in each hill, and pouring a tablespoonful of carbondisulphide into each hole, pressing the earth well together and covering for an hour or two with a heavy blanket.

Care should be used to keep the carbondisulphide away from any fire as it is very combustible. The best results are obtained by using this when the sun is shining brightly.

If ants are found in the house they will probably be in some beam or timber. The only permanent remedy is to destroy the nest by injecting into it some benzine or kerosene.

Raspberry Cane Borer.

The raspberry cane borer has been very prevalent the past season, many specimens of infested canes having been sent to the office.

The presence of the pest is shown by two distinct girdlings about one inch apart, on the cane near the top. Sometimes broken or wilting tops will call attention to its presence in the garden.

The adult beetle is about one-half inch long with slender, cylindrical body and long antennae, and of a deep color except the prothorax, which is usually yellow with two or three black spots.

Life history. In early summer the beetles and females girdle the young tips by cutting two rings around the shoot about

an inch apart, causing the tip to wither and droop. Between these rings will be found a small dark spot where the female has inserted an egg in the cane. A rather large elliptical, yellow egg is placed in the pith of the cane, and in a few days it hatches into a small white grub. This larva burrows downward through the pith of the stem, the burrows winding from side to side and frequently penetrates the side of the stem where openings are made every few inches through which long strings of excrement are cast out. It takes one or two years to complete the life cycle of the pest.

Remedy. As soon as the tips are seen to droop, they should be cut off well below the girdled point and bound. When the entire canes die from the effect of being tunneled, they should be cut in late summer before the larvæ have gone to the base of the canes to hibernate. Where such measures are practiced, the pest may be effectively controlled.

Leaf Hopper.

Great injury has been done all over New England by the leaf hopper. In Maine the past season I have inspected several orchards affected by this pest.

These pests resemble tiny grasshoppers, being about one-eighth of an inch in length. These tiny pests may be found for the most part on the underside of the leaf where they suck the juices from the leaf. When disturbed, the young dodge quicky out of sight, while the adult flies rapidly away.

The leaves being deprived of their green matter and sometimes curled, cannot function as well, and indirectly this may be the cause of winter injury.

Apple Leaf Hopper *(Empoasca Mali)*.

The apple leaf hopper is bright green in color. By attacking the tender terminal shoots great damage is done, as the leaves soon commence to curl. If these attacks are continued year after year, it causes a bushy appearance. This pest also attacks weeds, therefore where it is prevalent weeds should be kept down.

The young of this specie appear in June and breed through

the summer on the apple, producing two or three generations, and living over winter in the adult stage.

THE UNICOLOR LEAF HOPPER *(Empoasca Unicolor)*.

This specie somewhat resembles the apple leaf hopper, the use of the microscope being needed to make identification sure. The type of injury tells most plainly the specie doing the work. This specie seems to work on the young trees especially, but affects the old trees also. It causes no curling of the leaf, as does the apple leaf hopper, but does cause the white appearance on the top of the leaf, first appearing in small spots which merge into one large spot, therefore the leaves cannot function as well.

The unicolor leaf hopper spends the winter in the egg state. The young appear in May and mature by July, laying eggs only in the fall.

THE ROSE LEAF HOPPER *(Empoasca Rosa)*.

The rose leaf hopper is very pale yellow in color in all stages, and is easily distinguished from the others.

This specie confines its attacks largely to old trees. Both the rose leaf and the unicolor constantly discharge drops of liquid, which fall upon the fruit and foliage and if not washed off by rain will materially damage the fruit. This specie also causes the white appearance of the foliage.

The rose leaf hoppers spend the winter in the egg state, they being deposited in the bark of the rose. The eggs hatch in May and mature in late June, then migrate to the apple and produce the summer generation. In the fall they return to lay eggs in the bark of the rose.

It should also be remembered that the rose leaf hopper breeds on currants and gooseberry bushes, therefore these bushes should be cleaned out of any orchard having an infestation of the pest.

Control. Spraying for the control of these pests should be done while they are in the nymph form and tender, as when older and winged they fly quickly away when disturbed, and are then tough enough to withstand the spray. A good force should also be used, covering both sides of the leaves.

Kerosene emulsion or nicotine sulphate, 5-12 pint to forty gallons of water, should be used adding two pounds of soap if the water is soft, or four pounds to hard water. The soap should not be used however, if the nicotine sulphate is added to the lime-sulphur solution.

European Corn Borer (Pyrausta Nubilalis)

The European corn borer, one of the most dangerous pests of the field and garden, has recently been found in Maine in the field of W. Pickering, Eliot.

This pest is a menace to not only the corn crop of Maine which is worth from $1,000,000 to $1,800,000, but to the other garden and field crops as well, there being sixty host plants infested by this pest.

Two other places in the State are suspected of having infestations of the European corn borer.

A careful and constant search for this borer has been maintained in this State for the past two or three years, since its ravages have been more fully realized. All reported or suspected cases have been carefully investigated.

This pest has also been found in Massachusetts for the past ten years and covers an area of about 14,000 square miles. Other bad infestations are found in New York, both in the eastern and western parts of the State.

There is also an infested area in Pennsylvania.

The Dominion of Canada has an infested area opposite Niagara Falls.

This borer is known to be widely scattered throughout Western, Central and Northern Asia, also Japan and Central Europe. It is thought that it was brought to this country in hemp shipped to a cordage company in the vicinity of Boston.

Description. The full grown caterpillar is about one inch in length, in color somewhat reddish or smoky, the head being dark drown and flat. There are four light colored spots on each abdominal segment, from each of which arises a stout hair. These marks distinguish the European corn borer from the

The EUROPEAN CORN BORER

is the caterpillar of a small moth.

The moths lay their eggs in flat masses on the under sides of the corn leaves.

The caterpillars hatch from these eggs and feed at first on the leaves, but soon bore into the tassels, the stalk, the leaf-ribs and the ears

They live in the stalks all winter and in spring change to reddish-brown pupæ which soon transform again to moths

The pest also attacks other garden plants, weeds, and larger grasses, and lives through the winter in the stalks of these plants as well as in corn

Broken tassels with extrusions of saw-dust-like material at the breaks are the plainest signs of an infested field.

Holes in the stalk with sawdust-like debris extruded indicate where the borer is at work

The borer enters the ears through the husks and also through the stem and cob

Burn All Plants Containing Caterpillars.

Cornstalks, corn stubble, grasses, weeds, and stalks of garden plants should be thus destroyed throughout infested areas during fall, winter or early spring. No other effective method is known for combating this pest.

Stubble and scattered stalks — showing where the borer spends the winter in corn.

R. E. Snodgrass

common corn-stalk borer. Two broods of this pest are hatched during the season to destroy the corn crop. As the moth lays about 400 eggs for the first brood and 700 for the second, it would be possible in a single season to produce from 200,000 to 300,000 caterpillars from one pair. The larvae pupate in the spring and the moths of the first brood usually appear in the first or second week in June. The second brood appears about the last of July. The eggs are laid on the under side of the leaves in patches of twenty to thirty and it requires but a few days for these to hatch. The young soon eat their way into the stalk after feeding for a short time upon the thin tissue of the sheath. The second brood does not transform to pupae, but passes the winter within the stalks to appear the next spring. Great damage is done by this pest piercing the tassel stalk and feeding upon the interior. The tunneling so weakens the tassel stalks that they are soon broken over and the pollen which is so essential for pollenization of the cornsilk is destroyed. In some cases 50 to 75 per cent. of the crop is destroyed.

Control. This pest winters in cornstalks and weeds, therefore if all corn fodder is fed out or put into a silo, composted or burned, and all weeds destroyed this pest may be exterminated. If any of the above are found or any information desired concerning them, please communicate with Frank H. Dudley, state horticulturist, Augusta, Me.

Corn Ear Worm (Heliothis Obsoleta)

A few outbreaks of this pest have been reported and investigated the past season. This caterpillar's method of destruction is to bore into and feed upon the plant tissues of the corn stalk and later on the ear. The tender leaves and buds are the first portions to be attacked. Later the injury extends to the tassels before they are fully opened. Eggs are laid upon the silks through which the small kernels are reached, the tips of the ears being the first to receive injury. In sweet corn this pest frequently eats the entire length of the ear, completely destroying it. Wet seasons are more conducive to the spread of the pest, since after pupating in the ground, they emerge more easily from the wet soil. Certain molds gain access to

injured ears especially during a wet season, making the corn stalks thus affected unfit for consumption by cattle.

Life History. The caterpillars of this pest vary in color from light green to dark brown and are usually striped or spotted, although sometimes they are perfectly plain. They attain full growth in two or three weeks and are from one to one and one-half inches long. There are two broods of this pest during the season in the northern states. The first brood attacks the corn when it is about knee-high and feeds on the tender leaves. About a month later the second and more destructive brood appears, which attacks the ears.

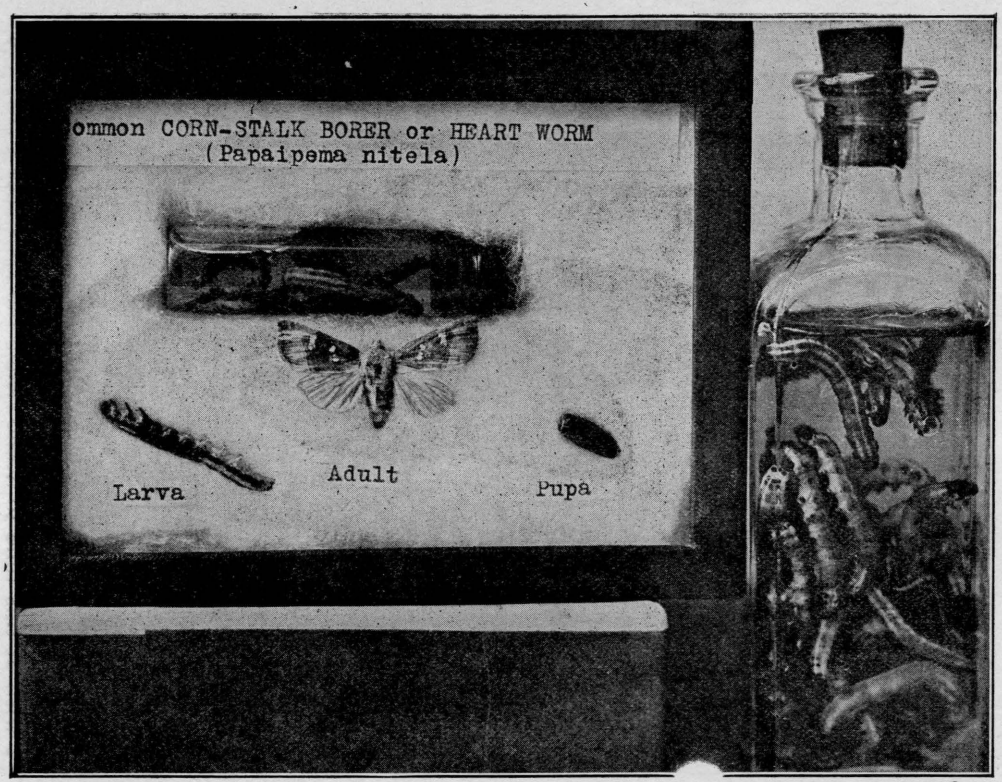
Control. Deep plowing of the infested land, during late fall, will bring the pupae to the surface of the ground where the severe weather will destroy them.

THE COMMON CORN STALK BORER (PAPAIPEMA NITELA)

This borer is not found in as large numbers as last season, but has done considerable damage this year.

The wilting and breaking down of the top is a marked indication of the presence of this pest. A round hole in the stalk plugged with the brown excrement of the caterpillar will be seen. In the spring while still young this pest frequently gains its sustenance from grasses and weeds, but as it grows larger it demands the food from the thick stemmed plants like corn and potatoes. Besides corn and potatoes this pest feeds upon wheat, oats and timothy, blackberry and raspberry canes, tomato plants, rhubarb and spinach, also upon weeds having thick stems, such as burdock, ragweed and pigweed.

Description. The corn-stalk borer when fully grown is about one inch in length, brown in color and bearing five white stripes, the one on the back running the entire length of the body and the other four being interrupted in the first four segments of the abdomen. The head and anal shield are of reddish yellow color with a black stripe on either side. This pest bears but one brood a year and by the first of July they are sufficiently grown to enter the corn-stalk. Pupation usually begins the latter part of July and the moths appear from the middle of August to the latter part of October. The eggs are probably



LIFE HISTORY OF COMMON CORN-STALK BORER. (ABOUT THREE-FOURTHS SIZE)

laid in the grass lands in the fall and hatch the following spring.

Control. If an infestation has been found, all grass plats adjoining a corn field should be mowed and the grass carried promptly away to be fed out or burned.

Bees.

Bees are classed as beneficial insects and are friends of the orchardist and the small fruit grower, as well as the gardner. Without these little friends there would be a small amount of apples of certain varieties. They are a necessity to the Ben Davis which is sterile and must be pollinated to bear fruit.

Small Fruits.

The business of raising small fruits in this State is a profitable one, especially is this true where the soil is a light loam and the grower has a nearby market. Many cater to the summer resort trade, while others ship their products to the cities of our State and to Boston.

Raspberries do not stand long shipments well, and this is the reason that there is no competition from the South as is the case with the strawberry.

Dozens of small fruit growers have taken up the sale of their surplus stock, and from this they derive an added revenue.

Any grower wishing to sell strawberry, raspberry or blackberry bushes may receive a state inspection and should have it in order to sell and to be able to guarantee bushes free from disease. Application for the same should be made to the state horticulturist.

I wish at this time to acknowledge the assistance of George H. Babb in caring for the exhibits at Portland, centennial week and at the New England fruit show, at Hartford, Connecticut, November 5th to 9th, to D. S. Clement for his assistance throughout the year at dusting demonstrations, as well as the insect exhibits held, and the work of inspection, to Roy S.

Bacon for his help at dusting demonstrations and the work of inspection, and to you for the support given in the work the past year.

Respectfully submitted,

FRANK H. DUDLEY,

State Horticulturist.

REPORT OF THE FIELD AGENT IN CHARGE OF GYPSY MOTH WORK.

To Major E. E. Philbrook,
Deputy Commissioner of Agriculture.

I have the honor to herewith submit my annual report as field agent in charge of gypsy moth work for the year 1920. The following report indicates, in a general way, the work which has been done during the past year. The funds expended in towns and cities have been used for the protection of shade and ornamental trees as well as orchards, it having been found impossible to carry on extensive work in woodlands owing to the extreme cost of these operations. American cities and towns are coming more and more to realize the importance and value of shade trees, and any steps that can be taken for their protection or to prevent injury from insects are most desirable.

The Work of the Year.

The inspectors and crews started work on January 1, and scouting continued until the eggs hatched. Owing to the severe winter and deep snows they could not make as much headway as usual. As soon as the eggs hatched and the caterpillars began to crawl, spraying was begun and continued until the first of August, with excellent results.

In spraying we used nine tons of arsenate of lead and millions of caterpillars were destroyed. In July and August no burlapping of trees was done on account of being unable to purchase the burlap. During the scouting operations millions of egg clusters were found and destroyed. In the work 827 gallons of cresote were used and delivered by the inspectors.

The men were given a vacation from September 25th until October 25th, when the work was again taken up and continued until November 25th, at which time the work closed for the year owing to lack of funds.

No new equipment has been purchased this year. At the present time we have in the spraying equipment: one ten horse power sprayer, three one and one-half horse power sprayers, and some fifty gallon barrel sprayers which are out of repair. Most of the working tools are in bad condition. It will be necessary to have the ten horse sprayer thoroughly overhauled, which will cost from three to four hundred dollars.

Correspondence.

In addition to the field work a great deal of correspondence has been carried on by the field agent. During the year over eighteen hundred letters have been received and answered by the field agent, all of which related to the handling of the gypsy moths, and reporting new infestations. In such cases one of the inspectors or I have visited the person making the report, with the purpose of teaching the proper methods of taking care of such infestations. By this method we have made many friends and received a great deal of help. We believe this is the best service which can be rendered to our citizens, as it helps them to properly care for their shade trees and orchards. Literature relating to the gypsy moth has been given out to granges and other organizations throughout the State.

Lectures.

During the year inspector Babb has rendered good service. He has lectured before schools and granges in the interest of the gypsy moth work.

Parasite Work.

This work has been conducted with the U. S. bureau of entomology from the laboratory at Melrose Highlands, Massachusetts. Many new colonies of parasites have been established in different sections of the State and a great many older

colonies have been strengthened. We were unable to obtain plantings of the calosoma beetle this year. Several plantings of the anastatus beetle were made in Monmouth, Winthrop, Gardiner, West Gardiner, Farmingdale and Bath.

Acknowledgments.

I am pleased to acknowledge at this time the help and advice relative to parasite work received from the government agent, A. F. Burgess, in charge of the laboratory at Melrose Highlands. To deputy commissioner, E. E. Philbrook, as well as the inspectors I am glad to acknowledge my obligations for their loyalty to the organization and their efficiency—to which in no small measure is due the success obtained in the work. To Major Philbrook I wish to express at this time my sincere thanks for his co-operation in all matters pertaining to the work of the bureau. In February our department had a great loss. Divine Providence took from our midst our honorable commissioner, John A. Roberts.

Conclusion.

The gypsy moth infestations have been reduced the past year. The territory infested remains about the same, and the improved methods which have been employed have shown good results. With the continuance of the methods already introduced and with the purchase of a high power auto sprayer, with the improved nozzles and hose couplings the work will be more thoroughly done. By being able to throw a stream over the tallest of our shade trees from the ground, not only is the great expense of labor overcome, but a whole town could be sprayed during the same length of time formerly required for the treatment of but a few trees.

Respectfully submitted,

M. H. McINTIRE,

Field Agent.

REPORT OF CHIEF OF THE BUREAU OF ANIMAL INDUSTRY.

To Major E. E. Philbrook,

Deputy Commissioner of Agriculture:

I herewith present my fourth annual report of the division of animal industry.

