STATE OF NEW JERSEY

DEPARTMENT OF AGRICULTURE

ALVA AGEE, Secretary

BULLETIN

No. 29

Sixth Annual Report of the New Jersey State Department of Agriculture

Trenton, N. J., September, 1921

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REPORT OF THE SECRETARY

ALVA AGEE

NEW JERSEY'S AGRICULTURE

New Jersey had 312 million dollars invested in farm property in 1920, according to the United States Census reports. This investment is incomparably greater than the same amount of money invested in most other ways, because it provides homes and a means of living to 30,000 farm owners and a living to laborers receiving 18 millions of dollars. It is also relatively of far greater importance, because the farms are engaged chiefly in the creation of new wealth rather than in the conversion of products from one form to another that in other lines of business usually involves heavy expenditure of money outside of the state. The state's welfare depends in large degree upon the prosperity of its agriculture.

The state has two very direct interests in agriculture: one is the dependence of its people upon the land for food, and the other is their dependence upon the purchasing power of the large body of its inhabitants that is engaged in farming. I wish to urge a third basis of interest, and that is due to a character of the farming industry that does not permit its workers to escape loss through adaptation of supply to demand each year. Many products are perishable, seasons vary greatly in productive power, and the land must be prepared and planted almost regardless of the outlook for net profit. Fertile land cannot and should not lie idle, and its owners and workers cannot know what sort of a market they will find for the products of a year's labor. There is a helplessness in this respect that puts this essential industry peculiarly under the fostering care of the state.

An instance of the farmers' courage to face difficulties and to take the great risks incident to their work is found in our state's agricultural operations the present year. Notwithstanding the fact that the drop in food prices last year was sudden, and so severe that the

cost of production was not met by sales in the case of most products, the total area in New Jersey devoted to fall grain and spring grain and vegetables to supply markets in 1921 is as great as it was twelve months ago. In July, 1920, wheat sold in the Chicago market for $2.85 a bushel, and in July, 1921, the price had fallen to $1.18. The acreage of wheat and rye was reduced only slightly, while the acreage of corn and oats is as great as that of the preceding year, and there is a small increase in the acreage of white and sweet potatoes. In other words, when manufacturers were cutting down production on account of the severe decline in prices and the known lack of purchasing power in the people to take all that they had produced, the farmers planted as extensively as usual despite their losses of the previous season and without knowledge of the demand that might be found when their crops were ready for market.

REDUCED PURCHASING POWER

In every period of deflation that has followed heavy expansion of credits to wage war, raw materials, which have a smaller labor factor than manufactured articles, have been first to drop in price. Last year was not exceptional in this respect, and the purchasing power of the farmers of America was reduced several billions of dollars, while the greater part of their supplies remained near the war-price level. Notwithstanding the actual losses in production that attended farming in many thousands of instances in our state, and the most serious limitation of profits in other cases, it is a matter of congratulation that New Jersey's agriculture has not suffered in any such degree as that of the great agricutural states of the Central West and South. Corn, which is the leading American cereal, went to a lower price level in the Chicago market this summer than had occurred within the previous fifteen years. Wheat has been selling at a price much below cost of production, and the inability of the farmers in all the central and southern states to take up the notes held by those furnishing their supplies during the last eighteen months has become one of the most serious considerations before the National Congress. Good purchasing power has ceased to exist, and the possibility of improvement in commercial conditions that rests upon agricultural prosperity has necessarily been deferred another year.

NEW JERSEY'S ADVANTAGE

There was a long term of years when New Jersey was at a disadvantage in competition with the fertile lands of the central states, but the time has come when proximity to the 11 millions of people in and near her borders is a big cash asset. It is partly for this reason that the best farm bargains today are in New Jersey and states adjacent, rather than in the states of the great Mississippi Valley. Both soil and climate favor the production of the kinds of food that city workers want in fresh condition, and even when a loss must be taken in production it is not comparable with that sustained at this time by producers remote from market. There might have been relatively little loss in New Jersey's agriculture in the present season if frost and drouth had not damaged crops greatly. Fruit-growing is a leading industry, and tree fruits are grown with as great skill and as fine results as are displayed in the apples of the Hood River Valley. Frost destroyed 71 per cent of the state's apple crop and 87 per cent of the peach crop. An extraordinary drouth nearly ruined the state's potato crop. That crop amounted to 14,820,000 bushels in 1920 and brought to the state $18,525,000 notwithstanding the extraordinarily low prices that prevailed in the latter part of the season. This year the yield is not 60 per cent of last year's crop. These losses, due to more or less local causes, are a big factor in reduction of the farmers' ability to purchase, but they are less disheartening than the more permanent loss due to the lower level of prices for wheat, corn, cotton and live-stock that confront the land-owners west of the Allegheny Mountains. The Jersey farmer is happily placed if we must pass through an era of low prices. Discouraging as the outlook is to many, it is less so than elsewhere in this broad agricultural country.

Practically one-half of the farms of New Jersey are free from all mortgage debt, as shown by the census taken last year. It is a disconcerting time to owe money, and the State Board of Agriculture during the last three years has consistently urged conservation in incurring indebtedness and has the comforting assurance that its effort has not been without some results. In an era when dollars are increasing in purchasing power debt becomes unusually burdensome. It should be borne in mind that a high percentage of these mortgages mark only the effort of men to gain homes of their own, and in so far is evidence of progress in agriculture rather than of any decadence.

Twenty-four per cent of New Jersey farms contain less than 20 acres, and some of these farms make large returns to their owners. The crop

adaptation of much of the land makes a special appeal to men of small means who want an independent life and opportunity for profitable work by all members of the family. On the other hand, there is opportunity for extensive corporation farming that has led to some of the most notable developments in this country. The success of some of these intances of large corporation farming is beyond question. They demand business ability of the highest order, and there is no reason to believe that the great bulk of food production will not continue in the hands of men who control farms of only moderate size.

CREDIT FACILITIES

Our farmers require a large amount of short-time credit. They are producers of special crops, and there is a heavy use of supplies. Dealers in commercial fertilizers, farm implements, etc., provide a great deal of this credit by selling goods on time. Such an arrangement places both buyer and seller at a disadvantage in the long run. The credit of the farmer is good, or otherwise merchants could not carry his paper, and the State Bankers' Association, cooperating with the State Board of Agriculture and farmers' organizations, should be able to devise means for direct financing of our producers. The banks finance other operations to the advantage of all concerned. Some expense in production can be eliminated to the profit of both producer and consumer if a cash basis were universally adopted. The organization of farmers for collective action should make possible some basis of financing that would be acceptable to those whose business it is to provide funds for the production and marketing of goods.

BUREAU OF MARKETS' SERVICE

The Bureau of Markets in the Department of Agriculture continues to work for the standardization of farm products and collective selling. It is only through the grading and collective selling of food products that the present large waste in distribution can be appreciably decreased. The progress along this line during the past year has been rapid. Standard grades have been adopted in conference with the Federal Bureau of Markets, and the service of the Department in the inspection of grades is afforded producers at cost. The State Federation of County Boards of Agriculture has served the state well in assisting producers to organize for the adoption of proper marketing methods, and the day is close at hand when consumers may have

reasonable assurance of the quality of food products ordered from producers. The use of the Federal Department's crop-reporting wire, which is looped through the offices of the Department, and some special city market reporting done for the Department, enables the Bureau of Markets to send out information each day which permits producers to direct their shipments to the best advantage. Local newspapers receive these reports of early morning markets by wire from the Bureau at their own expense, and county agricultural agents receive them over the phone for distribution to interested parties before noon. The Bureau's relations with transportation lines affect shipping facilities to the advantage of producers. The railroads are ready to provide a rapid freight service for any section that will engage in production upon a scale at all justifying the expense. Some new service of this kind has been given as a result of conferences arranged by the Bureau of Markets. The railroads regard it as good business to meet our request for any such service when bare costs can be met by their charges, as such arrangements lead to the development of new business later on because transporation is assured. In this way, the New York markets are being brought relatively close to most producing sections of South Jersey. The cooperative work being done by the Bureau of Markets with the Department of Health, representative milk producers, and representatives of consumers is a step toward the improvement of milk distribution methods.

THE GIPSY MOTH

The invasion of the state by gipsy moth is a serious matter. The Legislature at a special session in December, 1920, granted the $112,000 needed by the Department of Agriculture in its work to exterminate this moth, and the money was expended in cooperation with the Federal government, which contributed $117,000. The Federal and State Departments placed over 100 men at work scouting for egg masses, and the State Department purchased spray machines capable of throwing 50 gallons of liquid a minute under 600 pounds pressure. Some Federal money was used in scouting work, and the remainder was ready for expenditure when the spraying season arrived. It is impossible to determine at this time the headway that was made in the fight, but it is only right to state that the plan of campaign was formulated and the state's money was expended with as high degree of efficiency as could well have been possible to any great corporation. Every dollar was made to count in the best way known to scientific

and practical men, but extermination, or even control, of this menace is possible only through a continuation of the effort for three or four years. The report of the Bureau of Inspection gives the status of the Japanese beetle work, and an account of the vast amount of other control work that is being carried on.

BUREAU OF ANIMAL INDUSTRY

Special attention is asked to the report of the Bureau of Animal Industry. Absolute progress is now being made in the work of extermination of tuberculosis. Leading breeders of the state are cooperating heartily, and through their effort an emergency appropriation of $30,000 was made to add to the amount of indemnity to be paid for reacting cattle, as the demand for assistance was greater than the Bureau had ability to render.