I find the interest in animal industry throughout the State very good indeed. There are approximately 1500 farmers in the State who keep pure bred females, in addition to pure bred sires, and today the farmer with a grade herd who does not head his herd with a pure bred is a rare specimen. In fact, there are many who have never owned any pure breds except the sire, who have made wonderful progress in breeding and have more to show for their time and effort than many pure bred breeders. We must certainly commend such men for their excellent work, but cannot help wishing they had put the same amount of intelligence and careful study into a herd of pure breds where the value of such careful breeding would be a far greater asset to the owner. On the other hand we find some men who think that to invest money in a bunch of pure breds is in itself sufficient to insure them success, and if the herd fails in this respect they blame it on the pure bred cattle, the market, hired man or something or someone besides themselves. Such men are not real breeders and never will be, and will never make a success with animal breeding.

The figures in the following comparisons between 1919 and 1920 show a decrease in all livestock except cows and three and two year olds, which show a slight gain. In all classes of horses, cattle, sheep and swine there are 22,890 head less animals in Maine this year than last.

Live Stock in Maine.

Horses		
1919	110,520	loss of
1920	108,652	1,868
Three year old colts		
1919	2,765	loss of
1920	2,402	363
Two year old colts		
1919	2,971	loss of
1920	2,388	583
One year old colts		
1919	2,506	loss of
1920	1,901	605
Oxen		
1919	5,621	loss of
1920	5,024	597
Cows		
1919	152,617	gain of
1920	152,781	164
Three year olds		
1919	27,126	gain of
1920	27,493	367
Two year olds		
1919	44,882	gain of
1920	46,285	1,403
One year olds		
1919	62,115	loss of
1920	49,060	13,055
Sheep		
1919	112,061	loss of
1920	104,734	7,327
Swine		
1919	48,329	loss of
1920	47,903	426

When analized these figures are not as discouraging as they seem at first glance. With the increased use of autos, auto trucks and tractors, a decrease in number of horses can be reasonably expected; we can reasonably expect a decrease in oxen and steers as well, and for the same reason. In the matter of yearlings, where the greatest loss is manifest, it is probable that, on account of the war a large number of calves were kept during 1917 and 1918 that came into the class in the spring of 1919 when the valuation was taken. At that time the abnormal number of 62,115 yearlings were found in the State, and these were evidently culled severely during the following year, as the 1920 figures show that only 46,282 of them had been retained, while only 49,060 calves had been kept the year before to qualify in the yearling class of 1920.

In the matter of sheep, the situation of the wool and lamb market has been a very discouraging feature and has reflected on the sheep industry of the State by a reduction of 7,327. Mr. Charles Crawford, the sheep specialist in this division, will report more definitely on this important subject, and it will be found very interesting.

Dairy Inspection.

The report of Mr. Brooks Brown, state dairy inspector in this division, is appended to this. The work of Mr. Brown is commended by this department, local milk inspectors, boards of health and the public in general. The only unfortunate thing connected with this work is that there has not been half funds enough to carry it on as it should be. Urgent and important requests have come to this office from numerous sources the past year that could not receive attention. At the last regular session of the legislature a bill was presented to charge a fee of one dollar for all state milk licenses. The fees thus collected to be added to the regular state appropriation for milk and dairy inspection. This bill was unanimously endorsed by the committee on agriculture, but was killed in the house because a few, failing to grasp the importance and benefits of the bill, opposed it in such a way that it caused its defeat. It was felt by those most vitally interested in this work that one dollar from each milk dealer, a

sum not equal to one eight quart can of milk would not be felt by any one engaged in the milk business, and it would yield revenue enough to this department so that an extra man could be employed for nearly, if not quite the whole year. This is just what should be provided in some way. The public is constantly demanding more in sanitation, and its milk and source of its milk supply is one of the first things to be thought of. Our state milk inspection has ceased to be a one man job, and if we are obliged to confine it to that it will mean that a large amount of work will have to be neglected.

Sale of Pure Bred Stock.

As stated in the first part of this report, there are over fifteen hundred farmers in Maine who keep pure bred stock. Many of these men, realizing the importance of a good foundation, have purchased animals of high class breeding. The time has come when they can spare some of their surplus stock. Many of these men are standing at a critical cross roads in their animal industry work, even if they do not realize it. Most of them have had no experience in advertising, have had no animals but grades to dispose of in the past, and if the opportunities for sale of their pure breds come slow and the prices they finally accept are unsatisfactory, not at all in proportion to the price paid for their foundation stock, then their enthusiasm for pure breds is bound to take a slide downward. A certain percent. go out of the business entirely, or back to grade animals on this account. Feeling the importance of extending a helping hand to our new pure bred breeders, as well as to the older ones, and to bring out-of-state buyers to Maine where we have not only quality in stock but freedom from tuberculosis to a marked degree, this division in co-operation with the federal agent in marketing for Maine put across a small campaign to boom Maine stock. As a result of this many head of Maine pure bred stock changed hands, and it also demonstrated what could be done if this were attempted by the department in a larger way. Personally, I do not believe we could expend a certain amount of our time and money to better advantage or where it would do more to encourage animal industry in the State.

If there is any one thing that needs fostering it is improved livestock. The decrease or increase of cattle in Maine does not interest me in the least, but anything that will raise the standard of quality most certainly does. If a man can be induced to dispose of two unprofitable animals that are a constant source of expense and humiliation, and in their place put one that will return a good profit and be a pride to the owner the cow census will show a fifty percent reduction; nevertheless, it has been a long, strong pull in the right direction and will make for success in place of failure.

POULTRY.

There were 1,403,284 hens and chickens on our Maine farms on January 1st, 1920. This is 301,616 less than there were in 1910, but it is 126,673 more than there were in 1918, which was the low mark in poultry industry. The number of chickens raised in 1919 was 1,908,466 against 2,601,733 raised in 1909. However, the interest in hen population in the State is steadily increasing. The value of the eggs produced in 1919 was $5,487,542, and that of the chickens raised $2,328,329, or a total of $7,815,871, an increase of $3,468,960 over 1918; not such a small industry after all when we consider that the total value of dairy products sold was $17,772,370 the past year.

The poultry associations of the State are trying, by free admissions, lectures and practical demonstrations to aid the interest in this important branch of animal industry, and their efforts are being felt. This year the exhibits have been the largest for many years, and the attendance was at least double what it was a year ago. It is earnestly hoped that the increased appropriation to be asked for of the present legislature for poultry work, through these poultry associations and by direction of the commissioner of agriculture, will pass. It will be a wonderful help to an industry that is now 693,267 birds less than ten years ago.

The educational work of this division has been carried along as in former years. Requests for speakers along lines of animal industry, and dairy and milk inspection, by granges, clubs, N. E. M. P. A. locals, etc., have received careful attention.

This department met with a very sad loss in the death of commissioner Roberts last February, but in respect to his memory the whole department resolved that the work should be carried on as planned by him without any secession of effort. With the hearty co-operation of everyone, and a willingness to help one another in any emergency, and with the able leadership of our deputy commissioner, we feel that we have carried out our purpose and accomplished results.

For this help I wish to thank our acting commissioner, every member of our department, and especially those connected with me in this division.

Respectfully submitted,

HERBERT M. TUCKER,

Chief, Division Animal Industry.

REPORT OF DAIRY INSPECTOR.

To Herbert M. Tucker, Chief Division Animal Industry.

I respectfully present my annual report as dairy inspector for the year 1920.

Slowly, but none the less surely, the sanitary conditions surrounding the production and handling of milk and cream in this State are being improved. In other words, the amount of *clean* milk and cream dispensed in our various cities and towns is increasing. These results are being obtained by various means; among which is the work of the local milk inspector, the demand of an ever increasing discrimination on the part of many consumers, advertising campaigns in other states, inspection work by this department and literature on dairy sanitation.

Milk and Cream Analysis.

The collecting of milk and cream samples for the purpose of determining whether or not the supply from which they were taken complied with our State standards, has been somewhat neglected during the past year, due to the fact that I have been giving more time than ever before to the inspection of dairies. The local inspectors of most of our large towns and cities have, during the past year, given very careful attention to this matter of collecting and analyzing samples and I have devoted only a small amount of time to those places in which efficient work has been done. In fact I have visited such communities as a rule, only when called upon to assist the local inspectors or to check up on their work.

This has given me an opportunity which I have long desired, namely, to give more time to the towns having only a few dealers. Three hundred and seventy-four samples of milk and cream have been taken from retail dealers residing in sixty-three different towns and cities scattered throughout the

State. Several visits were made to many of these places because a few dealers were found to be selling an inferior product. Twenty-eight persons have during the year, paid fines for selling milk which had been either skimmed or watered.

Inspection of Dairies and Milk Depots

As previously stated, more time has been devoted to this work than ever before. Four hundred and twenty-seven dairies supplying milk to fifty-seven different communities have been carefully inspected, many of them having been visited several times.

The majority of the dairies inspected have been satisfactory from a public health standpoint. The owners have evidently tried to put a good, clean product upon the market, and have endeavored to handle their milk and cream according to sanitary methods. There is however, as I have previously stated, a fairly large minority of retail dealers in this State who, either because of carelessness or insufficient knowledge of their business, are daily putting out a product which while it may not in most cases be dangerous to health, yet has very great possibilities of contamination.

One dealer only has been prosecuted because of the unsanitary conditions surrounding the production and sale of his product. A fine of twenty-five dollars and costs was imposed in this instance. Eight other cases of this sort are pending.

Creamery Inspection.

As a result of complaints made to this bureau, I have run check tests for twenty-two patrons of four different creameries during the year. Several other complaints are on file and will be investigated at the earliest opportunity. Five rejected patrons of one creamery have been reinstated upon rcommendation of this bureau.

Investigation of Milk Sold by Restaurants.

Practically all restaurants receive their milk in cans and it is a common practice in many of these establishments for the

chef, or someone else, to remove the cream from the top of the cans to be used in cooking, for coffee, etc. The skimmed milk is then sold over the counter to anyone asking for a glass of milk. Skimmed milk at five or ten cents a glass is not appreciated by most persons, and unless sold as skimmed milk results in a violation of our statutes.

Twenty-three restaurant owners have, during the year, paid fines for the sale of adulterated milk.

At this time, it is only proper and fitting that I express my thanks to Mr. Soule, chief, division of inspection, for the co-operation and assistance he has given me during the year. Mr. Soule has furnished the services of Mr. M. R. Umberhind, an experienced inspector upon several occasions, and the results obtained in this restaurant work are due mainly to his efforts as I have not had the time necessary for this feature of the work.

Local Milk Inspection.

I am of the opinion that in the spring of 1917 there were only about half a dozen local inspectors in the State, at least the number was limited, and only a few were doing effective work. At the present time there are forty-five men engaged in this work in the various cities and towns. The work of many of these men is very limited, due to small appropriations in some instances and none at all in others. Taken as a whole, however, this feature of our milk control system has made a fairly satisfactory advancement.

It has been my policy to co-operate with the local inspectors in every possible way, and their assistance has been of great value to me. This was especially true during the latter part of last winter and the early spring, and came about through a change in the method of issuing the milk licenses. In past years this licensing of dealers has been mainly a matter of registration. The law states that the Commissioner of Agriculture shall issue a license to sell milk and cream to anyone applying for same when he is satisfied that the conditions surrounding the production and handling of the product are satisfactory. When I add that about 5000 licenses have been issued this year and the most of them before April first, you

of course realize how hopeless would be the attempt of one man to investigate the conditions of very many applicants during a reasonable period. I therefore called upon the local inspectors to assist up in this matter and practically all of them responded in a very satisfactory manner. The application blank which has to be filled out by the applicant for a license was revised and several questions touching upon the method employed by the applicant were added. In addition to that, a space was left for the signature of the local inspector, providing the municipal officers had made such an appointment. This was to be filled in by the inspector of the town or city where the product was disposed of, or by the inspector residing in the town where the applicant might be located. In addition to this we asked the local inspectors to refuse to sign any cards which might be presented to them if they considered the sanitary conditions unsatisfactory. I am satisfied that this plan, although far from perfect as yet, has done more to improve our milk supply than has any other factor since, milk control was first started within the borders of our State and the credit goes to those local inspectors who have so conscientiously investigated every case brought to their attention. I might add that no license has been issued to any dealer (unless by accident), when his card did not bear the signature of the inspector if one had been appointed for his locality. This plan gives this bureau an opportunity to devote more time to an investigation of applicants residing in towns which have not appointed a local inspector.

The second annual conference of the milk and dairy inspectors of the State took place at the state house, April 28th. The forenoon was devoted to a joint meeting with the local and state health workers and the afternoon to a conference with the Maine creamerymen's association. Twenty-three inspectors were present and much good was derived from the various papers and discussions.

Meetings and Exhibits Attended.

I have delivered a short talk on some phase of dairy and milk sanitation to three Pomona Grange meetings and the Houlton Rotary Club. Under the direction of Major E. E.

Philbrook, acting commissioner of the department of agriculture, I arranged the dairy exhibit at the eastern states exposition, Springfield, Mass. Prof. L. M. Dorsey of the university of Maine and I acted as judges of dairy products at the central Maine fair in Waterville and at the meeting of the Maine dairymen's association in Portland. I was also judge of dairy products at the Topsham fair.

In closing this report, I wish to thank the members of this department and the clerical force for their kindly assistance freely given at all times. It has certainly been a pleasure to carry out the duties of this office under the able leadership of our acting commissioner, Major E. E. Philbrook and yourself.

Respectfully submitted,

BROOKS BROWN,

State Dairy Inspector.

REPORT OF SHEEP SPECIALIST.

To H. M. Tucker, Director of Division of Animal Industry:

I herewith submit my annual report for the year of 1920.

My work as sheep specialist was very much interfered with during the first few months this year owing to the excessive amount of snow which made it impossible for me to keep all of my appointments that many times were long distances from railroad stations. However, it is very gratifying to note the marked improvement in the physical condition of the flocks in the various sections where special work has been done. While this work, without doubt, is proving very successful there is yet much more to be done along these lines. It has been found that personal visits to the flocks give the best results as it affords an opportunity to carefully inspect the individual flocks, the pens, feed racks and other conditions which affect the health and thriftiness of the flock. In personal visits it is possible to consider each individual situation and to learn the reasons and causes for failures, and with this information, the necessary instruction as to the remedy can be given.

This work consists principally in giving advice as to the sanitary conditions of the pens and what changes may be necessary, also advice in selecting ewe lambs which are to be kept for breeders, in culling the old and unprofitable ewes, and in selecting rams to head the flocks. In this personal work, due consideration can be given conditions of this kind and to improvement of the quality of wool grown.

By visiting the farms the quality of roughage supplied may be inspected and advice given as to what will be necessary as a substitute to make a balanced ration necessary to keep the flock in a good, healthy and thrifty condition. Often times it is found that sheep are being fed very coarse and late cut hay. When fed roughage of this kind it is necessary to feed roots or some succulent food to offset the poor quality of hay.

The work of inspecting flocks for the various parasitic diseases has continued throughout the year and it is very gratifying to note the wonderful improvement in the flocks resulting from the treatments recommended in this work. In every case where these treatments for diseases have been followed out according to instructions the results have been highly satisfactory. The flocks have become thrifty and more productive, producing a higher percentage of lambs and a higher percentage and better quality of wool.

The fact that personal inspection of the flocks has proven the most satisfactory makes it necessary to continue this work through a longer period of time. However, I believe that the success of the work warrants the extra time and expense. There are still many sections in the State where no special work has been done. Many public lectures and demonstrations have been given but while they have proved to be beneficial they do not equal in value the personal visits as they do not afford an opportunity to observe the conditions which are found to vary considerably with the different flocks.

Another branch of the work which is taken up with the personal visits to the flocks is the demonstration and advice in selecting the right type of ewes necessary for a high production. It has been found that very few men who are keeping sheep have made a study of this part of the work and in many flocks there is a considerable percentage of ewes which do not possess the type to ever become profitable.

This branch of the work is very important as by assisting the sheep owners and giving them the necessary instruction, in the future they will be able in selecting their ewe lambs to get the right type for the various breeds which carry possibilities of high production, necessarily increasing the production per sheep in the near future.

The percentage of lambs dropped and matured in this State in the past has been only 65 per cent which is altogether too low a percentage in considering profits. The percentage of lambs raised should be at least 100 per cent for all matured ewes. This can only be made possible by eliminating the diseases from the sheep and then by careful selection of the right type of sheep and administering the quality and quantity of food necessary. The percentage of lambs dropped depends largely upon the con-

dition of the ewe at the time of breeding; it is a well known fact that unprofitable ewes many times prove to be non-producers, whereas if the ewes are in a thrifty condition during the breeding season they will invariably drop 100 per cent or more of lambs.

As a result of advice and encouragement given, the use of pure bred rams possessing the right type, the demand for them has rapidly increased during the past two years. Had work of this kind been done in years past, the quality as well as the quantity of sheep in this state would have been very much better and much more profitable than at the present time. By the use of pure bred sires the quality of the lambs is very much improved and the quality of wool also. Breeders of pure bred stock should be encouraged by every one interested to continue to produce the best possible.

At the present time the supply of good breeding rams and ewes is not equal to the demand, and without doubt the demand will increase rapidly in the next few years. The results from this kind of breeding have been shown to be very profitable and much more satisfactory in every way.

I have not confined my work and influence in culling strictly to the grade flocks, but rather, have strongly advised the producers of pure bred stock to cull as well. It is evident that many animals have been sold as breeders which did not possess the qualities necessary for good breeding purposes and should have gone to the butcher.

In order to give the greatest amount of assistance to those who desire to purchase pure bred animals for breeding purposes I have made special effort during each growing season to get a list of all surplus rams and ewes that would be offered for sale for breeding purposes and as far as it has been possible I have endeavored to visit these various flocks and to carefully examine them for diseases and for quality, and have made a complete record of size and type as well as the price. As the breeding season has approached I have been in a position to inform all those who apply as to where they could get the breed and type desired, also to give them the price and such information as they desire.

The percentage of lambs raised has gradually increased during the past two years. This is especially noticed in the sections

where the special work in eliminating diseases and in better selecting and breeding has been in practice. The present percentage of 65 lambs matured per 100 sheep is altogether too low. Every sheep owner in the State should set a standard for production of lambs. It should be at least 100 per cent or one lamb for each matured ewe and for wool the average production today is about six pounds per head. The standard should be at least eight. These standards can easily be attained by first putting the flock in a healthy, vigorous condition and then carefully culling out non-producers and selecting only those possessing the necessary qualities for high production.

The present system of marketing the surplus lambs should be remedied. A much larger percentage of our lambs should be consumed within our State. At the present time many car loads of our best lambs are shipped out of the State and later returned to our local markets. This makes unnecessary expense. As a matter of economy the heads of families in our State should consider the interests of the industry and make it a point during the slaughtering season to have lamb the principal meat diet on their tables at least once a week. This would assist in lowering the cost of living as the choicest of cuts of lamb raised and butchered and distributed at home could be sold at a reduction in price and at the same time furnish the homes with the choicest and freshest of meat for the table.

Farmers themselves do not use as large an amount of their own production as they should. If a movement of this kind could be started in Maine nearly all of the lambs grown could be marketed without being exported out of the State.

Wool Marketing.

Since the earliest time wool has been the governing influence in the sheep industry. When wool sells high the industry is found to be flourishing, and on a low market sheep are condemned as unprofitable and go to the butcher. Fifty years ago conditions of this kind were real, when lambs invariably sold from $1.00 to $2.00 per head and were only a by-product of the sheep, wool bringing the principal income.

Those conditions have greatly changed until today lambs are the most important product as they furnish the principal income, or usually two-thirds of the entire income from the flock; the

wool, one-third. A good standard which might well be recommended to all owners of sheep would be when a sheep failed to produce a lamb of the size and quality which would not pay for her entire keeping for one year and yet leave a balance for profit, she should not be kept in the flock. This is easily possible, for under the present high cost of labor and feed it costs only approximately $7.00 per head to keep a sheep one year, including all labor, housing and feed.

At the present price of lambs and mutton a sheep that is not capable of producing at least one lamb that will sell for a price in excess of the cost of keeping, should not be entitled to a place in the flock.

Therefore the wool should not have the amount of influence in determining the profit and loss of a flock that is accorded it today; yet when wool sells for a low price farmers get discouraged and sell off the sheep and by this method the price of good breeding ewes is forced to a very low mark. Then when the price of wool begins to rise again the farmer wishes to replace his flock and thereby creates a demand and a higher price.

I would strongly urge all owners of sheep to give their entire flock a careful and thorough inspection once a year for all parasitic diseases and to make a record of all those which are not producers of lambs and do not possess the right type and covering necessary for a high production, and place a special mark on all those failing to meet the requirements to be sold as culls. This method would eventually leave a flock possessing the possibilities for producing at a profit which would be permanently satisfactory to the owner.

If the owners of sheep would use the same good care and judgment in feeding that is necessary for a high production in the dairy cow, flocks would prove much more profitable than at present. The common statements of many of our so called leading farmers are that sheep do not need any extra care or feed and that they can be kept on the waste material such as weeds, moss and brush, and with little or no care will be highly profitable. Information of this kind coming from men and even farmers of high standing has proven to be very injurious to the industry and to any one who is seeking information as to the best care of raising sheep. It would be much better to go to a good, practical sheep man who has proven his skill by actual practice and production.

There is much work to be done in improving the quality of wool in Maine as at present the quality, while it possesses a percentage of high grade, averages relatively low, due to the fact that most men in attempting to breed for a larger size sheep loose sight of the quality in wool. The wool produced on larger breeds is usually of a coarser quality, and the producers should be more careful in selecting not only the larger breeds, but the sheep possessing the quality of wool.

The quality of wool can be changed more rapidly and more satisfactorily by culling out the ewes producing a low grade of wool and by buying rams that possess both quality and quantity of fleeces. The percentage of profit and loss in the sheep industry as well as all other industries depends largely upon both quality and quantity of production. Seldom does the price of any commodity go so low that with a high production and high quality the industry will fail to return to the owner a profit.

For many years the production of wool not only in Maine but in all wool producing states has suffered from the lack of a suitable method of marketing. There has never been a time when the producer has received his part of the consumer's dollar. The system of marketing has been very costly and the growth and upbuilding of the same has incidentally cut the price to the producer to the lowest possible point. At the same time it has returned to the brokers millions of dollars as is evidenced by the expensive blocks found on Summer Street in Boston which have been built and furnished and maintained at the expense of the wool producers of our country.

The system which has been inaugurated by the wool brokers has been carefully planned and designed to get complete control of the marketing of all wool by causing it to be graded, sorted and scoured in and around Boston and delivering the same to the mills in any quantity desired. It thereby relieves the mills of the necessity of tying up large amounts of money in wool in order to make sure of their annual supply. This system of the wool brokers has forced the producers to sell all wool to their local agents and in this way has made it possible for them to get the handling of nearly all wool grown in our State, eliminating all competition and price-making, as the law of supply and demand is carefully regulated in the office of the brokers. As a result of this many thousands of dollars of Maine money

has been shipped to Argentina and Australia for wool to be shipped to our own State and manufactured in our own mills and has been worn out by the sheep owners themselves—a system which should be condemned as entirely unnecessary. Maine can produce a quality of wool that can be made into a fabric which will be perfectly satisfactory and, without doubt, if the real situation was known by the people of our own State they would be not only willing but glad to buy fabrics made from Maine wool, and in this way create a market for all the wool that we can produce.

In the past all wool has been sold upon a flat rate per pound regardless of quality. The price has usually been placed on the average of a low quality, thereby making it possible for the wool broker by grading, to get a large percentage of fine quality of wool which is sold to the mills at a handsome profit over what it cost him originally.

Conditions of this kind have been considered by many of the leading farmers of our State during the last few years and finally developed in the organized effort which has resulted in the Maine sheep and wool growers' association, an organization which has been in existence for a number of years but has not been active in the marketing end of the industry.

On March 4, 1920, a meeting of this organization was called to be held at the State House at which time the association was reorganized and incorporated for the purpose of advancing the interests of the industry in every way possible and especially for the purpose of co-operatively marketing the wool for its members. Plans were immediately started for giving grading demonstrations at the various shipping points, and after careful consideration, it was decided that this could best be accomplished by organizing local branches of the organization at the various points where wool would naturally be shipped, and work was immediately started along these lines.

This work of organizing, as well as the entire plan, received at once the hearty support of the department of agriculture, the extension service at Orono and the bureau of markets, Washington, D. C. As secretary of the association, naturally a large part of the planning and clerical work was left to me and with the assistance of the sheep specialist of the extension service, who is also the vice-president, Dr. L. S. Cleaves, the

chief of the division of markets, and especially Mr. C. M. White, agent in marketing, bureau of markets, Washington, D. C., and also the county agents and farm bureaus, work of the organization was started in Franklin, Kennebec, Penobscot and Washington counties. In Franklin, Washington and Kennebec counties a local was organized at each shipping point.

Owing to the lateness of the season it was deemed advisable to discontinue the work of the organization and especially so as the wool market seemed to be on the point of breaking, which conception has since developed to its full realization. Through the influence of Mr. C. M. White, agent in marketing for the bureau of markets, Washington, D. C., the service of an expert grader was secured to assist in giving grading demonstrations at the various shipping points. It was evident from the start that this method of grading and marketing wool appealed to the farmers as in every instance where there were meetings called and held, the keenest of interest was displayed.

Arrangements were made for grading demonstrations to be held in the following places:

Franklin County—Farmington, Wilton, Jay and Rangeley;
Kennebec County—Waterville, Gardiner and South China;
Washington County—Harrington, Dennysville, Machias and Perry.

These grading demonstrations proved to be very interesting and instructive, not only to those having the work in charge but more particularly to the farmers themselves and in each case Mr. Joseph H. Hanson, the expert grader from the bureau of markets, was very careful to explain to the producer the difference in quality of wool which he brought in. Often the owner of the wool would question the correctness of the grade but in each case when comparisons were made he was convinced that the grading was correct. This system demonstrated to the farmer that he was actually producing a grade of wool much lower than he anticipated, and afforded an opportunity for those in charge to explain the best and most satisfactory method of improving the quality as well as the quantity of wool. The farmers were found to be very eager to get this advice and at the present time it would be impossible to estimate the great amount of good resulting from these grading demonstrations.

Arrangements were made with a commission house in Boston to store and sell wool for the association on a commission basis and we feel that we were very fortunate in getting a contract with Mr. W. P. Yerrinton. He has shown a great interest in this movement and from long experience in handling Maine grease wool is in a position to market our wool as well or better, without doubt, than any other man in New England. Unfortunately for all concerned the wool market was broken to the point where no one cared to buy. Therefore, the wool of the Association which consisted of 30, 376½ pounds of graded wool was put in storage in Boston during the summer months.

The executive committee of the association, seeing no outlook for a suitable market at a reasonable price for this wool, immediately began to formulate plans to market at least a part of it themselves.

As there was some question as to the possible outcome of a project of this kind, personally I did not feel like asking the association for its wool to use in an experimental way so decided to have a small portion of my own wool manufactured into cloth to be sold direct to the consumer and to my surprise the demand far exceeded the amount of cloth produced. The quality proved to be of the best and demonstrated beyond a doubt that a large part of all wool grown in Maine can be made into a fabric that will attract the attention of all those who are interested in helping to build up and maintain the industry.

After this small experiment the matter was taken up by the executive committee and it was decided to continue the work of having the wool manufactured into cloth, and I as secretary was instructed to investigate the possibilities. After considerable correspondence and several trips to the various mills it was found that there would be a sharp demand by farmers and lumbermen for a heavy all wool fabric suitable to be made into pants for their use. This was reported to the executive committee of the association and I was instructed to go ahead with the work.

Upon further investigation it was found that by having these goods manufactured into pants ready to wear we could get them onto the market at a price that would be attractive to the consumer, and also return to the association a price for its wool far in excess of what could be obtained if sold through the ordinary

channels. This was taken up and has resulted in the production of ready to wear pants which are fine in appearance, thoroughly and strongly made, and can be sold to the consumer at a price much below that of a similar goods.

Samples of these pants were exihibited at the annual meeting of the Maine dairymen's show at Portland, November 16-19, and also at the annual session of the Maine State Grange held in Lewiston, together with samples of goods manufactured from our native wool which attracted a great deal of attention and has resulted in many orders being received for the finished product.

At Lewiston this exhibit proved especially attractive. The majority of the representatives present being masters of subordinate granges, many decided it would be both wise and fitting for them as representatives of their granges and communities to take hold of the marketing of the finished product, and many orders for sample pants were received at that meeting. Surely with the support of all people interested in the sheep industry in this State this project cannot fail of success.

Respectfully submitted,

C. H. CRAWFORD,

State Sheep Specialist. Secretary, Maine Sheep and Wool Growers' Association.

MAINE SWEET CORN GROWERS' ASSOCIATION.

To E. E. Philbrook, Acting Commissioner of Agriculture:

I submit the following report as secretary of the Maine sweet corn growers' association.

This organization has made a substantial growth during the year 1920. Every grower of sweet corn now realizes that this association has accomplished results far beyond the hope of even those most interested. Its policy of unselfishness and fairness has won the confidence and support of the public generally. One of the first duties placed upon its members was to keep an accurate account of the cost of production. This was necessary as a means of arriving at a price which would return to the producer the cost of production, and to the successful producer a reasonable profit. That the importance of these accounts are appreciated by the producers is evidenced by the substantial increase in the number kept each year. Unlike most other industries, a summary of these accounts is given the press each year, showing the consumer what part of his dollar paid for canned corn goes to the farmer. Much credit is due the extension service at Orono, in keeping these accounts as the account books are furnished free to the grower by them. Instruction in opening and keeping them through the year is given by the county agents and farm bureau, and finally all the accounts are balanced up by the county agents. The final summary is made up by M. D. Jones, farm management demonstrator. This work is very carefully and systematically done, and too much credit cannot be given Mr. Jones for his painstaking and untiring efforts in the interests of this organization as well as all other farm organizations in the State.

One of the lines of work taken up by the association with the study of cost of production, is a study of methods which will lower the cost per pound, as the cost per pound is regu-

lated largely by the production per acre. The association is to attempt, through a series of meetings arranged for by the executive committee, to be held at the various places where there are local branches, to take up the question of methods of production in an educational way.

That the growers of sweet corn are justified in asking for a price that will pay cost of production and a reasonable profit is without question as is also the fact that the production per acre in several counties is altogether too low. It will be necessary to make a careful investigation of both the methods of production and soil conditions in these sections and arrange for special meetings where assistance can be given those who do not understand the best methods of sweet corn culture, such as thorough preparation of the seed bed, application of fertilizer, cultivation, and special care in gathering and delivering to the factory.

There are many men trying to grow sweet corn whose soil is not suitable, lacking proper drainage and making it impossible for early planting. Usually soil of this kind is subject to frosts in late spring and early fall, making it impossible for a profitable producton covering a period of years.

Seed Corn.

The association has given considerable attention to the question of better seed, having received many complaints that seed furnished them has been of low germination resulting in a poor stand and consequently, a loss, as it necessarily requires nearly the same care and cost to grow an acre with a poor stand and at a loss, as it does with a good stand at a profit. Home or native grown seed properly selected and cured carries a higher germination and a consequent higher production.

Quality of Corn.

This association, realizing that a high price of any commodity necessarily means high quality, is using its influence through personal advice, lectures and the press to have a larger percentage of high quality of corn delivered at the factory. Farmers now realize as never before, that in order

to maintain the standard of quality for Maine corn that will warrant a satisfactory price to them, they must gather and deliver it when in first class condition for packing.

Maine grown sweet corn has always been acknowledged to be superior in quality to that grown in any other state, yet the standard must be raised still higher. The Maine sweet corn growers' association has set the standard of quality on the 100 per cent mark, and with the continued influence and assistance of the department of agriculture, extension service and allied organizations, intend to realize it if possible. The acreage for the state for 1920 is reported as slightly under that of 1919. The yield per acre for 1919 was 2758 pounds, for 1920 was 2860, an increase of 102 pounds per acre. The cost per pound for 1919 was $.0368 and for 1920, $.0426; an increase of nearly three-fifths of one cent per pound.

Respectfully submitted,

C. H. CRAWFORD,

Secretary, Maine Sweet Corn Growers' Association.

REPORT OF CHIEF OF DIVISION OF MARKETS

To Hon. E. E. Philbrook, Deputy Commissioner of Agriculture:

I have the honor to submit herewith the 1920 annual report for the division of markets. In presenting this the 4th annual report it is with a feeling of sorrow and inability to make a complete report in all details, owing to the untimely death of Frank S. Adams, who so ably conducted the work of the division since its inception.

Certain definite lines of policy were adopted at the beginning of the year with a view of making the work of the division more productive of results. Chief among these were the consolidation of the Farmers' Union of Maine with the Farmers' Union Grain & Supply Company; to establish better bookkeeping systems in many of the locals; reorganizing dormant unions and assistance in strengthening those already in operation. It was also aimed to make the public more familiar with the reorganization plans of the Turner Center System. New organization work in localities not already served by co-operatve organizations was to be undertaken where the need seemed to exist. The encouragement of co-operative organizations in establishing an official organ was to be attempted. These definitely outlined plans with numerous miscellaneous demands upon the time of both the chief and field agent have made a very busy year for both, and results are gratifying.

During the year 261 public meetings and conferences have been held with an average attendance of 51. The subjects under consideration on these occasions have been farmers' unions, 57, milk marketing, 94, sweet corn, 25, wool grading, 19, and miscellaneous, 66.

Farmers' Unions.

The unprecedented break in the grain market early this fall has resulted in a great financial strain on many of the weaker locals. Unfortunately it is probable that some of the locals who have insisted on distributing the savings effected through co-operation as soon as made, will be unable to stand the loss caused by the falling market. However, the wheat will be winnowed from the chaff, and those unions who are thorough believers in the benefits of co-operation and have practiced the business principles learned from experience will in the end be more firmly established than ever. Right here it should be emphasized that adequate bookkeeping systems which have been so often stressed as an important part of successful business should be more generally adopted by all co-operative organizations.

During the past year the field agent has assisted in installing bookkeeping systems in whole or in part in ten different locals. Many other unions have used the suggestions contained in the June bulletin of the department for better bookkeeping systems. This work should be continued and perfected wherever possible.

Distribution of savings effected by co-operation in some of the most successful unions have been as follows: A reserve has been laid aside for emergency. Dividends of from six to eight percent on the capital stock invested have been declared, and the remainder of the savings have been used in the form of patronage dividends, distributed according to the amount of business which each member has done with his local. The same general method will govern the distribution of the savings of the Farmers' Union Grain & Supply Company in its relation to local unions. No co-operative organization can afford to disregard the creation of a reasonable reserve against the day of replacement on account of depreciation and unavoidable losses.

Co-operative Milk Marketing.

With more than one hundred and eighty thousand cows in the State, anything which affects the price or marketing of milk is of vital importance to the dairymen of the State. More

than a year ago it became apparent that while collective bargaining had done a great deal to stabilize the industry, this alone would eventually fail unless the dairymen were in a position, if need be, to handle surplus products. From the perishable nature of milk it is impossible to use temporary means for its disposal.

The Turner Center System is to be the agency whereby the farmers may eventually have at hand the means of placing their milk products in the hands of the consumer. The plan as finally adopted for taking over this private corporation by the farmers, and its conversion into a co-operative enterprise is that the trade dividend which the Turner Center System has been paying to its producers in the form of bonus checks at the beginning of each year is to be used to retire the common stock of the corporation, and that the farmers will receive in lieu of their bonus checks certificates of co-operative stock in the Turner Center System. It is doubtful if a more beneficient move could have been made for the dairymen interested.

It may be, however, that many would have appreciated the value of the system rather more had their interests in it been actually purchased by a regular percentage deduction from each cream check. The producer would then have seen in dollars and cents what the Turner Center System was costing him. With this sense of ownership the duties and responsibilities of partnership in such a large concern would pressed more heavily upon him and his support of the movement been much more loyal, in proportion. The establishment of such a principle might also tend to discourage producers in remote and inaccessible communities from attempting to market their dairy products as fluid milk.

By this tentative plan, of course all dairymen who so desired could take part in the movement, and those not wishing to own their proportional share of the system would be entirely free to find a market elsewhere. However, the System as now established is receiving much less criticism and a great deal more favorable comment than one year ago at this time, and undoubtedly like all new movements, after a reasonable time of testing, the public at large will appreciate its many advantages and few weak points.

That the efforts of this division in promoting new organization work for the N. E. M. P. A. and strengthening existing locals of that association were warranted, is shown by the following table of milk prices for the month of November of the current year.