DOGS AND SHEEP

Two years ago the State Board of Agriculture had a bill introduced into the State Legislature providing for proper control of dogs, but this bill failed to become a law. Our State has relatively a large acreage of land that is adapted to sheep husbandry, and the industry cannot live where dogs run at large. A proper system of control of dogs is an urgent need of our state's agriculture, and legislation providing it should be enacted.

PURE ICE CREAM

Research work conducted upon an extensive scale at Johns Hopkins University and other scientific institutions has shown conclusively that milk, including butter fat, is essential to health and proper growth of children. There is no substitute, and the child that does not consume a considerable quantity of milk, including butter fats, is retarded in its growth and subject to various ills. The substitution of vegetable oils for butter fat in ice cream is a menace to all children that now get a large part of the necessary fats in the form of ice cream. There should be legislation protecting the public in this vital matter.

BUREAU OF STATISTICS

The New Jersey crop report, issued cooperatively by the Bureau of Statistics and the Federal Bureau of Crop Estimates, gives more

dependable crop statistics than could be secured in any other way. The data is based largely upon the reports of the 500 crop reporters scattered throughout the state, who have served the State Department of Agriculture so faithfully for years without any compensation other than that which is realized by anyone performing unselfish service.

FINANCING BOYS AND GIRLS

President Frelinghuysen has wanted to see means provided for interesting boys and girls in farm life and at the same time promoting the extension of pure-bred live stock. A fund of $30,000 was placed to the credit of the State Board by Senator Frelinghuysen and Mr. Julius Forstmann, the money to be loaned without security to young people who should be owners of pure-bred animals. Professor Hulbert, who is in charge of boys and girls' club work in the Extension Service of the State Agricultural College, offered the assistance of his staff of club agents in the selection of boys and girls that would receive loans, and in their oversight. Printed information giving all details of the loan scheme was sent out, and it was planned to begin making loans in the fall of 1921, as autumn is the time that purchases of swine and poultry should be made to insure the greatest ease in repayment of the loan within twelve months. However, there was so much pressure for loans upon calves that a beginning in the work was made last spring when nearly $4,000 was furnished for calves. The applications for loans this fall to finance purchases of pure-bred swine and poultry will reduce the loan fund rapidly, but there is assurance that sufficient funds will be found to meet the demand of everyone who is qualified to become a member of the State Junior Breeders' Association.

The Secretary hopes that this is a fitting place to express his great indebtedness to the State Board of Agriculture, which is composed of busy men who freely give their time to a solution of the problems that constantly present themselves to the Department of Agriculture. I believe that the State Board would have me express here the high appreciation which they have of the loyalty of Bureau Chiefs and all other members of the Department staff in the endeavor to serve the state with the highest degree of efficiency.

PUBLICATIONS

The following bulletins and circulars were issued by the Department during the last fiscal year:

Bulletins

No. 25. The Market Milk Business in New Jersey; Some of Its Economic Aspects.
26. Fifth Annual Report of the New Jersey State Department of Agriculture.
27. Official Proceedings of the Sixth Annual Agricultural Convention, together with some Addresses; Report of the Marketing Conference held by the Bureau of Markets of the State Department of Agriculture, and Addresses in the Conference of the New Jersey Federation of County Boards of Agriculture.
28. The State Potato Association and the State Alfalfa Association, Agricultural Week, 1921.

Circulars

No. 34. A Survey of the Important Commercial Peach and Apple Sections of New Jersey.
35. Standard Grades for White Potatoes.
36. A Few Insects Injurious to Ornamental Plants.
37. Crop Reports, Their Value and Preparation; Agricultural Statistics for New Jersey.
38. The Gipsy Moth.
39. County Boards of Agriculture and Granges.
40. Requirements and Rules for the Inspection and Certification of New Jersey Second Crop Seed Potatoes, as Adopted by the New Jersey Potato Association and New Jersey State Department of Agriculture.

REPORT OF THE BUREAU OF ANIMAL INDUSTRY

DR. J. H. MCNEIL, *Chief*

INFECTIOUS SWINE DISEASES

Hog Cholera

The work of swine disease control has made favorable progress during the year just closed. The problem of handling the situation has been simplified by the cooperation of representatives of the County Boards of Agriculture in the eastern and southern sections of the state. The plan adopted is to vaccinate in the districts twice each year, preferably in the spring and fall. In the sections of the state where the work is not fully organized sporadic outbreaks are reported from time to time, and in many instances severe losses have been reported. The animals at the large garbage feeding plants are regularly vaccinated, this work being done by veterinarians in private practice. The funds appropriated for this work have been adequate to handle all requests promptly.

Summary of Vaccination

Number treated by Bureau veterinarians—		
Serum alone.....	529	
Simultaneous	4,005	
		4,534
Number treated by private veterinarians..		
Serum alone.....	772	
Simultaneous	10,217	
		10,989
Total number treated.....		15,523

This summary by counties is as follows:

Atlantic	1,137	32
Bergen	183	3
Burlington	401	60
Camden	64	23
Cape May	478	56
Cumberland	994	212

Essex	339	232
Gloucester	840	261
Hudson	5,896	48
Hunterdon	88	4
Mercer	359	104
Middlesex	225	11
Monmouth	992	56
Morris	183	13
Ocean	1,067	75
Passaic	21	4
Salem	913	56
Somerset	16	—
Sussex	—	—
Union	—	4
Warren	26	47
	14,222	1,301

STALLION REGISTRATION

The list of stallions registered for public service has shown a noticeable decrease from year to year, as indicated by the summary which follows:

	1918		1919		1920		1921	
BREED	P.B.	Gr.	P.B	Gr.	P.B.	Gr.	P.B.	Gr.
Percheron	29	1	29	7	25	6	26	9
Clydesdale	8	1	8	1	5	1	3	1
German Coach	2	1	2	2	2	1	6	1
Jacks	7	—	4	—	2	2	4	1
Suffolk	4	—	4	—	2	—	3	1
American Saddle	1	—	—	—	1	—	1	—
Thoroughbred	9	—	7	1	6	—	5	—
Standardbred	18	—	14	5	8	2	3	2
Belgian Draft	1	26	—	15	1	9	1	6
Hackney	1	2	1	2	1	1	—	—
Roadster	—	11	—	7	—	4	—	3
Shetland Pony	1	2	1	2	—	1	—	—
French Coach	1	—	—	—	—	—	—	—
Morgan	—	5	—	1	—	—	—	—
Pacer	—	—	—	1	—	—	—	—
Purebred	—	—	—	—	—	1	—	—
Grades	—	—	—	1	—	1	—	1
Totals	82	49	70	45	53	29	52	25
	131		115		82		77	

Stallion Registration by Counties

	1918	1919	1920	1921
Burlington	16	15	7	6
Camden	2	1	2	2
Cape May	1	—	—	—
Cumberland	5	5	3	6
Gloucester	—	1	—	—
Hunterdon	25	27	19	14
Mercer	3	5	3	3
Middlesex	9	2	2	2
Monmouth	2	6	7	7
Morris	11	8	6	8
Ocean	1	2	—	—
Passaic	2	—	—	—
Salem	16	10	7	7
Somerset	10	10	7	5
Sussex	4	5	3	4
Union	3	1	1	1
Warren	21	17	15	12
Totals	131	115	82	77

GLANDERS

Glanders is a disease primarily affecting horses and mules, but under certain conditions it may be transmitted to man. The disease can be easily controlled by adopting the recognized tests and by the slaughter of all reacting and suspicious animals. During the past year three rather serious outbreaks were discovered. All of the animals were mallein tested and the reactors destroyed, but the origin of the outbreaks was unknown.

Summary of Outbreaks

No. 1. Occurred on premises in Jersey City. All the animals were mallein tested, and the reactors destroyed.

No. 2. Location, New Village. Thirty-two animals were mallein tested. Eight proved positive and were slaughtered.

No. 3. Location, Trenton. Fourteen animals were condemned and disposed of. The remainder of the twenty-two tested did not respond to the test.

The work of mallein testing all of the horses and mules used in interstate traffic between New Jersey points and New York City is done by private veterinarians, and the banding of the animals which pass the test is carried on under the direction of a private veterinarian who represents this Bureau.

Summary of Mallein Test Reports

	Negative	Suspicious	Positive
July	19	—	4
August	15	—	9
September	59	—	2
October	9	—	23
November	24	—	—
December	7	—	—
January	36	—	8
February	119	2	8
March	48	—	14
April	18	—	2
May	93	—	—
June	13	—	—
Totals	460	2	70

In addition, reports have been received for 3,087 negative and 4 positive tests made of animals used in New Jersey-New York traffic.

ANTHRAX

The work of protective inoculation for the control of anthrax in the southwestern portion of the state is carried out on the lines previously adopted by the Bureau. In addition we have been called upon to control outbreaks in several widely separated sections of the state where the disease had not existed previously, and in all instances we have not been able to discover the source of infection.

Summary of Protective Inoculation

Number of horses vaccinated	16
Number of premises on which animals were vaccinated	75
Number of cattle vaccinated	1173
Additional horses vaccinated	16
Additional cattle vaccinated	28

PASTURE DISEASE

Pasture disease has been occurring in epizootic form in horses and mules in the State of New Jersey for a number of years. Sporadic cases, variously diagnosed as "Forage Poisoning," "Cryptogamic Poisoning," "Spinal Meningitis," "Grass Staggers," "Blind Staggers," and "Pasture Disease," have occurred and continue to occur among all classes of live stock, but the occurrence of the disease in horses has caused such severe losses as to assume considerable economic importance.

The first outbreak of which we have definite record was in 1905, but of this we have little information beyond the fact that several hundred horses were lost during the summer and fall of that year. The areas chiefly affected were Ocean, Atlantic and Cape May counties, which are the ones that have always suffered most severely in every outbreak.

In 1912, at the time the "Kansas Horse Plague" appeared in the Middle West, Cape May County was the chief center of an outbreak of so-called "Forage Poisioning," in which more than three hundred horses died during a period covering less than four months. The disease was also reported at the same time in Ocean, Atlantic and Cumberland counties, but to a lesser extent. In the outbreaks reported the disease made its appearance in July, continued through to October, and apparently died out after the first frost. The occurrence of the disease covered all conditions of feed and forage. As many cases appeared on upland farms as in low-lying districts subject to more or less tide water inundation. The majority of the animals die after the disease has been clinically diagnosed, and in the acute form the animal dies in from one to three days. The symptoms are varied. However, in about sixty per cent of the cases paralysis of the pharynx is one of the symptoms.

The outbreak of "Forage Poisoning" which occurred during this fiscal year started late in August, 1920. Two localities were chiefly affected—Ocean County, particularly in the Toms River and Barnegat districts, and Atlantic County. More than one hundred fatal cases resulted, and it is known that quite a number of horses suffered a light attack and subsequently recovered. Early in the outbreak the possibility of Botulinus Poisoning in connection with the disease was recognized, as pointed out by Graham and others in the work done on this subject. Arrangements were made with Dr. Robert Graham, of the University of Illinois, to secure Polyvalent Botulinus Antitoxin and to inoculate a number of horses in the affected district. At the same time tissues of the different organs were forwarded to the Pathological Laboratories of the University of Illinios for examination, and as a result of the experimental work Doctor Graham reported the presence of B. Botulinus type A. Samples of soil were forwarded to Dr. K. F. Meyer of the University of California, with the result that in three out of five samples Botulinus type B was isolated.

Experiments were conducted by representatives of this Bureau at the University of Pennsylvania veterinary school in order to gain first hand information relative to the prophylactic and curative properties

of Botulinus Antitoxin against Botulinus Intoxication. However, because of our inability to obtain material to complete the experiment, we were unable to arrive at any definite conclusion as to the curative properties of the serum. The prophylactic value of the antitoxin is probable, and arrangements will be made to continue experiments in the field during the next fiscal year. We hope to be able to demonstrate the practical value of antitoxin in the prevention of the so-called "Pasture Disease."

TUBERCULOSIS

Marked and substantial progress has been made in the control of bovine tuberculosis through the establishment and operation of co-operative tuberculin testing under what is known as the "accredited herd" plan. There has been a material increase in the tuberculin testing of herds which supply municipalities with milk, but on the whole health authorities do not attach sufficient importance to the establishment and maintenance of a pure milk supply, as most of them think that the pastuerization of milk affords every protection against the spread of disease, while the health officials of other cities and municipalities do not even take this precaution, and the citizens, especially children, are left to take their chances.

The question of the intertransmissibility of tuberculosis from the bovine to the human, especially children, is a question of vital importance. Sufficient work has been done along this line to prove conclusively that a large percentage of the cases of tuberculosis in children is traceable to bovine infection through milk. In the recently published work by Rosenau it is estimated that perhaps 7 per cent of the tuberculosis in man is of bovine origin. Park and Krumweide have collected from literature a total of over 1500 cases, and are authority for the statement that tubercle bacilli of the bovine type were found in 35 per cent of the cases in children of ages from five to sixteen years. However, as it is definitely proven that bovine tuberculosis is communicable to human beings, it matters little the per cent to which it is transmissible. If only a few children became tuberculous from consuming milk infected with tubercle bacilli, it is the duty of society to prevent the distribution of the disease to that extent.

Tuberculosis of live stock is a disease that can be controlled and finally eradicated. The practicability of this plan has been demonstrated for a number of years. The accredited herd work has proven to be a satisfactory method to the breeders in every state of the Union.

For your information we submit a summary of the work for the fiscal year of 1920-21, which has been carried out by the Federal Bureau of Animal Industry in cooperation with fourty-four states and the District of Columbia.

Number of herds tested	86,687	
Total number of cattle tested	1,366,538	
Reactors	53,768	
Percentage of reactors		3.94 per cent

In connection with the cooperative tuberculosis eradication work under state and Federal supervision in New Jersey, I beg to submit the following for the fiscal year ending June 30, 1921:

Number herds under supervision	218
Number cattle tuberculin tested	10,519
Number reactors (making practically 8.3 per cent	877
Number herds tested in which no reactors were found	58
Number cattle in these fifty-eight herds	1,210
Fully accredited herds with twenty-five herds awaiting test.	48

The fund appropriated by the state for tuberculosis eradication work for the fiscal year 1921-22 is $75,000. The Federal Bureau of Animal Industry has $2,000,000 equally divided—one-half for appraisement and one-half for operation expenses. In the thirty-six states in which legislatures have been in session since January 1, 1921, nearly four million dollars have been appropriated for tuberculosis eradication, and there was in addition an emergency appropriation of $775,000.

In view of the foregoing facts we believe that in order to produce a safe milk for human consumption we must eliminate tuberculosis from our dairy herds.

Below is a summary for the year:

ACCREDITED HERD WORK

Tested by United States Bureau of Animal Industry veterinarians	1320	
Reactors		31 or 2.3 per cent
Tested by New Jersey Bureau of Animal Industry veterinarians	8607	
Reactors		846 or 9.8 per cent
Tested by United States and New Jersey Bureau of Animal Industry veterinarians	592	
Reactors		0

Comparison of accredited herd testing with previous years:

Year	Number herds under supervision	Number herds fully accredited	Number animals tested	Number animals reacted	Per cent reacted
1921	218	48	10,519	877	8.3
1920	108	28	7,021	468	6.6
1919	39	2	2,920	279	9.5

NATIVE CATTLE

Tested by private veterinarians	7,074	
Reactors	591 or 8.35	per cent
Tested by United States veterinarians	35	
Reactors	5 or 14.2	per cent
Tested by New Jersey veterinarians	121	
Reactors	16 or 13.2	per cent
Tested for export	334	
Reactors	29 or 8.6	per cent
TOTAL number of NATIVE cattle (including accredited)		
Tested	18,083	
Reactors	1,518 or 8.3	per cent

Comparison of native cattle tested (including accredited) with previous years:

Year	Number animals tested	Number animals reacted	Per cent reactors
1921	18,083	1518	8.3
1920	18,098	1392	8.0
1919	13,673	1086	7.9
1918	4,484	463	10.3
1917	2,436	262	10.0
1916	845	55	6.5

IMPORT CATTLE

Tested before entering by United States Bureau of Animal Industry veterinarians	4,807	
Reactors	18 or .37	per cent
Tested before entering by private veterinarians	12,302	
Reactors	537 or 4.3	per cent
Tested after entering by United States Bureau of Animal Industry veterinarians	247	
Reactors	37 or 15.0	per cent
Tested after entering by private veterinarians	219	
Reactors	11 or 5.0	per cent
TOTAL number ACCREDITED, NATIVE and IMPORT cattle		
Tested	18,549	
Reactors	1,566 or 8.4	per cent
Slaughter cattle which entered on permit	18,599	
Feeder cattle which entered on permit	617	
Grass calves under six months released	109	

CATTLE SLAUGHTERED

Reactors, quarantined in fiscal year 1920	333
Reactors, quarantined during this fiscal year	1,337
Total	1,670

BOARD OF HEALTH—PHYSICAL CONDEMNATIONS

Reported by Board of Health as suspected tuberculosis on physical examination and slaughtered	133

Reported by private veterinarians as suspected tuberculosis on physical examination and slaughtered	27	
Reported by Board of Health as suspected tuberculosis on physical examination and later tuberculin tested	23	
Reactors	19 or 82.6	per cent
Reported by Board of Health as tubercular as shown by tuberculin test	57	

During the fiscal year 1921, there were 831 reactors slaughtered, appraised and paid for. The total appraised amount was $253,633.30, and of this amount $54,006.16 was paid by the state, There were 997 animals slaughtered under inspection, and the owners received the carcass value.

REPORT OF THE BUREAU OF MARKETS

ALEXIS L. CLARK, *Chief*

The demand for new kinds of work made upon the Bureau of Markets, and the advantages of dividing a well-developed line of work into two or more definite efforts, has necessitated the addition of several projects to our program of activities. From the beginning five years ago, the aim of the Bureau has been to attack definite, fundamental problems only as fast as they could be actually discerned. The State Legislature has apparently favored this mode of progress, and each year has approved the necessary appropriation to allow us to advance in our work.

PROGRAM OF WORK

Project I. Standardization of Products for Marketing.

(a) Investigation of crop requirements and commercial requirements in grading.

(b) Establishment of standard grades for white potatoes, sweet potatoes, tomatoes, onions, peaches, apples, milk, eggs and hay.

(c) Inspection for shipping point certification and for grade protection.

(d) Encouragement of national standardization of containers.

Mr. Dilts and Mr. Bennetch.

Project II. Transportation.

(a) Investigation of needs of local communities and sections of the state, such as seasonal car supplies, refrigeration service, train schedules, etc.

(b) Cooperation with freight and express carriers in supplying requirements, reducing losses and delays, adjusting rates, etc.

(c) Promotion of motor truck transportation wherever practicable.

(d) Cooperation with marketing bureaus in other states on matters pertaining to interstate shipments of farm supplies and products in interstate commerce.