Average price for 3.5 milk per cwt. to producers:

	1919	1920
United States	$3 74	$3 72
New England	4 17	4 30
Middle Atlantic	3 51	3 86
E. North Central	3 63	3.30
W. North Central	3 31	3 24
So. Atlantic	4 43	4 37
E. So. Central	4 06	3 46
W. So. Central	4 35	4 59
Mountain	3 14	3 08
Pacific	3 39	3 88

It should be noted that New England dairymen are receiving 58 cents per cwt. more than the U. S. average, and that in only two sections of the U. S. is a greater price being received.

Sweet Corn Growers' Associations.

The Maine sweet corn growers' association organized early in 1919 is maintaining a healthful growth. The members of this division have assisted in more than twenty-five local conferences and membership campaigns. Further details of this important work will be found in the report of sheep specialist C. H. Crawford.

The co-operative spirit invaded a new field of activity the latter part of the year when county agent Tomlinson of Washington county reported a desire among the blueberry growers to unite in a co-operative association for canning and marketing their berry crop. After careful investigation on the part of Mr. Tomlinson as to how earnest the growers were in their intentions, it seemed advisable to proceed with organization work.

The field agent spent considerable time in preparing tentative by-laws and membership contracts for such an association, and on December 2nd, assisted in the organization of the Machias Valley co-operative canning association with Machias as its prin-

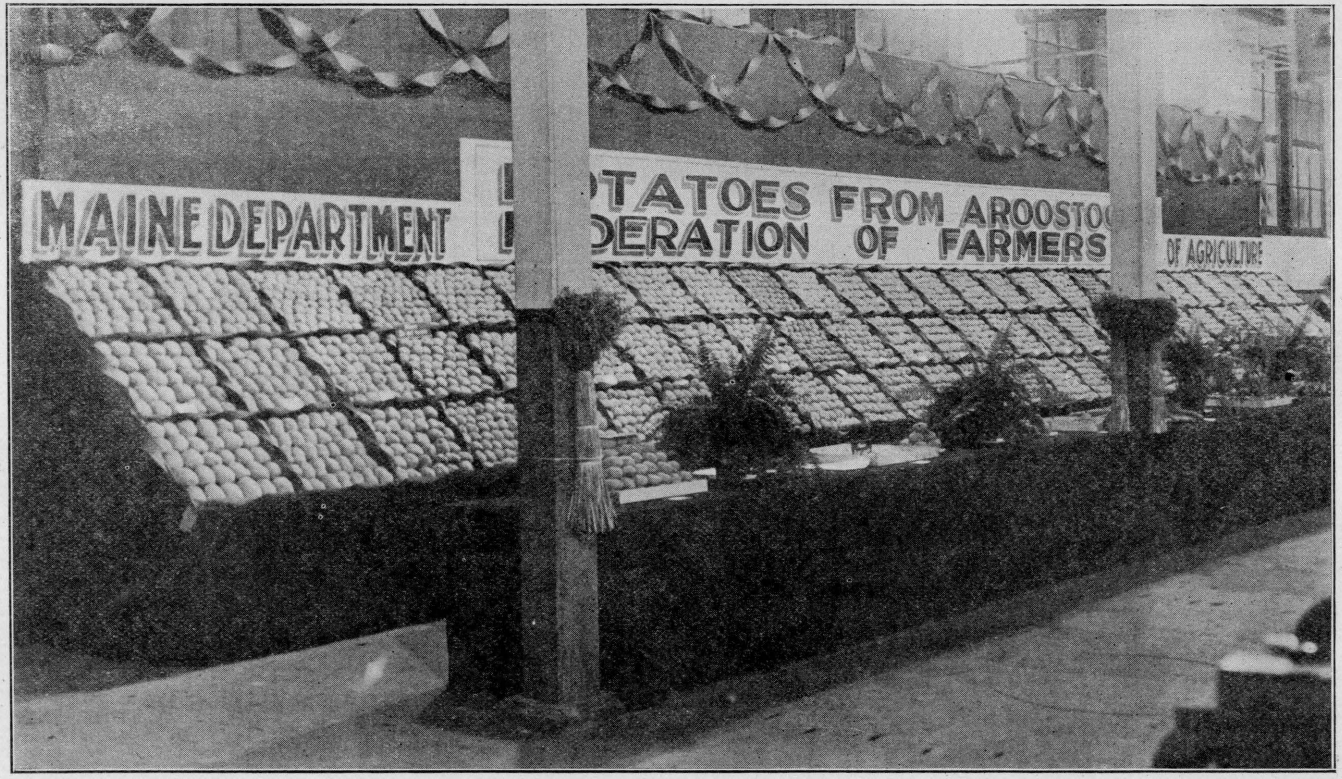


Exhibit at National Grange, Mechanics' Building, Boston, Nov ember 9-13, 1920.

cipal place of business. At this meeting $1,600 of the capital was subscribed with many more seeking membership. A very favorable aspect of this movement is the fact that a successful manager of a blueberry factory is deeply interested in the success of the association, and his advice and assistance will be of material help in avoiding the pitfalls incidental to many new and inexperienced ventures. Fortunate indeed is it when both rural and business men unite for the betterment of a community.

In the evening of the same day a preliminary meeting for the same purpose was held at Jonesboro and the organization in that place has since been perfected by Mr. Tomlinson, I understand.

From the fact that the demand for canned blueberries is large, while the sources of supply are comparatively limited, there is every reason to believe that a bright future is in store for the co-operative canning association which will profit by the experience of older co-operative organizations in the conduct of its business. This division should be in a position to furnish every assistance possible in the development of these associations.

Exhibits.

"It pays to advertise." Too often this old adage is repeated with an impersonal air of "it is good for some things" but has no effect in agricultural lines. To those who have been privileged to attend the eastern states exposition at Springfield, Massachusetts, the real value of advertising Maine's opportunities and possibilities was entirely apparent. With interested persons passing by and through the Maine exhibit at the rate of 3,825 per hour during the week of September 20th last, there could be no doubt of the effect upon their minds made by the skillfully arranged displays.

If no other states were putting forth efforts to boom their individual possibilities, it might be safe to wait for interested inquiry. *But* practically all states, and in fact the Canadian government, are making systematic bids through well arranged exhibits for up to date, hustling settlers. Maine can meet them more than half way for we have the actual opportunities. Let them not be neglected.

The division of markets assisted with the Springfield exhibit and under the direction of acting commissioner E. E. Philbrook, staged the entire exhibit at the meeting of the national grange in

Boston Dec. 9th to 13th. Aroostook seed potatoes were featured at this exhibit, and lists of growers and dealers were distributed to parties from the Atlantic to the Pacific coasts. Samples of the potatoes shown were sent to Washington, South Dakota, California, Colorado, Connecticut and Massachusetts. Cordial co-operation on the part of the Aroostook federation of farmers and farm bureau made possible the collection of this magnificent display of Aroostook stock.

Crop Reporting.

Two years ago the legislature enacted a law for the encouragement of better crop reporting, and for the first time last spring the department of agriculture in co-operation with the local boards of assessors obtained estimates of crop acreage. The results were very gratifying for the first attempt, as 50 per cent of all the towns reported, which gave a reasonable basis on which to figure the probable plantings of the different crops as well as the numbers of livestock at that time.

Using this data in co-operation with V. A. Sanders, field agent of the United States bureau of crop estimates, the December bulletin of the Maine department of agriculture has a summary of crop reports by counties of the staple products of the State. With the growth of co-operative marketing associations similar to the milk producers' associations and fruit growers' associations, as well as for the purchasing organizations like the farmers' unions, the importance of accurate crop reports cannot be overestimated. For instance, one year ago the national potato crop was shown to be in the neighborhood of three hundred and fifty million bushels. By comparing these two figures anyone acquainted with the rudiments of business can plainly see that in order to stimulate the consumption the price of potatoes must be materially lower this year than last, in order to dispose of the additional eighty million bushels. Consequently, the up-to-date manager of a co-operative organization with reliable figures of crop production as well as the normal world consumption can estimate with a fair degree of certainty at what price the bulk of the crop must move in order that it may all be consumed.

To acquaint the public more fully along this line, tentative plans have been made with the federal bureau of crop estimates as well as with the commissioners of agriculture of the

several New England states, whereby further work may be done along crop reporting lines and provide the citizens of this State with more accurate reports, believing this to be the foundation of market news reporting which should be added to the activities of the division of markets.

CO-OPERATION WITH THE FEDERAL BUREAU OF MARKETS.

Beginning with January 18, 1920, the field agent of the division of markets was granted a four weeks' leave of absence in order that he might assist in institute work in the state of Delaware, explaining to the farmers of that State the workings of the co-operative organizations in Maine, laying especial emphasis upon the two classes of organization known as collective bargaining and collective purchasing. During this period of four weeks, arrangements were made with the federal bureau of markets through its State co-operation project, whereby the field agent came under the joint pay of the federal bureau and the State department, with the understanding that material assistance in other lines would be rendered by the federal bureau.

The first important result of this arrangement was the wool grading project carried out in co-operation with the Maine sheep and wool growers' association. It is needless to repeat that any successful enterprise must build for permanency upon the foundation of quality. Unfortunately, the wool business of Maine has long been conducted on the flat basis. In other words, a price per pound was established and all wool growers received that amount—no more and no less, regardless of grade. After leaving the growers' hands, however, the wool was placed in its proper grade and sold accordingly. In order to demonstrate the difference in the types of wool, the federal bureau furnished an expert grader, paying his salary and all expenses during the time spent in the State of Maine. Mr. Crawford, of the sheep and wool growers' association, made plans in fifteen different localities of the State for grading demonstrations, and Mr. Hanson of the federal bureau in company with the field agent conducted all of these demonstrations. The meetings were well advertised, and the average attendance was sixteen. By seeing the wool grading the growers realize that there is a wide variation in the quality of fleeces.

The net result is that 29,888½ pounds of wool were graded and shipped to Boston for storage until such time as the market

would warrant its sale. So far as the net returns are concerned, a more inopportune time could not have been selected for starting such a project.

Already tentative plans are under way with the federal bureau of markets to furnish a wool grader for the coming season, and carry on the educational work of establishing in the minds of wool growers the difference in quality of the various fleeces, with the ultimate object that they may regulate their product by careful breeding.

Grain Grading.

At the annual meeting of the farmers' unions of Maine attended by over one hundred managers and other officials of local unions, the grain division of the federal bureau of markets sent two men with all the paraphernalia for demonstrating the United States grain standards as applied to corn and oats. Mr. Wallace and Mr. Hammer of Boston, who put on this demonstration, explained the advantages of being able to buy a car in the west of a certain grade with the assurance that if the same car arrives in the east off grade a satisfactory adjustment can be made where United States inspection has been had. Otherwise, a severe loss may result. It is undoubtedly a fact that many cars of number five grain have passed in this State as grade two or three because of ignorance or inability to obtain an inspection. The regular service of a grain inspector at Portland would mean a material saving to the dealers and consumers of this State.

In conclusion, it may be well to take up with the federal bureau the work already accomplished in Maine under the co-operative arrangement with a view to extending the scope of the arrangement, and possibly receiving more financial assistance from the federal government. Better market news service would be appreciated by the citizens of Maine, and this could be obtained only by a national service which might very appropriately come through our co-operative plan already established. Cordial relations and co-operation have been enjoyed with the extension service of the university of Maine and all other organizations looking to better agriculture, and to their help is largely due the successful progress of the past year.

Respectfully submitted,

C. M. WHITE,

Chief, Division of Markets.

REPORT OF THE DIRECTOR OF THE DIVISION OF INSPECTION ON THE ENFORCEMENT OF THE PURE FOOD LAW.

To the Hon. Edward E. Philbrook, Acting Commissioner of Agriculture:

I respectfully submit to you my report of the work covered by the division of inspection for the year 1920.

As outlined by the statute, the work of the division of inspection has consisted in the enforcement of the law regulating the sale of agricultural seeds, commercial feeding stuffs, commercial fertilizer, drugs, foods, fungicides and insecticides, including the duties involved by the annual registration required for commercial feeding stuffs, commercial fertilizer, fungicides and insecticides, also the enforcement of the weights and measures law and the enforcement of the law regulating the packing and grading of apples.

The work for the year 1920 has been marked by a few new activities, the enforcement of the new seed law which became effective July 1, 1919, by the application of a new clause added to the fertilizer law providing for a statement of nitrogen in the manufacturer's certificate and on the label of the package.

The passage by the last legislature of a statute requiring a health officer in every town, has added to the efficiency of enforcing health measures and a lot of co-operative work has been done by inspectors of the division and the health officers in various cities and towns and thus the scope of the inspection work has been greatly broadened.

The usual inspection of seeds began early in the spring and the collection of samples was continued until past planting time.

The inspection of feeding stuffs and the collection of samples was conducted for about nine months of the year.

The usual number of fertilizer samples were obtained during the spring months, 321 towns and cities having been visited at least once, and many several times.

Almost constant inspection has been given in the three largest cities of the State, in food and drug matters, where inspectors of the department have co-operated with the health officers. At least 685,000 of the total population of 768,014 have been afforded protection by inspection of their food supply.

In the preparation of this report, we have endeavored to observe brevity, giving just the barest outline of the work involved in the registration of feeding stuffs, fertilizers, fungicides and insecticides, the collection of samples, interpretation of analyses, and the settlement of all cases against violators.

A more detailed account is given in the various official inspections which contain the results of analyses of the samples of various commodities collected.

In conclusion please accept my thanks for your kind advice, wise counsel and hearty co-operation in the administration of affairs assigned to me.

Respectfully submitted,

A. M. G. SOULE,

Director, Division of Inspection.

REPORT OF DEPUTY STATE SEALER OF WEIGHTS AND MEASURES.

To A. M. G. Soule, Director of the Division of Inspections:

As deputy State sealer of weights and measures, I respectfully submit to you the eighth annual report of the work done by this Bureau.

Competition in all lines of trade at present and during the past few years has been of the keenest type. The small dealer is mainly affected through the price conditions which prevail throughout the nation. The chain stores, operated by large companies with capital which enables them to purchase to advantage, naturally comprise their main competitor with which they have to contend. He, therefore, is sometimes tempted to "take chances" giving short weight and measures in his endeavor to meet the prices fixed by these companies. Dishonest merchants, however large or small, invariably learn that questionable methods do not pay. Therefore, it can be readily understood why we are under the necessity of exercising a strict watch in our everyday operations to offset such conditions as arise from this source.

This department cannot and does not favor the small dealer in allowing him to deviate from the provision of the law. We can and do devote much of our time to his large competitor. We cannot regulate competition, but we can and do see that all alike comply with the law. The policy of the department is strict impartiality and this principle is followed to the letter in its treatment of merchants of all classes and our activities are not confined strictly to cities but the small sections as well.

In the majority of districts throughout the State, the work accomplished by the local sealers of weights and measures is commendable. They have done everything possible to have the trader and the buyer understand that the work which they

do is for each others benefit, and an honest person wants nothing more than what he pays for.

As we have said before, we hope that the time will soon come when the fee system will be done away with and that all sealers will be paid per diem. Then we will be able to able to retain the sealers in office when they know that it will be some inducement for them to do the work. You cannot expect sealers to drive four and five miles to test perhaps not more than one scale where the fee for same would not be more than twenty-five or thirty cents. Some sealers have anywhere from four to five towns which they are sealer for and it would not be reasonable to expect them to do the work unless they could make day pay.

Early last spring the department of weights and measures met with a great loss in the death of Hon. John A. Roberts, who was State sealer. He was a firm believer in the weights and measures law and a true friend to the State sealers' association, always ready to give advice and help in every way possible.

At the last regular session of legislature a law was enacted that no scales or measuring devices of any description should be sold, or offered for sale, without the approval of the national bureau of standards at Washington.

In the past year we have had a large number of hearings in regard to short weight on different commodities including coal, coke and ice. A great many of the cases have been settled out of court by putting the parties on probation and keeping strict watch over them. However, where we have found that in our judgment it was intentional on the part of the seller to give short weight, we have had them before court.

During the past summer I made an inspection of quite a number of slaughter houses and found the owners using steelyards and scales which had never been tested by the local sealers and found to be incorrect. I ordered them to purchase new scales if they wished to continue in business. The houses for the most part were in out of the way places, which must have been the reason for the sealers neglecting to test them.

Also found quite a number of portable scales and wagon scales which by use for a great many years without having anything done to them had become incorrect by wear and rust. The only thing needed to be done was to send them to the factory and have them put in order. Most of the parties owning said scales were glad to know what to do in regard to having their scales correct, because as a rule where scales are incorrect they work against the seller. The principle of scales is friction and when the pivots become dull or the loops cut it takes more to turn them, therefore the buyer gets more than he should have. You can readily see the vital importance for the seller as well as for the buyer to have scales that are correct, as no honest person should want anything more than what he is entitled to.

On October 27th and 28th the fourth annual convention of the local sealers of this State was held in Portland and there were many present.

The officers of the State sealers association are: Daniel J. Mooney, Brewer, president; Charles W. Jack, Richmond, vice-president; Augustus F. Bove, Portland, secretary; A. Van Derkerchoven, Bethel, treasurer.

In connection with this report you will find a tabulated report of each county of the work done by the local sealers, which represents between four and five hundred cities and towns and which gives the number of scales, weights and measures which have passed inspection, also the number which have been condemned.

Scales condemned 411, weights 267, dry measures 24, liquid measures 110, yard sticks 59, automatic pumps 51, and milk jars 126. These figures show how we are trying to protect the public from getting short weight and measure and as I have said before if the pubic would co-operate with the sealers in their respective towns it would be much easier to prevent the dishonest merchant from doing business.

In conclusion, I wish to thank you for your good advice and hearty co-operation in all matters pertaining to the work done by the department of weights and measures.

Respectfully submitted,

LEVI S. PENNELL,

State Deputy Sealer.

SUMMARY.