(e) Presentation of problems to state and national regulatory bodies as a last resort.

Mr. Bamford.

Project III. Buying and Selling Organizations.

(a) Assisting groups of producers to form cooperative associations.

(b) Cooperating with producers' organizations in maintaining proper accounting systems, locating sources of farm supplies, and in distribution of products.

(c) Cooperating with consumers' organizations in purchasing farm products in wholesale quantities.

(d) Studying principles and practices of cooperation.

Mr. Bennetch, Mr. Hankinson and Doctor App.

Project IV. Investigation of Costs of Marketing.

(a) Cooperative project with Federal Bureau of Markets on costs of milk distribution.

(b) Securing daily and weekly reports from farmers showing costs of marketing fruits and vegetables.

Mr. Bennetch, Mr. Hamilton, Mr. Lownie and Doctor App.

Project V. Market Reporting.

(a) Cooperative project with the Federal Bureau of Markets in compiling market news secured over the Federal Bureau's leased wire with drop in our office.

(b) Issuance of Weekly Market Letter to producers.

(c) Issuance of Weekly City Market Letter to consumers' organizations.

(d) Issuance of daily wholesale market report to newspapers, and telegrams to county agents.

Mr. Sherburne.

Project VI. Increasing Milk Consumption.

(a) Cooperation with producers' organizations, public school systems and consumers' organizations in education, publicity and legislation.

Mr. Bennetch.

Project VII. Retail Marketing.

(a) Cooperative project with State Federation of Women's Clubs and New Jersey League of Women Voters on more efficient retail distribution.

(b) Establishment of farmers' public markets in municipalities.

(c) Promotion of sound practices in roadside marketing.

(d) Encouragement of more efficient methods on the part of retail dealers.

Mr. Hankinson.

Project VIII. Wholesale Marketing.

(a) Licensing and bonding all milk dealers who purchase from producers under Chapter 74, Laws of 1917.

(b) Cooperating with commission dealers in maintaining confidence and building up better selling practices between producers and their agents, the commission merchants.

Mr. Bennetch and Mr. Bamford.

Project IX. Educational Publicity.

(a) Giving facts concerning seasonal crop and market conditions to newspapers.

(b) Promoting spirit of inter-dependence between producers and consumers through newspaper writings.

Mr. Sholl.

STANDARDIZATION

It was largely because of the need for legally established state grades that the Legislature was asked to provide certain measures of authority to the Department of Agriculture during the 1921 session. The resulting act, known as Chapter 83, Laws of 1921, provides among other things that the Department, acting through the Bureau of Markets, may establish and promulgate standard grades for farm products which may be used by growers and dealers. This is in no way a mandatory law, although it does, necessarily, provide a penalty for the misuse or abuse of the established brands and grade terms. Under this law grades have been established for white potatoes. This crop was taken first at the request of the Executive Committee of the State Potato Growers' Association. While a few growers are enthusiastic in their belief that a large proportion of the commercial crop of 1921 will be sold with certificates of inspection attached, we are doubtful of it, and are of the opinion that the experiment started in September 1920, with twelve carloads, will be followed up gradually this year.

We are preparing to train two men under Federal inspectors for this work during the potato shipping season of 1921. The grades established are those recommended by the United States Department of Agriculture, and the legal brands are N. J. U. S. Grade No. 1 and N. J. U. S. Grade No. 2.

Following out a line of thought developed at conferences with representatives of the Federal Bureau of Markets, and at meetings of the National Association of State Marketing Officials, the New Jersey Bureau of Markets, together with several other state agencies, mostly of the far west, has endeavored in every way possible to keep in perfect accord with the aims and projects of the Federal Bureau. It is now not difficult to see that a nation-wide grading and inspection service will rapidly develop, with all state marketing agencies acting in accord through the medium of the Federal Bureau.

With the potato crop it was felt that sufficient investigational work had been done by the Federal Bureau to warrant the establishment of state grades. With other crops we have carried on careful research work to determine proper grade requirements and definitions. During the season of 1920 four packing houses shipped a total of over 100,000 bushels of peaches graded and branded in accordance with tentative grades recommended by the Bureau. Several shippers of sweet potatoes cooperated with us, and tentative grades were worked out.

Studies have been made on onions and tomatoes, and also on eggs and hay. Milk presents certain problems in standardization of particular difficulty, but we have, after more than two years' work on the subject, arrived at some fundamental factors in agreement with the State Board of Health, and it looks now as though more rapid progress could be made. One or more conferences have been held with specialists of the Federal Bureau of Markets on each of the products mentioned, and in every case our tentative grades have been approved.

This Bureau's support was given to the movement for national standardization of containers at the annual meeting of the National Association of State Marketing Officials. A bill known as H. R. 7102 was introduced in the House of Representatives by Congressman Vestal on June 13, 1921, which includes standard requirements for the five-eighths bushel, or twenty quart hamper. This was the basket that was omitted in Mr. Vestal's previous bill.

The regulation of the healthfulness and safety of the milk supplies of the cities of the state is largely under the control of state and municipal health officials, many of whom have also designated the grades of milk which may be sold. It is difficult to separate any grading system for milk from the sanitary factors, healthfulness, cleanliness, and keeping quality, and as municipal health officers have authority to regulate the food supplies coming under their jurisdiction it becomes difficult for this Bureau to promulgate grades for milk to be sold in the various municipalities of the state unless such grades have the endorsement of the municipal health officials. The confusion at present existing in the sale of milk in the various parts of the state, because of the lack of uniformity of grades and the lack of agreement on the part of health officers as to what constitutes a fair, reasonable and workable basis for grades, is readily apparent to anyone.

After considerable study of the problem in cooperation with the State Department of Health, tentative grades for milk have been evolved which have met with the approval of representatives of producers, consumers and the New Jersey Health Officers' Association, who gathered in conference. Three grades or classes of milk are provided for; namely, certified, raw milk from tuberculin tested cows, and pasteurized milk. The basis for these grades is the condition of the "quality factors," which are "food value," "healthfulness," "cleanliness," and "keeping quality." The condition of these factors seems to be the only fair basis for a determination of grade.

Within the next year it is hoped to secure the further cooperation of all the agencies involved in securing the rapid adoption of these grades throughout the state.

While New Jersey is an important egg-producing state, marketing thousands of dollars' worth of this product in the cities of this state, as well as in New York and Philadelphia, our producers have been greatly handicapped in marketing because it has been practically impossible to standardize their product, due to the complicated systems of grading eggs adopted by the various commercial agencies which are primarily intended for the use of the city handler of eggs rather than the producer. There has been a need for a simple system of grading which could be adopted by the egg producer in standardizing his product before sending it to market. Such a simple system could be used either by cooperative producers' associations or by individuals.

The Bureau gave its attention to this problem, and in cooperation with the United States Bureau of Markets and Crop Estimates tentative grades have been devised which may do much to improve the marketing of New Jersey eggs. The bases for these egg grades are six primary quality factors; namely, shell (soundness), air cell (size), yolk (condition), white (condition), germ (development), and mold (presence of); and three secondary factors; namely, size, weight and color. These grades are now being considered by the New Jersey Poultry Producers' Association, cooperative, in the marketing of their eggs.

While New Jersey does sell some hay it also buys considerable quantities of hay, and standard grades of hay which would serve as the basis for inspection would be of value to both hay sellers and buyers. The Bureau is cooperating with the United States Bureau of Markets, which is doing some important investigational work preliminary to determining grades. It is hoped that these grades, adapted to our conditions, may be available within the next year.

TRANSPORTATION

This project has probably made a greater impression upon the minds of New Jersey farmers than any other effort of the Bureau. During the year the attitude of the various railroad authorities toward particular needs and improvements suggested by us has continued friendly and in the main distinctly helpful. Several investigations have been made of certain conditions called to our attention, and the carriers have in most cases seemed glad to receive our recommendations. The express service in particular has continued to improve. The use of

motor trucks for farm hauling is very wide. An estimate made from reports received from county agents and from some other sources shows the following general facts: number of farms in New Jersey, 1920 census, 29,702; auto trucks owned by farmers 6,500. From one to two and a half ton trucks seem to be preferred.

The Bureau has had considerable correspondence from the Pennsylvania and New Jersey Bridge and Tunnel Commission concerning farmer haulings to Philadephia, and has furnished some data.

The National Association of State Marketing Officials has officially recommended to all state marketing agencies the New Jersey plan of cooperation with railroad officials. One conference with the Interstate Commerce Commission has been held.

COOPERATIVE ORGANIZATIONS

Farmers in several parts of the state have been assisted in forming organizations to carry on cooperative buying and selling. The Hunterdon County Farmers' Cooperative Association and the Madison Farmers' Cooperative Association of Middlesex County are the two most promising. Recently the New Jersey Poultry Producers' Association, Cooperative, has been organized under the leadership of the State Federation of County Boards of Agriculture for the purpose of selling cooperatively the eggs produced by its members. It will start operations in the summer with over 400 members owning over 250,000 hens. This organization marks a distinctly new movement in that its members contract their entire output of eggs to the Association.

Through the specialist in dairy products marketing, this Bureau has continued its assistance to the two cooperative milk producers' selling organizations in the state by assisting at a number of meetings and consultations with representatives of the organizations, thus keeping in the closest possible touch with the problems confronting these cooperative producers' milk marketing associations, particularly in the after-the-war period when at times these problems have been especially difficult. The Bureau is interested in the promotion of these cooperative milk marketing organizations because it believes that through them the producer will be assured of a fairer price for his product on account of more efficient marketing methods which have been adopted. There is much yet to be accomplished by milk producers in perfecting the cooperative selling of milk, and this Bureau stands ready to serve.

Cooperative distribution of milk by producers has possibilities in a number of cities in the state where now a considerable quantity of milk is sold by small dealers or by a number of individual producers. The Bureau has had several requests for assistance in organizing producers for this purpose, but nothing definite has developed. It is believed that where a sufficient volume of milk can be distributed through a cooperative plant, properly organized, financed and managed, distribution can be made more efficient than under the present unorganized, competitive system.

Some time has been given to potato growers of Monmouth County, and a most promising movement is under way to place the distribution of a large proportion of the potato crop of the state into one selling agency's hands. This must come as a rational development of the potato industry. In the past, white potatoes from New Jersey have been sent to nearly thirty states by a score or more of large handlers and a hundred or more of small shippers. This has always prevented any sort of systematic distribution, and much actual waste, as well as unnecessary costs, has resulted. The Swedesboro Growers' Association is preparing to ship graded tomatoes in a more efficient manner than heretofore. The Holly Fruit Growers' Cooperative Packing Association, consisting of less than a dozen peach and apple growers, shipped some forty carloads of peaches from their central packing house in Mount Holly during the 1920 season, and are prepared to put some improvements into effect this coming season.

Some studies have been made in accounting systems in use by cooperative associations, and we are preparing some suggestions and forms to meet needs along this line.

During the fall of 1920 we interested a number of consumers' organizations in apple buying direct from growers in wholesale quantities. Local associations in Elizabeth, the Oranges, Montclair and other cities affiliated with the State Federation of Women's Clubs, the Jersey City Chamber of Commerce, the city commissioners of Passiac, and many others, including several large factories, purchased apples in truck loads and carloads. We kept accurate records of nearly 50,000 bushels of apples sold in this way, and estimate that at least twice that amount was handled throughout the season. Potatoes were another crop handled in the same manner. The usual procedure was for a committee to place the order and announce when and where the load would be placed, the character of the product and the price. One instance which our studies showed will illustrate some of the advan-

tages of this plan in a season when our ordinary distributing agencies are unable to handle efficiently a large production.

An apple grower in Warren County shipped a carload of Baldwin apples to a commission merchant in Newark. After paying for packing, barrels, hauling, freight and commission, the grower netted 50 cents per bushel. The next week, with no change in the apple market, he shipped a motor truck load in bulk to a women's organization in Elizabeth. In this case he netted 90 cents per bushel. The apples sent to the commission house, after going through a retail store or a huckster, sold to consumers usually in small quantities at an average price of around $2.40 per bushel. The housewives in Elizabeth, by going to a central point and taking the apples home in their own containers, bought them in half bushel quantities for 65 cents, or $1.30 a bushel.

A questionnaire was sent out to several hundred farmers' organizations in the United States, and to twenty-five in New Jersey. From studies made from such returns, we are endeavoring to formulate the most suitable plans for farmers' organizations in the state to meet particular problems in buying, selling, financing, contracting, etc.

COSTS OF MARKETING

As we enter into this project we see great possibilities. There are all sorts of ideas and opinions prevailing among farmers, dealers and consumers relative to the costs of marketing. There are very few known facts. In the milk business dealers frequently have charged more for this service than the farmers received from them. Fruit and vegetable growers adopt one or more methods of selling which may or may not be the most profitable for them. Investigational work along this line will furnish some very valuable information which will be available to the entire public and which can be immediately used to practical advantage.

The Federal Bureau of Markets is studying costs of milk distribution in several states. We entered into the cooperative project with them, and have examined the records and accounts of most of the larger dealers in the state. Only a few less than a dozen had records which would really show their costs. In general they have shown a splendid spirit of cooperation, and only a few have hesitated to allow us free access to the accounts. A number of dealers have been advised regarding more definite records, and the value of the results gathered from this year's work will be increased greatly by the results from next year's studies.

Nearly fifty farmers kept records of cost items in marketing fruits and vegetables during the summer of 1920 in a project carried on by us, and this year we are duplicating this work with a larger number of farmers.

Sixty-five poultrymen returned questionnaires sent out by us to ascertain the costs of marketing eggs. We are now following this work up by personal visits, so that we will have complete cost accounts from at least one hundred plants.

MARKET REPORTING

After experimenting in several ways, we were given opportunity to carry out a complete market reporting program commencing in the spring of 1921. Through a cooperative arrangement with the Federal Bureau of Markets, we now have their special leased telegraph wire connected in our office, and they supply the operator. Arrangements were made with the Pennsylvania Bureau of Markets to enable us to receive the Philadelphia market report, and arrangements were also made with the New York State Division for a daily report from New York City.

We thus receive daily reports from all parts of the country. Telegrams are sent out before nine o'clock each morning to county agents at no expense to them, giving the same morning's market prices and conditions in the large eastern markets. A number of daily newspapers are getting these reports from us by telegraph at their own expense. Our Weekly Market Letter has increased in popularity, and now goes out to a mailing list of nine hundred addresses. Daily, semi-weekly and weekly newspapers receive it at their own request. Our City Market Report issued on Wednesday of each week has a mailing list of one hundred addresses. This is a part of our cooperative project with the organized women of the state.

INCREASING CONSUMPTION OF MILK

Milk and its products are vital to the welfare of our people, and it therefore becomes important that consumption should be at the maximum in order that the health of our children and adults may be maintained and that the family cost of food may be reduced, as well as that the dairy industry may be stabilized by a larger consumption of its products. The decrease of exports of dairy products after the war threatened the dairy industry with large surpluses and prices too low

to maintain production, and it therefore became important that efforts to increase consumption be doubled. The Bureau has therefore gladly accepted every opportunity to cooperate with the various agencies engaged in this work. The work of the Interstate Dairy Council in the southern part of the state has been actively supported, particularly in its initial work in Trenton where excellent work was done in promoting milk consumption. The dairy industry has the support of health officials, particularly those doing malnutrition work in the public schools of the State who have found many undernourished children and who recognize that an increased consumption of milk is fundamental to a decrease in this too prevalent condition among children. The work done along these lines in the schools of Trenton and Montclair is particularly notable. The Bureau has recently enlisted the interest and support of the state-wide women's organizations in this work.

Believing that the prices charged by restaurants, soda fountains and lunch counters for milk and ice cream were out of line with the prices which the producer received for milk, and therefore curtailed consumption, this Bureau made an investigation in a number of cities in the state. In the case of ice cream in the various forms in which it is being sold, it was found that in most instances war prices were still being charged. A publicity campaign through the newspapers of the state was inaugurated and was at least partially effective. This was only the beginning of similar campaigns in a number of states.

It was found in the case of milk sold by restaurants, lunch counters and soda fountains that the price for a glass varied from 5 to 10 cents, the glasses varying in size from 5½ to 12½ ounces. Five samples were taken in each of six cities. In three cities four of the fifteen samples were below the legal minimum of 3 per cent butter fat, one of these containing only 0.3 per cent. Wide publicity was given to the facts, and the attention of health authorities was called to the fact that certain samples were below the standard for fat. There is no question that too high prices and frequent skimming of milk in restaurants and similar eating places has seriously curtailed milk consumption, and the campaign inaugurated by the Bureau, in an effort to secure lower prices and to assure the selling of whole milk instead of skimmed, has been effective to the extent that the attention of the public has been called to the facts.

RETAIL MARKETING

Our cooperative project with the State Federation of Women's Clubs has been broadened somewhat, and is carried on parallel with the New Jersey League of Women Voters. Mrs. M. J. Gross of Cranford, as chairman of the Home Economics Committee, represents the Federation; and Mrs. J. L. Douglass of East Orange, as chairman of the Fair Price Committee, represents the League. The project we are carrying on with these organizations is entitled "More Efficient Food Distribution" and covers the following subjects:

(a) Farmers' market place in cities.
(b) Cooperative buying.
(c) Direct buying from farmers by mail and express.
(d) Milk supply.
(e) Retail market reporting.
(f) Systematic study of distribution economics.

The scarcity of fruit and many common vegetables this season has not emphasized the need of new farmers' markets. Those already established have served their purpose well. A tour of several markets was made on August 26 with invited representatives of municipalities, Chambers of Commerce, women's clubs, etc.

A model roadside market was demonstrated in the Armory at Trenton during "Agricultural Week".

Some valuable studies in conducting retail food stores have been made. While this subject has not been dealt with in a thorough way, we have found some of the reasons why some stores handle products on a twenty per cent margin and others on a hundred per cent margin. A good example was found in two grocery stores in Trenton. One store handled ten to fifty sixteen-quart baskets of apples a week during the fall of 1920. These apples were purchased on an average for about 90 cents a basket and were sold for about $1.40. The other store handled 200 to 500 baskets bought for about 75 cents and sold for 90 cents. The fruit averaged about the same in quality. Both stores gave credit and made delivery, but one depended upon a small margin and volume of business while the other followed the usual method of handling a small quantity with a "safe" profit. We have tried through various publicity efforts to encourage dealers to rely on volume and narrow margins.

WHOLESALE MARKETING

The Federation of County Boards appointed a committee at our suggestion to enter into cooperation with the commission merchants of Philadelphia for the purpose of developing increased confidence between New Jersey farmers and their commission selling agents in that city. Unfortunate delays prevented the consummation of this project, but plans are being made for carrying it out in the near future.