Counties.	Number Tested.							Number Condemned.							Adjusted.		
	Scales.	Weights.	Dry Measures.	Liquid Measures.	Yard Sticks.	Automatic Pumps.	Milk Jars.	Scales.	Weights.	Dry Measures.	Liquid Measures.	Yard Sticks.	Automatic Pumps.	Milk Jars.	Automatic Pumps.	Scales.	Weights.
Androscoggin Co.	1,120	1,538	71	384	109	197	50	11	1	–	–	–	1	–	1	1	–
Aroostook Co.	979	1,146	225	384	133	294	1,286	23	11	9	27	11	1	33	2	–	1
Cumberland Co.	2,548	3,823	273	687	122	372	864	207	9	2	15	22	17	74	–	1	1
Franklin Co.	377	350	25	141	33	117	148	6	–	–	1	–	–	1	–	–	–
Hancock Co.	736	1,163	116	514	52	160	314	18	2	–	25	3	5	–	–	–	–
Kennebec Co.	818	1,293	45	359	32	207	451	23	10	–	3	8	1	–	–	–	–
Knox Co.	831	1,553	98	603	77	130	538	29	165	7	7	–	4	12	–	–	–
Lincoln Co.	236	453	38	138	15	41	32	3	–	–	–	1	–	–	–	–	2
Oxford Co.	702	473	73	333	63	224	612	7	–	–	3	–	–	–	–	–	–
Penobscot Co.	1,433	2,576	180	927	114	454	93	19	6	5	4	–	1	2	2	4	–
Piscataquis Co.	147	289	6	43	9	30	–	–	–	–	–	–	–	–	–	–	–
Sagadahoc Co.	314	478	37	75	20	60	136	27	9	1	9	6	5	4	–	–	–
Somerset Co.	597	898	102	331	46	161	–	11	50	–	14	6	10	–	–	–	–
Waldo Co.	544	470	16	352	34	199	–	–	4	–	–	1	–	–	–	–	3
Washington Co.	715	1,297	213	460	89	221	–	15	–	–	1	1	1	–	–	–	–
York Co.	1,063	2,326	192	354	88	239	4,015	12	–	–	1	–	5	–	–	–	–
	13,160	20,126	1,710	6,085	1,036	3,106	8,539	411	267	24	110	59	51	126	5	6	7

STATISTICS OF AGRICULTURAL SOCIETIES

OFFICERS OF AGRICULTURAL SOCIETIES.

NAME OF SOCIETY	President	P. O. Address	Secretary	P. O. Address	Treasurer	P. O. Address
Maine State Agricultural Society	Dr. A. M. Garcelon	Lewiston	J. S. Butler	Lewiston	T. F. Callahan	Lewiston
Eastern Maine State Fair	Albert E. Bass	Bangor	A. B. Peckman	Bangor	E. E. Piper	Bangor
Central Maine Fair	Frank E. Haines	Waterville	R. M. Gilmore	Waterville	Wm. A. Knauff	Waterville
Maine State Pomological Society	A. C. Macomber	Dryden	E. L. White	Bowdoinham	T. E. Chase	Buckfield
Maine State Poultry Association	E. E. Philbrook	Portland	John F. Tilton	Woodfords	F. H. Jordan	So. Portland
Androscoggin County	John Look	North Jay	Chas D. Dyke	Livermore Falls	Geo. W. Dykes	Livermore Falls
Androscoggin, Greene Town Fair Association	L. C. Mendall	Greene	E. B. Sanderson	Greene	J. C. Wood	Greene
Androscoggin Leeds Agricultural Association	E. F. Addition	Greene	H. W. Lincoln	Leeds Center	W. B. House	Leeds Center
Androscoggin Valley	W. W. Rose	Canton	Henry Richards	Canton	A. F. Russell	Canton
Aroostook County	Edgar W. Russ	Caribou	Frank Riley	Caribou	Frank Riley	Caribou
Aroostook, Houlton	Geo. H. Benn	Hodgdon	Dr. E. P. Henderson	Houlton	A. E. Carter	Houlton
Aroostook, Northern Maine Fair Association	J. Frank Guion	Preque Isle	E. T. McGlauflin	Presque Isle	John E. Bishop	Presque Isle
Cumberland, Bridgton	C. H. Cook	Bridgton	H. W. Jones	Bridgton	J. T. Bardsley	Bridgton
Cumberland County	Chas. W. Chaplin	Gorham	F. E. Moulton	Cumberland Center	H. C. Palmer	Gorham
Cumberland Farmer's Club	F L. Haskell	So. Windham, R. F. D.	Willard Wilson	Cumberland Center	Willard Wilson	Cumberland Center
Cumberland, Freeport Poultry Association	C. I. Davis	Waterville	L. G. Cushing	Freeport	L. E. Curtis	Freeport
Cumberland, New Gloucester and Danville	Fred M. Furbush	Auburn	L. A. McKnight	Auburn, R. F. D. 7	C. H. Nelson	New Gloucester, R. F. D. 1.
Franklin County	Bert H. Farrington	Dryden, R. F. D.	G. M. Hatch	New Vineyard, R. F. D.	Charles H. Pierce	Farmington
Franklin, North	Bion King	Phillips	Otto A. Badger	Phillips	F. E. Parker	Phillips
Hancock County	Fred Allen	North Sedgewick	A. S. Witham	Bluehill	M. R. Hinckley	Bluehill
Hancock, Eden	J. L. Fogg	West Eden	Julien Emery	Salisbury Cove	C. F. King	Salisbury Cove
Hancock, North Ellsworth	Sidney R. Moore	Ellsworth, R. F. D.	Vira C. Ellis	Ellsworth, R. F. D.	John McNamara	Ellsworth, R. F. D.
Kennebec, Cochnewagen	H. H. Witherell	Monmouth	W. E. Reynolds	Monmouth	C. H. Berry	Monmouth
Kennebec County	Ellsworth E. Peacock	Readfield	EllsworthE.Peacock	Readfield	Fred A. Walker	Readfield
Kennebec, South	Leslie B. Hisler	Coopers Mills	Arthur N. Douglass	Gardiner ,R. F. D.	Jasper S. Gray	Windsorville
Knox, North	W. E. Perry	Union	H. L. Grinnell	Union	George C. Hawes	Union
Lincoln, Bristol	G. A. Huston	Damariscotta	J. Wilbur Hunter	Damariscotta	C. B. Woodward	Damariscotta
Lincoln County	Geo. D. Pastorius	Newcastle	J. A. Perkins	Nobleboro	E. R. Castner	Damariscotta
Oxford County	L. E. McIntire	Ea. Waterford	W. O. Frothingham	South Paris	W. O. Forthingham	South Paris
Oxford, North	Young A. Thurston	Andover	John F. Talbot	Andover	Fred A. Milton	Andover
Oxford, West	C. W. Farrington	Fryeburg	Benj. T. Newman	Fryeburg	A. D. Merrill	Fryeburg

Oxford, Western Maine Poultry Association	H. E. Lovejoy	Norway	E. P. Crockett	South Paris	D. H. Bean	South Paris
Penobscot, Bangor Poultry Association	Wm. H. Northrup	Bangor	Harry I. Bolton	Bangor	Harry I. Bolton	Bangor
Penobscot, North	C. M. Lombard	Springfield	I. R. Averill	Prentiss	J. C. Butterfield	Springfield
Penobscot, West	E. M. Atkins	Dexter, R. F. D.	E. E. Colbath	Exeter	F. C. Barker	Exeter
Sagadahoc Agricultural and Horticultural Society	H. E. Peterson	Brunswick	E. C. Patten	Topsham	I. R. Morrell	Brunswick
Sagadahoc, Richmond Farmer s Club	B. L. Ludwig	Richmond	N. H. Shelton	Richmond	E. N. Stewart	Richmond
Somerset Central	Geo. H. Plummer	Skowghegan	John H. Lancaster	Skowhegan	John W. Fogler	Skowhegan
Somerset, East	R. J. Goodrich	Pittsfield	H. H. Coston	Pittsfield	H. H. Coston	Pittsfield
Somerset, Embden	Harlon Boynton	Solon	Chester K. Williams	North Anson	Fred C. Ward	Solon
Somerset, Four County Fair Association	A. H. Burse	Pittsfield	Nellie Burse	Pittsfield	James Halliday	Pittsfield
Somerset, Harmony Grange Fair Association	F. A. Pattee	Harmony	J. L. Johnson	Harmony	W. S. Bemis	Harmony
Somerset, Madison	Mark Gray	Anson	J. Frank Withee	Madison	Walter G. Hilton	Anson
Somerset, Solon	A. C. Heald	Solon	Joseph Matson	Solon	John McCollar	Solon
Somerset, Wesserunsett Valley Fair Association	Harvey D. Eaton	Waterville	Harry N. Flanders	Athens	J. E. Chapman	Athens
South Berwick Poultry Association	Chas. N. Harvey	South Berwick	Ralph E. Foss	South Berwick	Ralph E. Foss	South Berwick
Waldo and Penobscot	J. W. Nickerson	Swanville	F. H. Putnam	Monroe	Frederick M. Nickerson	Frankfort
Waldo, New Belfast Fair	Miles Jellison	Belfast	H. C. Buzzell	Belfast	J. Frank Parker	Belfast
Waldo, Tranquility Grange Agricultural Society	W. A. Young	Lincolnville	I. O. Fugley	Lincolnville	H. A. Miller	Lincolnville
Waldo, Unity Park Association	C. A. Plummer	Unity	J. H. Averill	Unity	J. H. Averill	Unity
Washington, Cherryfield	Wm. G. Means	Machias	W. G. Means, Jr	Machias	Wm. G. Means	Machias
Washington, Machias Valley	Wm. G. Means	Machias	F. S. Ames	Machias	Wm. G. Means	Machias
Washington, West	R. M. Allen	Columbia Falls	W. S. Coffin	Harrington	S. H. Allen	Columbia Falls
York, Cornish	Wm. R. Copp	Cornish	Leon M. Ayer	Cornish	Samuel G. Sawyer	Cornish
York, Shapleigh and Acton	Guy R. Thyng	Waterboro	Fred K. Bodwell	Acton	Lawrence Staples	Shapleigh

FINANCES

Name of Society.	Amount received from State.	Receipts for membership.	Receipts from loans.	Entry fees for poultry.	Receipts from entry fees for trotting purses.	Receipts from all other sources.	Total receipts.
Maine State Agricultural Society	$2,500.00	$740.00	$4,000.00	-	$1,835.00	$35,915.51	$44,990.51
Eastern Maine State Fair	1,750.00	20.00	-	-	1,467.50	40,190.35	43,427.85
Central Maine Fair	2,500.00	-	2,900.00	-	1,510.50	26,963.14	33,873.64
Maine State Pomological Society	1,994.66	70.00	197.98	-	-	1,380.25	3,642.89
Maine State Poultry Association	931.39	94.00	1,200.00	$674.45	-	1,318.50	4,218.34
Androscoggin County	150.65	-	-	-	-	1,662.35	1,813.00
Androscoggin, Greene Town Fair Association	36.43	-	-	-	-	219.81	256.24
Androscoggin, Leeds Agricultural Association	60.05	-	-	-	-	423.20	483.25
Androscoggin Valley	174.52	5.00	-	-	510.00	1,558.88	2,248.40
Aroostook County	281.72	-	-	-	1,840.00	11,870.32	14,002.04
Aroostook, Houlton	1,101.60	-	3,200.00	-	192.00	18,867.75	23,391.35
Aroostook, Northern Maine Fair Association	1,987.67	38.00	-	-	3,005.00	38,617.15	43,647.82
Cumberland, Bridgton	186.04	-	-	-	1,030.00	2,033.80	3,249.84
Cumberland County	630.97	80.00	-	-	328.00	9,970.72	11,009.69
Cumberland Farmers' Club	-	-	-	-	-	-	-
Cumberland, Freeport Poultry Association	462.59	21.00	400.00	324.00	-	191.50	1,399.09
Cumberland, New Gloucester and Danville	107.84	-	-	-	120.00	1,119.10	1,346.94
Franklin County	768.53	1,274.50	500.00	-	1,085.25	10,128.89	13,757.17
Franklin, North	128.62	394.50	550.00	-	192.50	591.27	1,856.89
Hancock County	306.11	-	-	-	210.00	2,922.74	3,438.85
Hancock, Eden	59.76	-	-	-	135.00	1,731.31	1,926.07
Hancock, North Ellsworth	42.30	5.00	-	-	-	291.25	338.55
Kennebec, Cochnewagen	120.50	-	-	-	-	387.64	508.14
Kennebec County	250.04	40.00	192.00	-	.42	765.00	1,247.46
Kennebec, South	125.02	20.00	-	-	-	1,838.41	1,983.43
Knox, North	185.26	45.00	-	-	6.00	4,802.28	5,038.54
Lincoln, Bristol	39.18	.75	-	-	-	247.79	287.72
Lincoln County	83.68	2.00	700.00	-	-	418.65	1,204.33
Oxford County	1,195.17	24.00	-	-	715.00	11,098.68	13,032.85
Oxford, North	239.03	2.00	50.00	-	200.00	1,444.90	1,935.93

Oxford, West	744.80	116.00	-	-	80.00	5,310.33	6,251.13
Oxford, Western Maine Poultry Association	452.67	-	-	-	-	-	452.67
Penobscot, Bangor Poultry Association	606.66	32.00	700.00	536.75	-	2,250.00	4,125.41
Penobscot, North	110.87	-	-	-	560.00	1,540.00	2,210.87
Penobscot, West	590.92	19.00	-	-	480.00	3,668.04	4,754.96
Sagadahoc, Agricultural and Horticultural Society	1,068.51	110.00	-	-	1,300.00	15,288.69	17,767.20
Sagadahoc, Richmond Farmers' Club	35.50	2.50	-	-	-	193.80	231.80
Somerset, Central	405.53	50.00	-	-	290.00	8,024.14	8,769.67
Somerset, East	211.81	-	2,000.00	-	111.50	1,788.85	4,112.16
Somerset, Embden	27.91	-	-	-	-	73.75	101.66
Somerset, Four County Fair Association	348.94	-	-	-	-	3,542.33	3,891.27
Somerset, Harmony Grange Fair Association	47.77	-	-	-	-	-	47.77
Somerset, Madison	67.98	-	15.00	-	376.50	1,071.06	1,530.54
Somerset, Solon	112.83	-	-	-	-	282.85	395.68
Somerset, Wesserunsett Valley Fair Association	54.85	-	-	-	-	972.43	1,027.28
South Berwick Poultry Association	-	26.00	-	-	-	243.83	269.83
Waldo and Penobscot	285.13	-	1,616.21	-	420.00	1,732.08	4,053.42
Waldo, New Belfast Fair	164.94	90.00	-	-	813.50	3,792.53	4,861.00
Waldo, Tranquility Grange Agricultural Society	31.73	-	-	-	-	113.60	145.33
Waldo, Unity Park Association	77.96	-	-	-	400.00	719.50	1,197.46
Washington, Cherryfield	-	-	-	-	-	3,990.00	3,990.00
Washington, Machias Valley	167.03	-	-	-	-	4,490.00	4,657.03
Washington, West	113.90	-	-	-	-	-	113.90
York, Cornish	334.96	-	300.00	-	450.00	5,676.63	6,761.59
York, Shapleigh and Acton	119.52	245.00	60.00	-	-	67.75	492.27
	$24,592.08	$3,566.25	$18,581.19	$1,535.20	$19,663.67	$293,833.33	$361,771.72

FINANCES - CONCLUDED.

NAME OF SOCIETY	Amount expended in improvements.	Amount expended in trotting purses.	Expenses during the fair.	Amount expended for purposes not named above.	Total amount paid out including premiums and gratuities.	Value of property belonging to the society.	Amount of liabilities.
Maine State Agricultural Society	$2,500.00	$5,265.00	$8,603.54	$28,269.20	$49,358.04	$83,450.00	$28,300.00
Eastern Maine State Fair	647.13	4,995.00	4,710.21	31,929.83	46,699.67	27,710.75	21,649.68
Central Maine Fair	2,022.03	4,734.00	12,972.38	2,862.52	28,131.80	25,000.00	20,000.00
Maine State Pomological Society	-	-	1,075.79	1,299.84	3,382.38	2,370.00	-
Maine State Poultry Association	2,112.86	-	1,154.13	-	4,684.08	2,500.00	1,666.74
Androscoggin County	-	600.00	-	710.00	1,798.50	-	-
Androscoggin, Greene Town Fair Association	-	-	-	140.45	234.80	-	-
Androscoggin, Leeds Agricultural Association	-	-	210.07	-	359.52	-	-
Androscoggin Valley	200.00	1,275.00	500.00	-	2,467.50	3,500.00	2,850.00
Aroostook County	2,836.56	4,600.00	6,749.76	-	15,103.72	25,000.00	21,000.00
Aroostook, Houlton	-	4,722.70	10,893.02	7,461.75	25,620.32	25,372.15	8,000.00
Aroostook, Northern Maine Fair Association	11,220.71	7,000.00	9,100.38	13,454.47	45,341.46	75,000.00	16,000.00
Cumberland, Bridgton	200.00	1,800.00	536.45	560.00	3,658.20	4,100.00	500.00
Cumberland County	500.00	3,100.00	5,692.53	-	11,166.53	8,000.00	-
Cumberland Farmers' Club	-	-	-	-	-	1,000.00	-
Cumberland, Freeport Poultry Association	200.00	-	235.02	-	1,153.52	900.00	400.00
Cumberland, New Gloucester and Danville	336.38	450.00	404.69	4.64	1,640.76	2,500.00	524.65
Franklin County	1,680.36	2,600.00	4,738.34	1,779.68	12,727.58	28,000.00	-
Franklin, North	100.00	550.00	40.00	12.00	947.30	1,950.00	550.00
Hancock County	485.32	760.00	2,207.86	216.25	4,120.13	1,000.00	-
Hancock, Eden	379.36	420.00	588.52	-	1,543.33	2,500.00	115.00
Hancock, North Ellsworth	94.71	65.00	238.87	40.00	619.98	500.00	-
Kennebec, Cochnewagen	-	-	39.04	94.45	498.34	-	-
Kennebec County	-	-	440.67	-	1,205.42	1,000.00	192.42
Kennebec, South	-	497.50	403.65	697.32	1,853.17	1,500.00	-
Knox, North	461.85	596.00	1,156.35	860.27	3,585.67	1,500.00	-
Lincoln, Bristol	-	-	131.11	-	189.36	1,200.00	-
Lincoln County	625.25	20.00	370.41	204.75	1,378.33	4,500.00	3,700.00
Oxford County	924.15	1,950.00	2,841.71	1,974.11	10,426 01	120,000.00	3,800.00
Oxford, North	250.00	550.00	94.00	110.00	1,589.00	-	-

Oxfords, West	-	-	-	4,448.49	6,085.28	-	-
Oxford, Western Maine Poultry Association	-	-	-	-	-	500.00	-
Penobscot, Bangor Poultry Association	100.00	-	635.32	-	1,989.32	1,000.00	700.00
Penobscot, North	100.00	1,400.00	826.90	1,047.20	3,601.00	5,000.00	-
Penobscot, West	640.20	1,300.00	703.50	296.80	4,386.55	5,000.00	3,400.00
Sagadahoc, Agricultural and Horticultural Society	1,000.00	2,500.00	1,569.00	5,190.69	12,953.15	10,000.00	-
Sagadahoc, Richmond Farmers' Club	-	-	67.00	-	177.05	-	-
Somerset, Central	950.00	1,074.00	1,800.00	4,990.38	10,135.88	10,000.00	4,200.00
Somerset, East	100.00	706.49	510.39	2,631.40	4,478.43	2,500.00	1,800.00
Somerset, Embden	-	-	-	12.80	76.80	5.00	-
Somerset, Four County Fair Association	500.00	890.00	898.38	577.04	3,891.27	9,026.74	5,468.35
Somerset, Harmony Grange Fair Association	-	-	-	-	-	-	-
Somerset, Madison	39.90	900.00	139.93	208.15	1,453.03	1,200.00	738.00
Somerset, Solon	20.45	-	65.82	-	321.27	-	-
Somerset, Wesserunsett Valley Fair Association	136.48	-	122.30	88.45	510.23	75.00	-
South Berwick Poultry Association	-	-	278.11	-	403.86	182.51	134.03
Waldo and Penobscot	269.90	1,200.00	470.17	650.00	3,966.17	4,000.00	2,469.75
Waldo, New Belfast Fair	2,150.00	1,554.50	740.00	383.51	5,194.08	4,000.00	90.00
Waldo, Tranquility Grange Agricultural Society	-	-	6.64	.25	103.09	-	-
Waldo, Unity Park Association	84.00	1,000.00	163.50	-	1,685.37	-	50.08
Washington, Cherryfield	1,455.00	1,650.00	560.00	-	3,873.57	1,316.43	-
Washington, Machias Valley	760.00	2,150.00	2,920.00	-	6,137.16	-	1,340.00
Washington, West	-	-	-	-	-	1,926.00	1,500.00
York, Cornish	500.00	1,800.00	1,600.00	2,226.63	6,883.58	4,500.00	330.00
York, Shapleigh and Acton	-	-	87.80	-	388.47	2,000.00	-
	$36,582.66	$64,675.19	$90,263.26	$115,433.32	$360,179.03	$412,284.58	$151,468.70

ANNUAL REPORT

OF THE

State Pomological Society

1920

MAINE STATE POMOLOGICAL SOCIETY.

OFFICERS FOR 1920.

President

A. C. MACOMBER — Dryden

Vice-Presidents

N. D. STANLEY — Pittsfield
W. G. CONANT — Hebron

Secretary

E. L. WHITE — Bowdoinham

Treasurer

T. E. CHASE — Buckfield

Executive Committee

THE PRESIDENT, FIRST VICE-PRESIDENT, SECRETARY AND TREASURER, ex-officio

W. C. ROBINSON — N. Anson
F. H. DUDLEY — Augusta
E. W. DOLLOFF — Standish

TRUSTEES FOR 1920.

Androscoggin County—Arch D. Leavitt, — Turner
Cumberland County—E. W. Dolloff, — Standish
Franklin County—J. E. Collins, — Farmington
Hancock County—C. L. Morang, — Ellsworth
Kennebec County—Clement & Taylor, — Winthrop
Knox County—Frank H. Lenfest, — Union
Lincoln County—W. C. Ford, — Whitefield
Oxford County—W. H. Conant, — Buckfield
Penobscot County—Ernest Page, — East Corinth
Piscataquis County—Lyman K. Lee, — Foxcroft
Sagadahoc County—R. A. Douglass, — Bowdoinham
Somerset County—W. C. Robinson, — North Anson
Waldo County—C. C. Clements, — Winterport
Washington County—Millard H. Wiswell, — East Machias
York County—C. E. Felch, — Limerick

LIFE MEMBERS.

Allen, W. H.....Buckfield
Andrews, Charles E.....Auburn
Atherton, Wm. P.....Hallowell
Atkins, Charles G.....Bucksport
Averill, David C.....Temple
Barrows Greenhouse Co.....Gorham
Bearce, Harry W.....Hebron
Bennoch, John E.....Orono
Bickford, Lewis I...Dixmont Center
Bisbee, George E.....Auburn
Bisbee, Stanley.....Rumford Falls
Blaisdell, A. L.....Winterport
Blossom, O. E.....Turner Center
Bowman, H. G.....Hebron
Bradbury, Mrs. Bert..Buxton Center
Briggs, John .....Turner
Brown, F. Howard..Marlboro, Mass.
Brunberg, A. E.....Camden
Buck, O. C.....Hebron
Burleigh, Miss Clara M..Vassalboro
Butler, Charles Henry....Wiscasset
Butler, Charles M.....Wiscasset
Butler, Alonzo .....Union
Butman, J. W.....Readfield
Chadbourne, C. L....North Bridgton
Chandler, Mrs. Lucy A....Freeport
Chase, Henry M.,
103 Federal St., Portland
Chase, Homer N.....Auburn
Chase, Thomas E.....Buckfield
Clement, D. S.....Winthrop
Clements, C. C.....Winterport
Conant, A. A.....Hebron
Conant, E. E.....Hebron
Conant, George I.....Hebron
Conant, H. L.....Hebron Station
Conant, W. H.....Buckfield
Conant, W. G.....Hebron
Corbett, Herman .....Farmington
Cottle, A. S.....R. 37, Waterville
Crowell, Mrs. Ella H....Skowhegan
Crowell, John H.....Farmington
Cummings, Marion L.....Hebron
Dana, Woodbury S.....Westbrook
Dawes, S. H.....Harrison
Dearborn, Hall C.,
Hampden Highland
DeCoster, Virgil P.....Buckfield
Dennison, Mrs. Cora M....Harrison
DeRocher, Peter...Bradentown, Fla.
Dirwanger, Joseph A.....Portland
Dodge, Mrs. Lucy T.....Orono
Dolloff, E. W.....Standish
Douglass, C. S.....Douglass Hill
Dunham, W. W.....North Paris
Emerson, Charles L...South Turner
Emery, Ralph B.....Springvale
Farnsworth, B. B.....Portland
Farrington, Mrs. G. H.....Brewer
Felch, Charles E.....Limerick
Fish, Mrs. Benjamin.....Winterport
Flint, John M.....West Baldwin
French, H. C.....Rumford Center
Gardiner, Robert H.....Gardiner
George, C. H.....Hebron
Goddard, Lewis C.....Woodfords
Goding, M. T.,
50 St. Lawrence St., Portland
Graves, Grace A.....Augusta
Grover, Franklin D.....Bean
Gulley, Alfred G.....Storrs, Conn.
Gurney, F. E.....Hebron
Hackett, E. C.....West Gloucester
Hall, Mrs. H. A.....Brewer
Hardy, E. E.....Farmington
Hardy, Walter M.....Brewer
Hayes, William .....Gardiner
Heald, U. H.....Paris
Herrick, A. A.....Norway
Higgins, Forrest L.....Standish
Hinds, W. C.....Winthrop
Hitchings, E. F.....Orono
Hoyt, C. E.....New Portland
Hoyt, Mrs. Frances.....Winthrop
Jones, Elwyn .....Dryden
Jackson, F. A.....Winthrop
Jewett, Glen A.....Head Tide
Keene, Charles S.....Turner
Keyser, Howard L.....Greene
Lang, Ivan E.....Augusta
Lapham, E. A.....Pittston
Leavitt, L. C.,
322 West St., Biddeford
Lee, Lyman K.....Foxcroft
Lincoln, E. L.....Wayne
Litchfield, J. H.....Auburn
Littlefield, Harry W.....Brooks
Lombard, Thurston M.....Auburn
Lord, J. Merrill.....Kezar Falls
Luce, Willis A.....Mabton, Wash.
Macauley, T. B.....Montreal, Can.
Martin, John J.,
270 Center St., Bangor
McAllister, Zaccheus....West Lovell
McCabe, George L....North Bangor
McLaughlin, Mrs. Edna G....Exeter
McLaughlin, Henry .....Bangor
Merrill, H. H.....Hebron
Merrill, Oliver F.....Gardiner
Merrill, Rupert B.....Gardiner
Millspaugh, L. H.....Winthrop
Minot, Clarence M.,
426 Summer St., So. Portland
Mitchell, Frederick H.....Turner
Mitchell & Co.....Waterville
Moody, Charles H.....Turner
Moody, J. F.....Hebron
Moore, William G.....Monmouth
Moor, F. A.....Waterville
Morse, F. H.....Waterford
Morse, W. J.....Orono
Mosher, C. M.....Wilton
Nason, E. A.....Mechanic Falls
Newell, G. E.....Turner
Page, E. E.....East Corinth
Page, F. W.....Augusta
Palmer, George L.....Kent's Hill
Parsons, Howard G...Turner Center
Patten, Mrs. E. C.....Topsham
Pingree, Arthur E.....Wiscasset
Prince, Edward M...W. Farmington
Pope, Charles S.....Manchester
Pulsifer, D. W.....Poland
Ramsdall, E. H.....Ripley
Rich, N. H.....Charleston
Richards, John T.....Gardiner
Richardson, Herbert A.,
82 Best St., Woodfords
Ricker, A. S.....Turner
Ricker, Fred P.....Turner
Roak, George M.....Auburn
Robinson, W. C.....North Anson
Rogers, Mrs. Jeanette,
North Newburg
Sawyer, Andrew S...Cape Elizabeth
Sawyer, Charles F.....Hebron
Saunders, Ernest .....Lewiston
Seavey, Mrs. G. M.....Auburn
Skillings, C. W.....North Auburn
Smith, Frederick O...New Vineyard
Smith, V. N.....Buckfield
Stanley, H. O.....Winthrop
Stanley, N. D.....Pittsfield

Staples, George W.,
904 Main St., Hartford, Conn.
Stilphen, Asbury C.. .....Gardiner
Strout, Charles S.....Biddeford
Supt. Maine Sanatorium Farm,
Hebron
Sweetser, F. R..Cumberland Center
Taylor, Miss L. L. (Lakeside)
Belgrade
Taylor, Frank H.....Winthrop
Thomas, William W.....Portland
Thomas, D. S.....North Auburn
Thurston, Edwin..West Farmington
Townsend, Mrs. B. T.....Freeport
True, John W.....New Gloucester
Twitchell, George M.....Auburn
Verrill, H. E.....Hebron
Verrill, Harry M.....Portland
Vickery, James .....Portland
Walker, Charles S.....Peru
Walker, Elmer V.....Oxford
Waterman, Willard H..East Auburn
Waugh, F. A.....Amherst, Mass.
Wentworth, H. G.....Skowhegan
Weston, Joseph .....Gardiner
Wheeler, Charles E.....Chesterville
White, Charles M.....Bowdoinham
White, Mrs. Annie.....Bowdoinham
White, Edward L.....Bowdoinham
Whitman, L. E.....Hebron
Woods, Charles D.....Orono
Wright, Frederick .....Augusta
Yeaton, George A.....Augusta
Yeaton, Samuel F., West Farmington

ANNUAL MEMBERS, 1920.

Ames, Alfred K.....Machias
Babb, Geo. H.....Sebago
Bradbury, Mrs. Bert.....Buxton
Chenoweth, W. W....Amherst, Mass.
Conant, C. M.....Winterport
Dudley, F. H.....Augusta
Dunn, Charles, Jr.....So. Portland
Jewett, F. E.....Norridgewock
Laughlin, L. B.....Portland
Morton, E. W.,
221 Woodfords St., Portland
Pierce, Arthur W.....Woodfords
Pike, Mrs. Roy L.....Turner
Philbrook, E. E.....Portland
Roberston, R. E.....Westbrook
Sinclair, Will .....Monmouth
Smith, Geo. S.....Monmouth
Staples, L. W.....Bowdoinham
Stewart, H. B.....Fairfield
Sweetser, H. P.....Orono
Young, Geo. C.....Turner
Walker, E. E.....Augusta
Walker, S. W.....East Dixfield

ANNUAL MEETING
OF
MAINE STATE POMOLOGICAL SOCIETY

CITY HALL, PORTLAND, NOVEMBER 19, 1920.

The meeting was called to order by the president and the following reports were heard:

ADDRESS BY PRESIDENT A. C. MACOMBER.

In presenting my annual report, let me first thank the Portland chamber of commerce and the citizens of Portland who have so generously contributed to make this meeting a success, and I also wish to thank the Portland farmers club for their bountiful banquet, and every exhibitor for doing his best to make this show possible.

Since our last annual meeting there have been great changes in all agricultural activities, particularly in horticulture. Some of these have come through the scarcity and high cost of labor, scarcity and high cost of packages, and the increased freight rate. Having these things to contend with, in addition to the immense crop of apples over the country and the small crop in the State of Maine, makes it doubly hard for this State.

Apples from the Pacific slope are selling in the cities and small towns all through the State. This ought not to be so, when we can raise apples in this State far superior to the western apples. We have a splendid apple packing law, but it has not been lived up to. We have not had inspectors enough to look after the apples going out of the State.

The real thing which we must work for is better marketing methods and a better system of distribution. What the pomological society would like to see is a live fruit growers' asso-

ciation in every orchard section of the State. This would eliminate much of the present difficulty in marketing the fruit and would give the growers nearer what belongs to them.

The Maine fruit growers' exchange is doing good work, not only in marketing the fruit for the associations, but in buying their spray material, fertilizers, barrels, spray pumps, etc. The co-operation which has thus been brought about has saved the fruit growers thousands of dollars and through this agency the fruit has sold for better prices.

We have held field meetings in different sections of the State which were largely attended and a keen interest taken in the lectures.

The president appointed George A. Yeaton, Neil Dow Stanley and E. W. Dolloff, a committee on resolutions.

Report of Secretary, E. L. White.

The executive committee have been called together three times during the year.

The meeting at Augusta, January 19th, was for the purpose of reviewing the work of 1919 and making plans for 1920.

At the meeting in Auburn, February 18th, the matter of holding field meetings was talked over and plans were made for four meetings. Plans were also made for the program at our annual meeting and exhibition.

The third meeting was held in Portland, June 29th. The premium list was revised; arrangements were made for our field meetings and it was decided to have five instead of four.

Our first field meeting was held with Mr. Dolloff in Standish. There were about one hundred present.

The second was held in Mr. U. H. Heald's orchard on Paris Hill. We had about seventy-five present.

Our next meeting was held in the orchard of Merle Thompson of Jay. This orchard is situated on one of Maine's hills. We had about fifty present.

Mr. H. G. Wentworth of Skowhegan kindly invited us to his orchard for our fourth meeting. This orchard afforded an opportunity for observing the practice of using a tractor for cultivation. We had one hundred present.

Our fifth meeting was held in Mr. Thaxter Friend's orchard in Etna. Fifty were present.

The speakers at these meetings covered the subjects of cultivation, spraying, pruning and marketing. There was a great deal of interest shown and questions were asked.

These meetings prove to be of great value to the fruit industry of the State.

The fruit industry, like all other agricultural lines in the State, is facing problems never before thought of, which can only be met by the united effort of every farmer in the State.

Respectfully submitted,

E. L. WHITE,

Voted, that the report of the Secretary be accepted.

REPORT OF THE TREASURER.

RECEIPTS.

1920		
Jan. 20,	Cash on hand (as shown in last report)	$ 65.71
Feb. 2,	Rec'd from Bangor chamber of commerce (1919)	500.00
Feb. 5,	Rec'd from State treasurer.....	1,092.86
Mar. 19,	Rec'd one life membership fee	10.00
Apr. 14,	Rec'd from H. M. Tucker (1-3 rent of space) ..	8.00
June 30,	Rec'd interest on liberty bond.....	20.00
July 12,	Rec'd interest on bank stock.....	20.00
Sept. 29,	Rec'd one life membership fee	10.00
Oct. 9,	Rec'd one life membership fee	10.00
Nov. 30,	Rec'd one life membership fee	10.00
Dec. 4,	Rec'd Portland chamber of commerce (1920 show)	785.00
Dec. 6,	Rec'd from State treasurer.....	497.47
Dec. 13,	Rec'd sale of apples	4.75
Dec. 20,	Rec'd one life membership fee	10.00
Dec. 24,	Rec'd interest on bonds	42.50
Dec. 28,	Rec'd from H. M. Tucker (1-3 rent of space) ...	4.24
Dec. 28,	Rec'd annual membership dues.....	22.00
Dec. 28,	Rec'd two life membership fees	20.00
Dec. 30,	Rec'd discounted note	296.94
Jan. 24, 1921.	Rec'd sale of apples	13.00
Total		$3,442.47

PERMANENT FUND INVESTED AS FOLLOWS.

Four shares Farmington Nat'l Bank stock	$ 400.00
Two $500 bonds Stockton Springs Water Co	970.00
One liberty bond	1,000.00
On deposit in savings bank	270.00
	$2,640.00

DISBURSEMENTS.