Licensing of all those buying milk from producers is required by Chapter 74, Laws of 1917, and the requirement of bond where necessary has been continued by Mr. Bennetch, of this Bureau. Under this law all those who engage in the business of buying milk from producers shall each year on or before June 1 make application to the Department for license. A sworn financial statement is required upon the basis of which the Department is enabled to determine whether or not bond should be required. As this law is intended to protect producers who sell to these buyers, the cooperation of such producers in calling the attention of the Department to all buyers who have not complied with the law by displaying their license card at the place of business would greatly facilitate its enforcement.

During the past year 154 buyers of milk were licensed by the Department. A large number who made application purchased milk from less than three producers and were exempted from license.

EDUCATIONAL PUBLICITY

For many years farm interests, and in fact the interests of the entire public, have suffered because of the lack of sympathetic and authoritative information on crop production and marketing conditions.

Under such headings as "Buy it in Quantity, Eat it in Season" and "New Jersey's Turn Now" we are giving newspapers readable articles on seasonable crop subjects. Each week we emphasize one or two crops which are at the peak of production. Not long after this plan was inaugurated the chief of the Bureau was invited to be the guest of the New Jersey Press Association on its annual outing, and to speak at its business meeting.

Personal acquaintance was made with scores of newspaper publishers, and some valuable suggestions were secured on this work. It is probably true that no day now passes that does not have a marketing

item of some sort in one or more papers of the state. Of course, on some days New York and Philadelphia papers and scores of New Jersey papers carry the same "write-up."

SUMMARY

To the workers in the Bureau the past year seems to have been a year of wonderful progress. The principal of standard grades has been adopted, and it seems now that within a few years the bulk of farm products sold through wholesale dealers will be described by standard grade terms. Cooperation, with all that it means in an educational way, has developed to the point where keen business minds, as well as economists and sociological theorists, recognize it as a definite factor in the business world. With a beginning made in research work we look forward to the securing of scientific information which will give the needed impetus to all our other lines of endeavor.

REPORT OF ASSISTANT DIRECTOR OF FARMERS' INSTITUTES

WM. H. HAMILTON

In conducting farmers' institutes during the past season, the State Department of Agriculture has endeavored to make each meeting fit the needs of the local community in which it was held. The assistant director of institutes visited each county agent in the state during the early part of September to discuss plans for the season and to make arrangements for the meetings. Wherever feasible the county agent consulted the leaders in the various communities regarding institute work for their community. These leaders were then called together and definite arrangements were made for the institute programs of the county. During the early part of the season, every county was interested in the membership campaign of the County Boards of Agriculture, State Federation of County Boards of Agriculture and American Farm Bureau Federation, and wanted speakers on this subject. The Department cooperated in furnishing speakers, and in a number of counties planned a series of one-session booster meetings preceding the membership campaign in the county.

Local exhibits always add to the value of a meeting, and wherever possible such exhibits at institutes have been encouraged. At each of the ten meetings in Hunterdon County a local corn show was held, and these local shows resulted in a very creditable exhibit from Hunterdon County at the State Corn Show.

The Department of Agriculture has endeavored to secure the best speakers available, although difficulty is often encountered in getting the particular speaker desired in a community. No regular staff of institute speakers is employed, but use is made of the members of the staff of the State College of Agriculture and Experiment Station, and of the Department of Agriculture staff, and a liberal use is made of good farmers in the state. Occasionally, speakers are brought in from adjoining states to fit special meetings.

The following is a list of speakers used during the year:

State College of Agriculture

1. Dr. J. G. Lipman, Dean.
2. Prof. L. A.Clinton, Director of Extension.
3. Prof. M. A. Blake, State Leader of Farm Demonstration.
4. Prof. H. R. Lewis, Department of Poultry Husbandry.
5. Mrs. Frank App, State Leader of Home Demonstration.
6. Prof. A. J. Farley, Department of Horticulture.
7. A. Freeman Mason, Specialist in Horticulture.
8. Miss Marjory A. Eells, Home Demonstration Agent, Sussex County.
9. Miss M. Ethel Jones, Assistant State Club Leader.
10. Prof. A. W. Blair, Associate Soil Chemist.
11. C. H. Nissley, Extension Specialist in Market Gardening.
12. Prof. L. G. Schermerhorn, Associate Professor in Market Gardening.
13. J. W. Bartlett, Extension Specialist in Dairying.
14. Dr. W. H. Martin, Associate Plant Pathologist.
15. I. L. Owen, Extension Specialist in Poultry Husbandry.
16. Prof. Merle S. Klinck, Professor of Rural Engineering.
17. H. R. Cox, Extension Specialist in Soils and Agronomy.
18. I. T. Francis, County Agent, Essex County.
19. J. B. Turpin, Mercer County Club Leader.
20. E. H. Wene, Superintendent, Egg Laying Contest, Vineland.
21 Robert P. Armstrong, Associate Pomologist.
22. Joseph R. French, Assistant Specialist in Horticulture.
23. W. F. Knowles, Assistant State County Agent Leader.
24. R. Frank Poole, Assistant Plant Pathologist.
25. Florence Powdermaker, Specialist in Nutrition.
26. H. B. Seaver, Instructor in Horticulture.
27. Ellwood Douglass, County Agricultural Agent, Freehold.
28. W. Raymond Stone, County Agricultural Agent, Hackensack.
29. Mrs. Mabel Douglas, Woman's College.

State Department of Education

1. Dr. W. F. Maroney, Director of Physical Education.

State Library Commission

1. Miss Sarah B. Askew.

State Department of Agriculture

1. Alva Agee, Secretary.
2. A. L. Clark, Chief, Bureau of Markets.
3. P. B. Bennetch, Specialist in Dairy Products Marketing.
4. Wm. L. Hundertmark, Market Specialist.
5. Douglas S. Dilts, Market Specialist.
6. Dr. T. J. Headlee, State Entomologist.
7. Dr. Mel. T. Cook, State Plant Pathologist.
8. E. G. Carr, Deputy Bee Inspector.
9. H. B. Bamford, Transportation Specialist.
10. Wm. H. Hamilton, Assistant Director of Farmers' Institutes.
11. C. H. Hadley, Assistant to State Entomologist in Japanese Beetle Control.

New Jersey Federation of County Boards of Agriculture

1. Harry E. Taylor, President.
2. Dr. Frank App, Secretary.

Practical Farmers

1. Hon. David H. Agans, Master, State Grange.
2. Gilbert Borton.
3. G. D. Brill.
4. Harry C. Brose.
5. Roscoe DeBaun.
6. J. Reid Chambers.
7. Neal Demarest.
8. Earl Dilatush.
9. B. S. Ells.
10. John C. Errickson.
11. Fred Gardner.
12. Alvin Gaventa.
13. L. R. Harris.
14. John H. Hankinson.
15. J. C. Haynes.
16 D. Henniger.
17. Thos. Hunt.
18. A. R. Kohler.
19. C. B. Lewis.
20. J. W. Miller.
21. Walter Minch.
22. David McKay.
23. W. W. Oley.
24. Wm. M. Mount.
25. Chas. Probasco.
26. Geo. T. Reid.
27. F. F. Rockwell.
28. Henry Schmidt.
29. E. A. Sexsmith.
30. Fred Shangle.
31. Howard M. Sheppard.
32. E. R. Smith.
33. H. R. Talmadge.
34. Horace W. Tinkham.
35. Percy Van Zandt.
36. C. N. Warner.
37. A. E. Young.

Miscellaneous

1. Leslie J. Allen, U. S. Department of Labor.
2. L. Ray Balderston, Teachers College, New York.
3. James Burrows, Brooklyn, N. Y.
4. Marion Butters, New York.
5. J. Edward Cattell, Philadelphia, Pa.
6. Emil Closs, Brooklyn, N. Y.
7. H. W. Collingwood, Editor, Rural New-Yorker.
8. Rev. Forrest E. Dager, Philadelphia, Pa.
9. Rev. Alfonso Dare, Haddonfield.
10. Mildred DeVoe, Spottswood.
11. Hugh Fergus, Grove City, Pa.
12. Grace Frysinger, States Relation Service, Washington, D. C.
13. Mrs. Clarence Griffin, Caldwell.
14. Dorothy Halstad, Brooklyn, N. Y.
15. Mildred Hocking, Caldwell.
16. Eugenie Huckel, Caldwell.
17. Elsie Jacobus, Verona.
18. Roy E. Jones, Storrs, Conn.
19. Isabelle Ely Lord, Brooklyn, N. Y.
20. S. Mendelsohn Meehan, American Nursery Association.
21. Clarence G. Meyer, Montclair.
22. Mrs. Rose Morgan, New York City.
23. Vera McCrea, Ithaca, New York.
24. Rev. S. E. Persons, Linthicum, Md.
25. J. E. Rice, Cornell University, Ithaca, N. Y.
26. Mrs. F. W. Stillman, Rahway.
27. Hon. Harold B. Wells, Bordentown.
28. F. P. Willits, Interstate Milk Producers' Association.

One-session meetings, at which a subject of particular interest to a community is discussed, are becoming more popular and are probably of greater benefit to the community than a meeting of two or three sessions at which a greater number of subjects are discussed.

The following list shows the location of meetings held:

NOVEMBER

4, Beverly.
9, Bargaintown.
11, Vincentown.
15, Hamburg.
15, Sussex.
16, Branchville.
16, Lafayette.
17, Montague.
17, Layton.
18, Fredon.
18, Tranquility.
18, Spring Valley.
19. Sparta.
19, Walpack Center.
19, Allentown.
20, Hope.
20, Cape May Court House.
20, Medford.
23, Washington.
23, Moorestown.
30, Rocksburg.