Order No.		
1	Paid W. C. Robinson—executive committee expense	$ 6.25
2	Paid Economy Printing Co.—printing	6.71
3	Paid W. C. Robinson—executive committee expense	8.75
4	Paid J. P. Hutchinson & Co.—treasurer bond	5.00
5	Paid L. W. Staples—speaker farmers week	10.94
6	Paid W. C. O'Kane—speaker farmers week	44.60
7	Paid A. A. Eastman—speaker farmers week	15.42
8	Paid C. L. Pierce—speaker farmers week	13.71
9	Paid G. A. Yeaton—speaker farmers week	8.77
10	Paid Wallace S. Ladd—printing	4.33
11	Paid A. C. Macomber—expenses, three bills	37.30
12	Paid W. C. Robinson—executive committee expense	7.84
13	Paid T. E. Chase—executive committee expense	7.84
14	Paid T. E. Chase—six months salary and exp. treasurer	19.40
15	Paid F. K. Jack—postage	21.72
16	Paid E. L. White—six months expense	45.52
17	Paid E. L. White—six months salary	75.00
18	Paid N. D. Stanley—executive committee expense, 2 bills	37.05
19	Paid Wallace S. Ladd—printing	7.30
20	Paid J. H. Gourley—speaker field meetings	112.60
21	Paid C. L. Pierce—speaker field meetings	53.28
22	Paid Bastian Bros. Co.—badges for annual meeting	36.29
23	Paid H. P. Sweetser—speaker field meetings	37.40
24	Paid A. K. Gardner—judge annual show	35.76
25	Paid E. F. Hitchings—judge annual show	41.78
26	Paid H. P. Sweetser—judge annual show	10.82
27	Paid Geo. A. Yeaton—judge annual show	45.16
28	Paid Wm. H. Wolff—speaker annual show	46.40
29	Paid S. D. Lincoln—carpenter work and supplies	51.27
30	Paid E. H. Doughty—trucking	82.35
31	Paid S. Seiger—rent of canvas	6.00
32	Paid W. W. Jewett—printing	5.50
33	Paid S. H. & A. R. Doten—lumber	36.66
34	Paid A. L. Tisdale—photographer	4.00
35	Paid E. L. White—six months salary	75.00
36	Paid E. L. White—six months expense	64.60
37	Paid M. C. R. R. freight	11.68

Order No.		
38	Paid Merrymeeting Grange—storage	2.00
39	Paid Falmouth Hotel—officers, speakers, judges, etc., (annual show)	199.60
40	Paid W. W. Chenoweth—speaker annual show	54.66
41	Paid Grant G. Hitchings—speaker annual show	75.63
42	Paid A. A. Conant—apples	46.00
43	Paid Maine fruit growers exchange—apples	95.50
44	Paid T. E. Chase—expenses	24.63
45	Paid J. F. Nealy—watchman city hall	15.00
46	Paid E. W. Dolloff—executive committee expense	12.14
47	Paid A. C. Macomber—executive committee expense	67.93
48	Paid Wilson Stream fruit growers' ass'n—apples	56.00
49	Paid Portland chamber of commerce, four months dues	8.33
50	Paid Evening Express Pub. Co.	10.50
51	Paid Portland News Pub. Co.	6.75
52	Paid Chase Orchards—apples	23.50
53	Paid Premiums—annual show	405.75
54	Paid Premiums annual show—on barrels and boxes	601.00
55	Paid W. C. Robinson—executive committee expense	20.52
56	Paid Eastern Argus Pub. Co.	6.00
57	Paid Maine fruit growers exchange—apples	42.00
58	Paid N. D. Stanley—executive committee expense	10.26
59	Paid Transfer to permanent fund (life fees of 1920)	70.00
60	Paid E. A. Nason—apples	8.00
61	Paid Maine fruit growers exchange—apples	24.00
62	Paid T. E. Chase—six months salary and expenses	16.75
63	Paid Transfer to permanent fund (life fees of 1919)	110.00
64	Paid Organized Farmer of Maine (share of stock)	10.00
65	Paid note at bank	200.00
66	Paid federal dues (2 years)	12.00
67	Paid Shayler Engraving Co., slide used annual show	5.00
68	Paid L. B. Raynes—stenographic work annual show	50.88
	Deduced by bank for revenue stamp on note	.02
		$3,433.19
	Jan. 25, 1921, Cash on hand	9.28
		$3,442.47

Respectfully submitted,

T. E. CHASE,

Treasurer.

Voted to accept the report of the Treasurer.

The president appointed the following as a committee to receive, sort and count ballots: L. K. Lee, H. P. Sweetser, D. S. Clement.

The following officers were elected for 1921:

President, A. C. Macomber of Dryden.

1st vice president, Neal D. Stanley of Pittsfield.

2nd vice president, W. G. Conant of Hebron.

Secretary, E. L. White of Bowdoinham.

Treasurer, T. E. Chase of Buckfield.

Member of executive committee for three years: W. C. Robinson of North Anson.

Member of experiment station council, Wilson H. Conant of Buckfield.

State vice president of American pomological society, George A. Yeaton of Norway.

Vice president of New England fruit show, E. E. Philbrook.

Three delegates to the federation of agricultural associations of this State, A. C. Macomber, W. H. Conant, E. L. White.

It was voted that this society pay the expenses of our representative to the American pomological society to be held at Columbus, Ohio, December 1-3, 1920, and that George A. Yeaton, State vice president of the American pomological society be our representative at said meeting.

It was also voted that in case for any reason Mr. Yeaton should be unable to attend this meeting, the executive committee have authority to appoint a representative to take his place.

It was voted to pass the following resolution: Whereas all the departments of the Maine agricultural experiment station are actively engaged in investigations devoted to apple orcharding in Maine, such as the conduct of fertilizer experiments, orchard disease studies, orchard insect enemy researches, the investigation of the problems which have to do with propagation by root and by seed and studies in the self sterility and cross fertility of the different varieties of apples, which are bringing results of great value to the orchardists of the State; and whereas the station in the attempt to meet the added costs due to the depreciated currency has reduced its staff in its different departments until further reduction would mean the stopping of work in one or more departments; and whereas the station cannot maintain itself at its present reduced efficiency without further financial support, therefore

Be it resolved that the Maine pomological society at its annual meeting hereby declares that the welfare of orcharding demands the continuation of the work of the Maine agricultural experiment station with at least its present efficiency and asks the incoming legislature to carefully study the needs of the experiment station and to make suitable appropriations for the continuation of its researches; and hereby instructs its officers to lose no effort in bringing this matter to the attention of the legislature and exercise every lawful means to insure this needed appropriation for the station.

The committee on inspection offered the following resolution, which is was voted to adopt:

RESOLVED, that the Maine pomological society request the commissioner of agriculture to ask the legislature for an appropriation large enough to make thorough inspection of all packing, sales and shipments under the Maine apple law, and that the executive committee of the society is directed to give the commissioner all assistance in their power for the obtaining of such an appropriation.

REPORT OF COMMITTEE ON RESOLUTIONS.

Whereas, The U. S. government has withdrawn a part of the federal aid in the crop reporting scheme that has been in vogue the past few years, and

Whereas, The members of the Maine State pomological society believe that the crop reports are of real value to the farmers of the State as a whole and that the work should be extended rather than curtailed, and be it

RESOLVED, That this society go on record as favoring an appropriation by the State legislature to assist in defraying the expenses of collecting and dissiminating this information.

Whereas, The Maine State pomological society has been most royally entertained by the City of Portland through the Portland farmers' club, and be it

RESOLVED, That the members of the pomological society heartily appreciate the courtesies and extend a sincere vote of thanks.

(Signed) G. A. YEATON,
NEIL DOW STANLEY,
E. W. DOLLOFF,
Committee.

Voted to accept the same.

REPORT OF W. H. CONANT, MEMBER OF EXPERIMENT STATION COUNCIL FROM THE POMOLOGICAL SOCIETY.

To the State Pomological Society:

As the member of the council of the Maine agricultural experiment station for the current year I submit the following report as covering part of the items of the greatest interest to the society.

There have been three meetings of the council all of which I attended. They covered the work of the station in detail, the reports of the meeting covering about 60 closely written pages involving a very large number of projects.

The work now being extensively carried on with the apple trees at Highmoor farm studying the pollination of the apple is giving remarkable and exceedingly important results from a practical as well as a scientific standpoint.

It has been found that most of the leading varieties of apples grown in Maine are self-sterile. McIntosh, Ben Davis, Rhode Island Greening, Russett, Spy, Duchess and Early Harvest are all self-sterile and will set no fruit when pollinated with pollen from the same tree or with pollen from other trees of the same variety. The Baldwin is slightly self-fertile but for all practical purposes it can be classed as self-sterile. Following are the varieties tested this year for self-sterility:

Ben Davis, 1214 flowers self-fertilized, 9 fruits set.
Baldwin, 1764 flowers self-fertilized, 106 fruits set.
Russett, 917 flowers self-fertilized, no fruit set.
Rhode Island Greening, 95 flowers self-fertilized, no fruit set.
Northern Spy, 618 flowers self-pollinated, no fruit set.
McIntosh, 1025 flowers self-pollinated, 7 fruits set.

It is obvious that if self-sterile varieties are to set fruit they must be pollinated by other varieties. But not all varieties are fertile with each other. Some combinations are fertile while

other combinations are totally sterile. It is, therefore, necessary to determine which varieties are fertile with each other. This is being done at Highmoor farm. This year 4,000 crosses were made and about 6000 flowers were self-fertilized. The work was limited to the leading varieties of Maine because of economic importance. Unfortunately the Rhode Island Greening did not bear this year at Highmoor to any extent and could not be included. Following are the good and poor combinations of apples to plant together. The first variety is to be used as the female. That is, it is to be the main variety in the orchard.

Fertile Combinations.

Ben Davis with Spy, McIntosh and Russett.
Baldwin with Ben Davis, Russett, Spy and McIntosh.
Russett with Ben Davis.
Spy with Ben Davis, Russett and McIntosh.
McIntosh with Ben Davis and Spy.

Sterile Combinations.

Ben Davis with Baldwin.
Russett with Baldwin and McIntosh.
Spy with Baldwin.
McIntosh with Baldwin and Russett.

It will be noted that although Ben Davis set poorly with Baldwin pollen the Baldwin set well with Ben Davis pollen. Here it would be desirable to have only a few trees of Ben Davis with the Baldwin to serve as pollinators because the Bens would set little fruit with Baldwin pollen. Baldwin pollen set very poorly with the other varieties used this year. This is not due to poor pollen because we had a plentiful supply of good Baldwin pollen. The Baldwin used as female set with all other varieties of pollen. This may be the one reason why Baldwin is such a good yielder in New England. The Spy is fertile with many other varieties but is too late in blooming to cross readily with early varieties such as McIntosh. In planting an orchard two things are necessary to insure complete cross-fertilization. First, plant varieties which are cross-fertile with each other and second, plant varieties which have about the same blooming time. In planting varieties together it would be best to plant every

fifth row to a pollinator variety or, if desired, every fourth tree in every fourth row planted to a pollinator would be sufficient.

In case an orchard is already planted to a solid block and does not bear well, it appears logical to top-work part of it to a variety which is cross-fertile with the main block of the orchard. This experiment is being tested at Highmoor farm. One of our Ben Davis orchards has been top-worked with McIntosh which is very fertile with the Ben Davis. Unfortunately this orchard suffered quite heavily in the freeze of two years ago. The experiment should however yield some valuable results.

Experiments have been performed showing that pollen is carried from one tree to another almost entirely by the bee. In one case the petals were removed from all the flowers on a tree and practically no bees visited it. As a result no fruit set. This shows that wind pollination has very little to do in carrying the pollen from tree to tree. Since apple pollen is carried largely by bees it is necessary to place plenty of bees in the orchard. It will pay even though no honey is obtained.

In addition to obtaining data on self and cross sterility, the crossing work provides seedlings of known parentage which may develop into superior varieties for our extreme climate. Practically all of the leading commercial varieties of fruit have originated as seedlings. For instance, the Baldwin was a chance seedling originated by Colonel Baldwin in Massachusetts. The Rhode Island Greening was a chance seedling grown in Rhode Island. The McIntosh, one of our best varieties, originated as a chance seedling in Ontario. It will be noted that the varieties which are best adapted to a locality are, as a rule, originated in that same locality. For instance, the Baldwin is the leading New England apple and was originated in Massachusetts. It would seem as though the chances were much better of obtaining a desirable fruit when both of the parents are of a desirable type for a locality rather than something unknown. This year over 500 apples were obtained from crossing. The seeds from these apples which numbered about 3000 will be planted next spring. It is hoped that with these a new seedling orchard may be started on high, well drained soil.

Apples should be thoroughly pollinated with fertile pollen to get a good set and a uniform fruit. It was found this year that

the apples that fall in the June drop have less seeds than those that hang on. To get a good set it is, therefore, necessary to have plenty of good pollen to make a large number of seeds develop. If only a few seeds develop, the apple, even if it does not drop, develops irregularly and lop-sided. To show this we cut off two of the five stigmas of a number of Ben Davis apples' flowers and pollinated with McIntosh pollen. This caused the seeds to set in three of the five seed compartments of the fruit. In every case the side on which the seed was set was greatly developed while the side with no seed was very small, making a lop-sided fruit of little commercial value. Thus it is necessary to furnish plenty of good pollen and insure setting of many seeds which is necessary for the proper development of the fruit.

The stock and scion orchard of about 500 trees is just beginning to bear. The tree type of each variety is the same whether grafted on Tolman Sweet or French Crab stock. This is to be expected although we may get differences in the amount of growth, depending on the kind of stock used.

Past records show that some trees are consistently high yielders while others are consistently low yielders. This difference is not entirely due to soil or location. If this ability is transmitted through scions there is value in pedigreed nursery stock. This year grafts were made from the highest and lowest yielding trees to determine if yielding ability is inherited. If results are favorable we have data on many of the leading varieties which will enable us to pick the best trees of each variety for propagation and general distribution.

There is also a definite relation between type of tree and yield which makes it possible to select a high yielding tree by its shape. This would be of value to those who wish to select scions but who cannot keep an individual record of their trees.

Grafts from the seedling orchard which numbers about 1400 trees are beginning to bear. There are a number of trees of promise in appearance although many of them are of the wild type as is to be expected. One apple obtained this year was much like the Transparent but was larger and somewhat greener in color. This seedling was from a cross of Nod Head and Autumn Strawberry. The tree is of a typical wild type and apparently very hardy, but the fruit is very large and of the cultivated type of excellent quality. Another type obtained was

like the Red Astrachan and the tree is of the cultivated type. This shows the possibilities to be expected from the seedling work.

Respectfully submitted,

W. H. CONANT,

Member Station Council.

Voted to accept the same.

ADDRESS BY GRANT G. HITCHINGS.

Mr. President and Members of the Maine Pomological Society:

It seems a little funny for a grower, a man who gets his bread and butter out of apples, to come out here and address you. Sometimes we expect to have professors tell us just what to do; sometimes we get too much theory and not enough practice. Perhaps that is the idea that your president had in calling on one of the men who grows apples, to speak to you.

Now there are in New York state two schools at the present time for growing apples. Some believe that cultivation is the one thing. Others believe that sod mulch is the one way. We have fought it out there for twenty-five years along those lines, and I guess both sides have come to the conclusion that there is merit in both ways. The main thing to do is to study your own condition and adopt the plan which best fits that condition. We are very anxious to learn all that the Experiment Stations and the professors know about our business, and we follow everything that we can, but sometimes as practical every day growers we have to do a little different from what they tell us. We have to get our bread and butter. The theory is all well enough if you have money enough, but when you have to depend on your own resources, you have to do things quite a little different. I was interested in the remarks made about the pollenization of fruit. It is wonderful, what they are finding out, and it is well worth listening to and adopting as far as you can; and while we have had those things worked out somewhat in New York state, I will tell you that the consensus of opinion among the growers is today that we can do better in pollenization by feeding our trees, by fertilizing, than we can by depending on the trees. That is our feeling just at the present time, notwithstanding we are planting trees as recommended by your experiment station here. We are trying to plant Rome Beauty and Spies because they blossom somewhere near each other. We are not taking chances. We find that nitrate of soda and acid phosphate

applied at the right time help out in setting fruit more than anything else we have yet tried. We are feeling along and looking for light on the questions. We have a good strong fruit bud and we seem to get results where we do that. The bees may help us out but we get it without. That is the way we feel about it, and it is very interesting to me to hear remarks made on what we are finding. In the study along these lines, Maine is doing a wonderful work with the varieties here. Understand, if you follow out and do set the different trees mentioned, don't fail to strengthen your fruit bud so it will set fruit; those two things together are what we want.

In discussing the different methods, I will outline the best I can the way we do, and I want you to ask questions, because what is very clear to me may not be clear to you. And do not be afraid to criticise anything that you do not approve, do not fail to criticise me in my statements—it won't hurt my feelings at all. I am just as glad to be criticised as can be. I may learn something. I welcome the criticism.

We have been at this twenty-five years and I have just come from an apple crop of 30,000 bushels, finest ever grown in the state of New York—we won the silver cup for every county in the state represented at New Jersey—some seventy-six varieties got the silver cup, showing that the mulch method does grow apples, notwithstanding they sometimes advocate you can't do it. I have been to the state fairs in thirty years and they won every time. That is the answer to whether we can or not. We have tried experiments with the two methods for ten years and beat so far that they were not in the running at all. That applies to our particular soil and location. Other men throughout the states have different conditions where they are cultivating. It costs more. If you have to cultivate, why cultivate, but this way produces apples cheaper.

I will start right from the beginning—how we set the trees, how we manage about pruning, and the whole thing right down through as we found it. A great many times you will hear it advocated to cultivate the first few years and get them started. We do not do that at all. We set the trees right in sod at first. Some things we have found by experiment to be necessary. You don't want to cultivate it all. When you plant your tree, set it in the sod and use a little stable manure to mulch that tree for

the first few years to get it started. Sometimes we don't use any stable manure at all—set it right there. The reason for that is that the grass around the trees takes the moisture near the top of the ground. That forces those trees to send their roots deep at the start. You get your deep-rooted tree at the start, because the grass around the tree forces the tree roots down below. Later on the grass will die before the tree does—I have seen the grass all brown around the tree and the tree green, because it has the deep-rooted system. If you have cultivated your orchard and got it started and drawn the roots nearer the surface, it is a harder proposition to establish a good mulch orchard. That applies to an older orchard. If the trees are up there, you have got to use more manure and vegetable matter to hold the moisture than if you start right. So start right if you are going to plant an orchard.