DECEMBER

1, Flemington.
2, Roseland.
2, Stewartsville.
3, Morristown.
4, Freehold.
11, Somerville.
14, Mount Holly.
14, Mullica Hill.
14, Ringoes.
14. Sergeantsville.
14, Shiloh.
15, Shiloh.
15, Lebanon.
15, Westwood.
16, Spring Mills.
16, Califon.
16, Gouldtown.
16, Harmersville.
17, Dividing Creek.
17, Dutch Neck.
17, Whitehouse.
18, Three Bridges.
18, Pattenburg.
28, Center Grove.
28, Cross Keys.
30, Vineland.

JANUARY

3, Hackensack.
4, Almonesson.
5, Crosswicks.
17, Franklin Park.
19, Little Ferry.
21, Upper Macopin.
26, Lambertville.

FEBRUARY

1, Norma.
2, Woodcliffe Lake.
2, Elmer.
3, Woodstown.
5, Mountain View.
8, Ramsey.
9, Hammonton.
9, Imlaystown.
14, Mendham.
14, Union Hill.
15, Mt. Fern.
15, Mt. Freedom.
16, Wall.
16, Washington Valley.
16, Hanover Neck.
17, Pine Brook.
17, Towaco.
17, Elizabeth.
18, Chester.
18, Long Valley.
18, Hopewell.
19, Vernon.
19, Myersville.
25, Chesterfield.
25, Trenton.

MARCH

2, Dayton.
3, Union Center.
5, Somerville.
12, Cape May Court House.
14, North Haledon.
17, New Monmouth.
18, Greenville.
19, Harbourton.
21, Caldwell.
29, Upper Preakness.
31, Manahawkin.

June

9, Hackensack.
10, North Haledon.

ATTENDANCE

The following tabulation shows by counties the number of meetings, the number of sessions, total attendance and attendance per session:

COUNTIES	Number of Meetings	Number of Sessions	Attendance	
			Per Session	Total
1. Atlantic	2	5	24.6	123
2. Bergen	7	15	65.4	981
3. Burlington	7	13	108.0	1,405
4. Cape May	2	4	29.2	117
5. Cumberland	5	11	78.8	867
6. Essex	2	5	70.0	350
7. Gloucester	3	4	78.8	315
8. Hunterdon	10	19	57.4	1,090
9. Mercer	4	9	125.0	1,125
10. Middlesex	2	6	50.8	305
11. Monmouth	5	9	131.1	1,180
12. Morris	13	14	46.4	650
13. Ocean	2	2	51.0	102
14. Passaic	4	4	93.7	375
15. Salem	4	6	49.5	297
16. Somerset	2	3	55.0	165
17. Sussex	10	16	48.22	772
18. Union	2	2	22.5	45
19. Warren	4	6	47.6	286
Totals	90	153	(Average) 68.9	10,550

County agents, county boards of agriculture and community committees, and the men and women who rendered service as speakers, deserve great credit for the success of the meetings.

REPORT OF THE BUREAU OF STATISTICS AND INSPECTION

H. B. WEISS, *Chief*

SUMMARY

The scope of the Monthly Crop Reports has been enlarged. Additional correspondents have been secured.

A survey of the commercial poultry plants was made.

Three hundred and twelve cases of foreign nursery stock were inspected. The brown-tail moth was intercepted.

Six hundred and fifteen cases and nineteen carloads of domestic stock, mostly fruit trees, were inspected, and 2,700 trees condemned.

One hundred and eighty-six nurseries and dealers' establishments were inspected.

Twenty-four special inspections were made.

The state appears to be almost free of white pine blister rust, only one infection having been found on currants.

One hundred and fifty-eight acres of second-crop seed white potatoes were certified.

Sweet potato seed certification was started.

Gipsy moth and Japanese beetle quarantines were established.

Excellent progress has been made in cleaning up the gipsy moth infestations. Estates, nurseries, plantings, etc., have been scouted for this insect with negative results. Attention is directed to the statement of results in the body of this report.

During the past year work against the Japanese beetle has consisted of the following lines: quarantine enforcement, insecticidal investigations, parasite investigations, and control operations. The quarantine enforcement operates under state and federal quarantines, and takes care of the inspection and certification of nursery and greenhouse stock and farm products and scouting to determine the limits of infestation. During the past season 62,137 baskets of sweet corn were examined, and 846 beetles found.

Other farm products were handled by the growers in such a manner as to make actual inspection unnecessary. The insecticidal investigations dealt with methods of treating balled earth infested with grubs, grub-killing materials in the field and beetle-killing materials. Progress

is being made in these lines, but further experimentation appears to be necessary. Concerning the parasite investigations, several shipments of a predacious ground beetle (*Crespedonotus tibialis*) have been received from the investigator in Japan and are being colonized. The control operations consisted of the maintenance of the barrier band and cyaniding.

STATISTICAL SERVICE

Monthly crop reports were issued regularly during the past year. The cooperative work with the United States Bureau of Crop Estimates, which was started in May, 1920, when the first joint report was issued, has continued with mutual satisfaction and has resulted in a broadening of the reports. In addition to the regular monthly crop condition and forecast figures for New Jersey, these reports have contained miscellaneous agricultural statistics, together with graphs and charts designed to show the trend of certain phases of agriculture in the state.

Beginning with May, 1921, the report was enlarged by including in it, under the term "Barometrics", certain items intended to show the general trend of the more important agricultural happenings in the United States as a whole. These items consisted of figures dealing with acreages and production of the important crops; movement of livestock at important centres; livestock prices; average weekly prices of farm products at New York, Chicago and Philadelphia; carload shipments of fruits and vegetables; fertilizer material prices; cold storage reports; movement of butter, cheese, dressed poultry and eggs at New York, Chicago, Philadelphia, Boston and San Francisco, and index numbers of wholesale prices of farm products and other groups of commodities. An effort was made to secure figures showing monthly sales of agricultural machinery, commercial fertilizers and feeds, but apparently there are no agencies in the United States which collect such figures. As time goes on, an effort will be made to strengthen the report still further by the inclusion of additional items which are useful as agricultural barometers.

The total number of reporters on our lists is 872, and the monthly returns from these men have been gratifying. It is a source of regret to this Bureau that the Department cannot show its appreciation to these correspondents in a more substantial way than by thanking them.

COMMERCIAL POULTRY SURVEY

During the first several months of this year (1921) a survey of all commercial poultry plants in New Jersey having 300 birds or more was attempted by this Bureau and the State Bureau of Markets. This survey was made for the purpose of determining the extent and importance of this industry and in order that definite figures could be secured which would be useful for comparative purposes in future years. The results have been tabulated and will be published, together with a list of breeders, in a Department circular.

PUBLICATIONS

In addition to the monthly reports, which contain acreage, production and value figures, livestock estimates, fertilizer consumption figures, etc., all of which it is unnecessary to reprint here, Circular No. 37 was prepared jointly by this Bureau and the United States Bureau of Crop Estimates, and it contains a full discussion as to the methods of reporting and making up our reports, together with statistics since 1866 for the more important crops.

Report of the Inspection Service
Plant Inspection

HARRY B. WEISS, *Chief*

THOMAS J. HEADLEE, PH.D., *State Entomologist*

MEL. T. COOK, PH.D., *State Plant Pathologist*

During the past fiscal year 312 cases of foreign nursery stock were inspected. As in the case of the previous year, very little attention was paid to several hundred additional cases of imported bulbs, as such stock was not considered likely to carry pests of a nature serious to agriculture, nor was our inspection force large enough to properly care for this work. Most of the foreign stock consisted of palm seeds, orchids, rose stocks and fruit tree seedlings.

SUMMARY OF FOREIGN NURSERY STOCK INSPECTED

Country of Origin	Number of Cases
Australia	75
Brazil	5
England	15
France	8
Germany	13
Holland	136
Ireland	4
Japan	56
Total	312

The only insect intercepted in the above shipments was the brown-tail moth, nests of which were found on apple stock from France consigned to Springfield, New Jersey.

DOMESTIC STOCK INSPECTED DURING FALL OF 1920

State of Origin	Number of Cases	Number of Carloads
Alabama	23	—
Connecticut	11	—
Colorado	5	—
California	8	2
District of Columbia	5	—
Indiana	4	—
Illinois	7	—
Iowa	3	—
Kansas	1	—
Massachusetts	24	—
Michigan	6	1
Missouri	13	2
Maryland	32	—
Maine	15	—
New York	70	3
Ohio	48	2
Pennsylvania	14	—
Rhode Island	6	—
Tennessee	4	—
Virginia	2	—
West Virginia	1	—
Totals	302	10

In the above shipments, which consisted mostly of fruit trees, 812 apple and 496 peach trees were rejected on account of crown gall, hairy root and borers.

DOMESTIC STOCK INSPECTED DURING SPRING OF 1921

State of Origin	Number of Cases	Number of Carloads
Alabama	16	1
Connecticut	5	2
California	132	2
Florida	1	—
Iowa	5	—
Kansas	5	—
Maryland	35	—
Massachusetts	3	1
Michigan	7	—
Missouri	5	—
New York	57	2
Ohio	19	—
Pennsylvania	16	1
Tennessee	7	—
Total	313	9

In the spring shipments, 1,438 apple trees were condemned on account of crown gall and hairy root. Most of the domestic stock shown in the two tables above consisted of fruit trees consigned to the southern half of the state, and a large number of the inspections were made in response to the requests from growers.