After you set your orchard in the sod, never take any of the grass out of the orchard. Let everything go back. The idea is to accumulate vegetable matter in your soil in the early life of the orchard. We find in our experience that there are three things necessary for a successful apple orchard: there has got to be a certain amount of vegetable matter in your soil and a certain amount of nitrate phosphorus and potash. Those are the three elements which combined with the vegetable matter form the basis for a successful orchard. The cheapest way to get them is the problem for the grower. If you can bring in a little straw manure to furnish that vegetable matter, as that decays you get phosphorus and potash in your soil. You have solved your problem and you haven't had to buy any phosphorus or potash at all. You can get along for a good many years and get wonderful results from what you supposed worn out soil by that vegetable matter decaying there, holding the moisture by the aftermath of the grass. If the time comes when your orchard begins to fail, then apply the different elements, such as phosphorus in the acid phosphate form and what nitrogen you need to stimulate your growth, to carry your crop. I find at certain times a year that needs to be done. If you apply that nitrate in the acid phosphate about two weeks before the blossom comes out, you can carry it over the blooming period—the pollenization period as well, pull through a fine lot of apples and build up for the succeeding crop. Sometimes it pays to spend

a quarter to get five dollars back. You have got to watch your orchard. If you can dodge that without doing it you are that much ahead. This last year is the second year we have applied those fertilizers. In some orchards on new ground we are not doing it at all. I have cut down woods, without ploughing or doing a thing, seeded it down with a little grass and let it go, and got some of the finest orchards we have right in that new ground where there is an abundance of vegetable matter. That is virgin soil. You can control it in that way and get the results. In the old pastures, the rough soil, on stony land which you have here in Maine as well as we do in New York, on the sidling ground, you can utilize that plan and get wonderful results. But you have got to supply those conditions,—you have got to supply that vegetable matter and those elements if they are not there. You have got to spray those trees and keep your foliage healthy, or else you spoil the combination. You have got to put enthusiasm in your business. You have got to be there yourself and not by proxy. That is the way we have done. With all the state of New York saying you couldn't do it, if a fellow has got a little of what you call down east Yankee grit he is going to win out if he can. I have stayed there and been on the job. I will say we have now 32,000 trees which I largely planted myself with my own hands and installed the best orchard in the state of New York. So you see you can do it. There are different grasses you can use. Where you can grow alfalfa that is one of the best, but it has got to be used with judgment. Many use too much, supply too much nitrogen and over-stimulate. You have got to be careful. A light seeding of alfalfa with other grasses is just the thing. One orchard has been in alfalfa for twenty years; we have had wonderful results without a bit of fertilizer. If you can grow alfalfa to a moderate extent, get some of it with the other grasses, you have saved a lot of expense in buying fertilizer, and you will get the foliage a dark green color and grow your orchard in nice shape. Blue grass we like first rate. We don't like orchard grass. It grows too thick and heavy, and you get too strong a growth early at the time of the bloom. Where you get too strong a growth at the blooming period it is taking too much away from your trees at that time. Orchard grass will do it. The growth is so strong early that it seems to take that strength away that is needed. That is

where the nitrogen tides them over that period. So we should be careful about getting too strong a growth at that time. The other grass don't grow quite so strong and don't hurt the trees. And you don't get as good an aftermath from the orchard grass as from the blue grass.

I spoke about setting the tree in the sod. Now I will tell you the way that we plant the tree. We dig a hole say two feet wide, eighteen inches deep; that is, we say eighteen inches deep. If you have got help that means fourteen inches and that is about right. Place the dirt you take out of that hole, the sods in one pile, the dark-colored soil in another, and the bottom or coarser soil in a third pile. Set your tree after throwing in about two shovelfulls of the dark-colored soil in the bottom of the hole; set your tree on top of that, placing the balance over the roots. Then stamp it down. No fertilizer in that hole. And then take the sods—here comes the important part—take the sods, invert them and put over that, and if there isn't enough to cover with laying around, dig a few on the side until you cover the surface of the hole, and stamp it down. Put your coarse dirt on top of that and raise it a little above the level. You can't lose one in a hundred if you do that way. The sod holds the moisture over the roots if you happen to have a dry spell, and your tree will start all right. Then if you have a little stable manure to mulch those trees, don't go right close to the tree, keep away about a foot, and cover the place where the joints come on the side, just cover that place and extend it. And then cut all the grass that grows on there once a year and the first two or three years use it as a mulch, and after that cut it and let it rot. One thing about using mulch, don't put it close to the tree. Keep it at least two feet away from the trees at the start and as the trees get older, seven or eight years, don't go within eight feet of the trees. Keep it beyond the limbs. The mistake that nine-tenths of the men make is to crowd the tree. The roots of those trees are extending way out to the outside, and that is where you want to get your vegetable matter, where the roots are. A man asked me once if I should mulch trees with straw. I said yes. I supposed of course he would use his judgment. A few months later I went by. He had mulched right up around the trees. There is the extreme. Most men will commence right at the trunk. The proper way is to keep away further. Follow that

up every year. Of course more or less weeds will grow. That won't hurt you—they are vegetable matter. If they get too bad you will have to mow it twice. The aftermath cutting down is all the expense you have got to take with the orchard. You can't tell how much easier it is to drive around in a sod mulch orchard than in one broken up, and with the high price of labor, tools, etc., it costs a lot of money. We grow a large orchard with a limited amount of help rather than concentrate our energies on a few acres. If you only have a few acres and a lot of help, concentrate, and if you want to cultivate, cultivate. That is all right. But we look at the work and we dodge on. In my system with 16,000 trees we never had to hire until we commenced picking—just my own family, three boys and myself did the work, all the spraying of those 16,000 trees. That speaks for what mulch means. You can get over a large territory and by arranging your work and having your water and all those things handy you can do a lot of work at a small cost. That is the way to make your money.

Along the line of spraying I want to say a few words. We have been all through that, started in with the old pump and leather valves and we worked along up through. Now we use four of the liquid sprayer gasoline engines and a duster. Last year we tried the duster and I want to say for the last spraying it is the thing. The duster beat the others. We had all four in the test this year. I will say this much for the dust for the last spray—I would not advise it for the first two, I would still cling to the liquid for the first two,—but when the foliage is thick and heavy and a lot to do, you can do much better using the dust. That applies not only to the fungus troubles but to the codling moth as well. Both are controlled much better with us. In one day three of us blew on a ton of dust and that was equal to forty-five 200 gallon tanks of liquid to equal the amount of surface we covered in one day with the dust, and the dust was way ahead of the other, the results were much better. We tried four different things. We tried lime sulphur solution 1 to 40, we tried atomic sulphur, and the B. T. S., a trade preparation, and the result stood at the end as near as we could determine without measuring, using our best judgment,—the dust was ahead, atomic sulphur No. 2, B. T. S. No. 3 and the lime sulphur No. 4 in the effect on the fungus. We had no bones to

pick. We wanted results. So we have adopted dust alone for the future in the last spray. In the first spray it would be a little wasteful—the leaves are not out and you are liable to have a little wind. You can get over a large territory, do a thorough job and do it quickly.

Where you use the mulch method you can keep your trees lower down. You haven't got to have the trees headed up so you can cultivate near them. That is quite an item in the picking of the fruit and the spraying. It might interest you to know that we have twelve in a gang, four ladder men and eight men on the ground. It takes two-thirds of the force to pick what they can reach, one-third to use the ladders. That makes quite a difference in the commercial orchard. It may interest you to know that in harvesting the fruit the best we have done is 6½ cents a bushel delivered in the grading room from the orchard. It is picked from the tree and brought to the grading room at headquarters at 6½ cents a bushel, paying $5 a day for help to do it. That is the best we have done. It generally runs to ten. This low picking makes quite a difference in your net results. We have got to figure on the cost these times when we consider what we pay for things and the low price we get for things. All those things have a bearing on the commercial orchard in a large way. Now I started in with the local market with different varieties. We have 108 varieties. We started in with the local trade near Syracuse and we kept growing from that. Now we are only interested in carload lots. We are beyond the local trade and we are not interested in it. We sometimes leave the house so we won't hear the telephone bell ringing—we are sick and tired of it. We would rather sell at a little less and sell a carload than to sell locally. But when you first start you will be interested in it because it is good money. Northern Spies at the present time $10 a barrel for local trade—we are turning them down, we don't want them. That seems funny to people just commencing, but you will get into that when you get into commercial lines. You will rather sell a carload. It is gone. You will pick up anywhere from fourteen to sixteen hundred dollars while you are making one deal in bushels. You will get to that point if you go into it deep enough. I have peddled the market from the pocket to bushels and barrels and loads and been through it all, and after a while the time comes when you get

tired of it, and I guess some of these older men will bear me out in that. But for the young man starting in business to get close to the local trade is all right. Grow the quality and you can get money doing it. It really depends on the kind of orchard you want, how you plant it. In planting an orchard now we wouldn't think of anything only a thousand trees in a block. Send the average help up there, they will work in that place, they will pick Northern Spies, but mix them up too much and they can't tell Greenings from Spies, the average help you get. You have to take what you can find. This year we have had help from San Francisco and some from one place and some from another, and it takes too much of the good man's time to tell those fellows the different kinds. So you get into planting them in blocks, because they do know an apple when they see it, but they don't know the kind. That is the help you get. They are green. We have worked this thing to a system. At 6½ cents a bushel somebody has to step along. We have to crack the whip once in a while and they jump, that is all there is to it. You will learn to do it. I am fortunate in having four boys and they are lieutenants in the business. They are a chip of the old block and right on the job, and those things help out. The men have to show what they are made of. We don't keep them unless they do. $5.00 a day is a little extra price. You have got to ship about four a day in order to keep the rest up to the mark, in practice.

I don't know what you people want me to talk about. I am ready to talk on any line of it. I am full of apples, have been for twenty-five years, and could talk here for a month. It don't bother me at all. I am here to tell you people anything you want to know about managing the orchard. I might state that we don't trim much. We are out for apples and if you go to trimming a young tree you will wait for your apples. If you leave it alone it will start in bearing in from four to six years, even Northern Spies, but we don't prune those trees. I learned long ago that the apples always form near the center of your tree and the buds are formed there. Get your tree into the habit of bearing apples. After that you are all right. But you go to pruning that center out and growing big trees, and you will wait fifteen or twenty years before you get much fruit. As long as I am getting apples I am going to keep on doing what I am doing.

I notice Cornell University is now advocating the same thing. Let a number of limbs grow and they grow up in a cluster like that and come down and you have your low headed tree. I am advocating this for a mulch orchard. Don't misunderstand what I am doing. It is for a mulch orchard with the low-headed trees. They will all color up if you keep them sprayed and your fertility up. You have got to thin your apples. You will get apples enough and get them early. You ought to see a seven-year old orchard of McIntosh and Rome Beauty, I think 200 Rome Beauty in the block and 400 bushels of apples and will all grade fancy. So we don't prune, and start them bearing early. You get these low-headed trees, they will look like the beech trees when you see a block growing. But some men will say, I wish I had cut those trees so as to cultivate. If you are going to cultivate, follow the other plan, because if I did cultivate I should want to go the limit and not half do it. If you are going to follow the mulch method, study the mulch method and make a success of the mulch method, and not do as our experiment station did, half do it and said it couldn't be done to the man who had been doing it twenty-five years. They thought they knew more than he did. I have seen the grass growing here in many places where you could do the same thing we are doing, no question about it at all. There may be occasionally a little sandy soil where you could not get grass to stand at all where you would have to adopt the other way.

If there are any questions you want to ask, I would be glad to answer them.

Question: What about the color of the fruit?

Answer: It couldn't be better. The Spies are a solid red, just as red as those Baldwins you see. All through the tree—no trouble at all. If you keep your foliage healthy and keep your fertilizer supplied to your trees, you needn't worry about the color. The limbs will open out and that lets the sun in and the fruit colors all right. * * * You don't get water suckers until you commence to prune. If you don't prune, you don't get the water sprouts.

Question: Do you use the vetch in your orchard?

Answer: We had to limit it in extent. It grew so much and such a tangle of it, we didn't care for it. It is all right as a cover crop if you cultivate. You can get the nitrogen with the vetch in good shape, but we dodge all those things that we can.

Question: Do you use a dormant spray?

Answer: Yes, we do.

Question: What do you use?

Answer: Lime sulphur, one to nine.

Question: And nothing else?

Answer: Nothing else for the first one. I think it is a good thing, it kind of cleans up the tree, one gallon of lime sulphur to nine of water for the dormant.

Question: Do you use a spray gun?

Answer: No, we did one year, I wouldn't use a spray gun under any consideration—no man can use the spray gun and do a good job, too much in some places and not enough in others. That would not apply to high trees way up in the air, thirty years old, where you want to shoot up to the top, you would do a better job with the spray gun than any other way. But up to twenty or twenty-four years old you can't do a good job because in order to coat the outside you get too much in the center. We use two nozzles and 300 pounds pressure, and then we go around the tree, two men to a tree, fifty feet of hose, and we take one tree at a time, and we have one man go round on this side and another on this side, till they meet, and go up and down and all round this way. They have time and there is nobody hurrying up. We tried those things out and we got a more uniform application. Uniformity counts—not too much in one place because it is liable to burn. That is where the dust comes in, there is no danger of doing damage and you get a more uniform application than with the spray.

Question: What about the little pilot gun?

Answer: I never tried that. If you can control it, all right, if you don't waste your material and get too much on—lime sulphur is pretty warm stuff, if you are getting too much on you hurt your apples and hurt your foliage. That you don't want to do.

Question: What is your pink bud formula?

Answer: It is one to forty.

Question: You don't use arsenate of lead?

Answer: Yes, we use arsenate of lead. We use the powder instead of the other.

Question: Have you ever tried calcium arsenate?

Answer: No I never tried that. I think any one could use it that way all right, but we like the lead, we have had good results. Eight pounds to two hundred gallons has been sufficient to control what insects we have had to contend with.

Question: I asked about the calcium because we are just a little mite undecided as to whether we ought to go into it very extensively or not.

Answer: Well, of course I understand it is cheaper, but I would go a little slow,—I think two pounds in fifty gallons isn't very expensive—until you are sure. In an experimental way it is all right.

Question: We have had no unsatisfactory results with calcium in this State as far as I know.

Answer: If you have found it satisfactory and cheaper, of course it is the thing to do. We have stuck pretty close to the arsenate of lead because we have uniformly had good results with it and we dislike to change.

Question: How do you control aphis?

Answer: We use the black leaf 40.

Question: At what time?

Answer: At the dormant spray. If we are afraid of aphis, we use at the dormant spray 3-4 of a pint to 100 gallons of water. That controls it. Also we have the red bug. I don't know that you have that here in Maine. You want to watch it. That is the worst one you will have to contend with. The only practical time is the pink spray and you are not sure whether he hatches in time for that or not. Sometimes he is a little late and you don't get him without drenching the trees. The only way to know you have got him, the leaves look as though they had been sprinkled with red pepper. The leaves are not very thick then on the trees and you can hit them all right. But wait till he get a week old—he gets livelier every minute, he gets behind the leaves and you have a job to control it. We have about given up using it at the late spray, because this is pretty expensive stuff to be thrown away, but get these red bugs at the pink spray—if we think we have got any at all, use it at that time.

Question: Your experience as to pollenization has been identical with my own. It accords with our work at the station. With the weak fruit buds you get very little pollen and there is

nothing to fertilize with, in case of starving trees, unfertilized trees; but where they are fed and there is sufficient good strong pollen then the agency gets the material to work with and you are sure of good results.

Answer: That is it exactly. I think you could get along with less bees if you had strong buds.

Question: Because you have material to work with.

Answer: The idea is first strengthen your buds and then use bees or any other method. That is why I was so interested in your talk. It was along the line we are working on.

Question: About culture—we have to be a little mite careful about the condition of our trees for winter—they have to be hardened off to stand our cold winters, and with our mulch systems, experience and experimenting with it, we have had a little trouble in getting the trees to stop growing in the fall of the year. I wonder if you have a suggestion to make whereby we could manipulate our mulch system so as to stop our trees growing in the fall of the year and ripen them off?

Answer: Certainly, you don't want to put a heavy mulch on. Don't put any mulch after the tree gets to be four or five years old—just what grass grows is all that is necessary and that aftermath which has enough moisture so that your tree will harden off early. The fruit buds begin to form in the mulch system in June, and it is pretty well finished up by September, you have got a good strong bud and you don't want to increase your growth later in September. Just cut out your heavy manure mulch and don't think it is necessary, because it isn't. A tree wants a steady supply of plant food over the year. You don't want too much. You don't want to force things too much.

Question: About pruning, do you have the central leader top?

Answer: No, the most of them are open heads, no central leader. Of course once in a while one will go up, but we prefer to have them all open out like an umbrella. We use the two-year-old New York state trees and when you get them forked, cut them out to avoid that form. And in pruning the tree, we generally cut back when we set the trees about half of it, may be a little more, depends a little on the condition of the tree and if there are any forks clean them up at that time, and don't prune after that. It will look a little thick and you may think it is growing into a brush heap, but you better err on the safe side,

There is no cast iron theory, it is a question of judgment. If you are not absolutely sure a limb ought to come out, leave it there and you will come out better in the long run—that is my experience, at least.

Question: The idea is you can cut it off but you can't cut it on again.

Answer: That is the idea exactly. I have seen so many orchards practically ruined by too much pruning, I hesitate to advise any man to prune a tree. When you go up in our orchard there is a row a mile long of one kind, not a missing tree. It is a beautiful sight. In the western part of the state, the horses breaking them over, there are lots missing, I notice.

Question: You must have to thin your apples?

Answer: Yes, we do. It takes any one about five years to learn how to thin, I don't care how good a man he is—because he won't do it enough, I don't care who he is, especially if he planted the trees. It will take at least five years and then he begins to know something about it. Because they set so full. Really a tree will carry about so many and bring them up to the size you want. If you let all those apples stay on, you not only get poor quality of fruit but you hurt your tree so it will take two years to get over it. You want to thin them down to grow fancy fruit, it pays you so much better. You have got to handle that small fruit any way. It costs you lots more in September than in July for help. We are planning more and more to thin, to get rid of all that waste stuff as soon as you can.

Question: Does thinning have a tendency to bring about annual bearing?

Answer: Annual bearing—the fertilization tends more than anything else to keep the buds coming. If a man uses acid phosphate year after year, I think he can come nearer getting annual bearing than in any other way. A tree then is fortified enough so that it will set buds even if there is quite a lot of fruit on it. We have noticed that in the two years we have been using it. It seems to show that is the thing to do to keep your annual bearing up, keep your trees healthy so that they can carry buds and fruit at the same time. The only way I know to do is to keep your tree well sprayed and well fertilized.