The most important finding of the year was made in April, 1921, when a carload of spruces from Massachusetts consigned to Little Silver was found to be infested by gipsy moth egg masses, which were imperfectly creosoted. The trees were carefully gone over and the infection eliminated.

NURSERY INSPECTION

One hundred and eighty-six nurseries and dealers' establishments were inspected and certificates issued as follows:

General certificates	112
Dealers' certificates	27
Berry certificates	20
Greenhouse certificates	10
Peach certificates	7
Orchid certificates	1
Dahlia certificates	4
Rose certificates	5
Total	186

SPECIAL INSPECTIONS AND CERTIFICATES

Twenty-four special inspections were made, of which twelve were for the purpose of furnishing special certificates in order to facilitate shipments being made out of New Jersey, and twelve were concerned with various insects and diseases necessitating personal visits and advice.

WHITE PINE BLISTER RUST WORK

Only one case of blister rust was found during the past year, and this was a very light infection on currants at Blue Anchor, New Jersey. All white pines under quarantine and in nurseries were examined with negative results.

The following table shows the findings since 1916:

Locality	1916	1917	1918	1919	1920	1921 to July 1
Rutherford	15 pines	9 pines	0	0	0	0
Little Silver*	1 (on currants)	1 (on currants)	0	0	0	0
Clementon (not near a nursery)			2 pines	0	0	
Eatontown	3 pines	0	0	0	0	0
Red Bank*	1 (on currants)	1 (on currants)	4 (on currants)	1 (on currants)	0	
Millburn	1 pine	0	0	0	0	0
Morristown	48 pines	6 pines	3 pines	0	0	0
Blue Anchor*				1 (on currants)	1 (on currants)	
	67 pines	15 pines	5 pines	0 pines	0 pines	0 pines

* Number before phrase "on currants" refers to the number of plantings infested.

WHITE POTATO SEED INSPECTION AND CERTIFICATION

This work, conducted jointly by the State Department of Agriculture and the New Jersey State Potato Association, shows a healthy growth. One hundred and ninety-seven acres were entered by 21 growers, compared with 153.5 acres by 13 growers in 1919. One hundred and fifty-eight acres passed the last year, compared with 38 acres in 1919. The following table shows the results of the work of the past year.

Variety	Field Inspection			Tuber Inspection	
	Acres Inspected	Acres Rejected	Acres Passed	Acres Rejected	Acres Passed
Irish Cobblers	133	0	133*	4	124
Giants	42	2	40†	4	21
Mill's Pride	10	0	10	0	10
Red Skins.....	3	0	3	0	3
Green Mountain	9	0	9	9	0
Totals	197	2	195	17	158

* Five acres were sold before final tuber inspection.
† Fifteen acres were sold before final tuber inspection.

The four acres of cobblers were rejected on account of scab. Of the giants, two acres were rejected in the field because of mosaic, and four during the tuber inspection on account of late blight rot. The Green Mountain variety was rejected on account of Rhizoctonia on the tubers. A total of 20 acres (5 acres of cobblers and 15 acres of giants) were sold before the final inspection. Of these about 15 acres would have passed.

SWEET POTATO SEED INSPECTION AND CERTIFICATION

This work was started in June, 1921, at the request of several Atlantic County growers. The following regulations were drawn up, and the work will be conducted in accordance with them. These may be modified in the future, depending upon the results of the first year's work.

Regulations, Sweet Potato Seed Certification

1. Application for inspection and certification must be made on prescribed blanks not later than April 1.
   (The grower has the privilege of increasing the acreage by filing notice with the Bureau of Statistics and Inspection, Department of Agriculture, not later than the date of the first inspection.)
2. The application must be made to the chief of the Bureau of Statistics and Inspection.
3. The applicant must pay fees as follows:
   Two dollars ($2.00) per acre for the first five acres.
   One dollar ($1.00) per acre for each additional acre.
   If the acreage is less than five, the minimum fee will be ten dollars (10.00).
4. The fee must accompany the application.
5. The applicant must sign an agreement to comply with all the rules and regulations for inspection and certification prescribed by the State Department of Agriculture.
6. The inspector will make three inspections:
   (a) The first inspection about three weeks after setting the plants.
   (b) The second inspection about four or five weeks after the first inspection.
   (c) The third inspection at digging. This inspection should be made before frost.
7. Crops will be disqualified for more than 5 per cent of black rot or 7 per cent of stem wilt, or for a total of 10 per cent diseased of the two. Ten per cent of disease at time of the first or second inspection, or a total of 10 per cent for the two inspections, will disqualify the field, and the third inspection will not be made.
8. The crop must be marketed in uniform packages, and each package must carry the prescribed tag.
9. The tags must not be used on any potatoes other than those that have been passed and certified.
10. If the field passes all inspections, the grower will be given a certificate.
    NOTE: The certificate and tags refer only to the condition of the potatoes at time of digging and have no bearing whatever on rots and other undesirable conditions that may develop following that time.

Recommendations

Growers are advised to select their own seed stock, and to treat and bed in accordance with Circular No. 123 of the New Jersey Agricultural Experiment Station.

Instructions

1. The field to be certified must be staked out, so that the inspector will be able to take all necessary data most conveniently.
2. Cultivation must be sufficient to keep down weeds and grass in order to enable the inspector to do satisfactory work. Failure to keep the field clean will be just cause for rejection.
3. It will be necessary to arrange with the inspector to be present at digging time. This must be done in ample time before digging. It is important that he make the last and most important inspection at this time. Any failure on the grower's part to arrange with the inspector to make this inspection will disqualify the potatoes.
4. After the field is set the grower will not remove diseased plants, nor reset misses. Any proof showing that diseased plants were removed, that will mislead the inspector in making up his report, will be sufficient for disqualification.
5. The certificate must show precisely the actual results found by the inspector and placed in his report.
6. The inspector will be fair to all and partial to none. His report will cover facts as accurately as possible as they appear in the field. Sweet potato growers who are not willing to conform to these rules and accept actual results should think twice before they take up the work.

Ninety acres were entered for certification by 23 growers. The first field inspection was made during the early part of June, and 81 acres passed. The remaining nine acres had been planted late and had suffered from the dry weather. They were, therefore, not ready for inspection. Of the total acreage entered 73.5 were of yellow varieties and 7.5 of red ones.

QUARANTINES

Japanese Beetle Quarantine dated November 1, 1920, supersedes that of April 1, 1920, and deals mainly with the movement of plants and plant products from the infested territory in Burlington and Camden counties.

On October 4, 1920, a quarantine was placed on the territory infested by the gipsy moth in Middlesex and Somerset counties. This dealt mainly with nursery, forest and quarry products. This will be revised whenever the infested area is extended or lessened.

THE GIPSY MOTH

The presence of the gipsy moth on the Duke Estate, Somerville, New Jersey, was brought to the attention of the State Department of Agriculture about the last of June, 1920. At that time the insect was found

to be present in a large block of blue spruces, about four acres of which had been completely defoliated. Thousands of old egg masses and caterpillars were present, and these, together with the dead trees, presented an alarming spectacle, indicative of what would occur over the entire state were the insects allowed to spread unrestricted.

The facts surrounding the original introduction of the pest into New Jersey are somewhat obscure. It is thought that the moth may have been introduced in the egg stage on blue spruces imported from Holland and set out on the Duke Estate during 1911. At that time it was not customary to inspect Holland stock, which was considered safe, and the facilities for obtaining information concerning importations into the state were not good. The supposition that it came direct from Europe to New Jersey is supported by the fact that New Jersey egg masses are darker in color than those found in the New England area, although this might be due to environmental factors.

As soon as the Somerville infestation was noted word was sent to the United States Bureau of Entomology, and this Bureau, in spite of the limited funds at its disposal, immediately placed a small force of scouts in the field. These men determined the general limit of the infestation and traced the trees sent out by the Duke Estate since 1911. Early in November, 1920, the State Legislature made a special appropriation of $112,000 to fight this pest, and this money, together with an appropriation made later by Congress, has made it possible to prosecute the work rapidly and effectively.

Findings and Work accomplished to July 1, 1921

A scouting of the territory in the vicinity of Somerville has resulted in finding the moth generally distributed over approximately 175 square miles. Two hundred and seventy-three shipments of nursery stock made by the Duke Estate in previous years to various parts of New Jersey have been traced and inspected, and infestations found at the following places: Wyckoff, 4 egg clusters; Glen Rock, 4 egg clusters; Paterson, 1 pupa case; South Orange, 12 egg clusters; Elizabeth, 2 egg clusters; Madison, 2 egg clusters; Deal Beach, 18 egg clusters. During the course of the scouting work 1,400 egg clusters were found in old orchards and on nearby grounds at Mendham. The origin of this colony is unknown.

At all of the above-mentioned places, the egg masses were creosoted, the surroundings of each place thoroughly scouted and a safety area thoroughly sprayed. At Mendham, the orchards were cut and burned, the egg masses on trees not destroyed were creosoted, the entire township scouted and a large safety area sprayed. In various instances the routes taken by trucks which delivered blue spruces from the Duke Estate were scouted, and no infestations were found beyond the area known to be infested.

After funds were available, intensive scouting of the region around Somerville was started. The entire territory known to be infested earlier in the season was examined, and all egg clusters found were creosoted. Afterwards, this work was extended outward into surrounding townships. At the present time 410 square miles are known to be infested, of which 175 are generally infested, the remainder lightly. About most of this territory a wide border area has been examined and found free of traces of the gipsy moth.

In Hillsboro, the township in which Somerville is located, the infestation was heavy, more than 3,000,000 egg clusters having been treated. Outside of this township the clusters were scattered, and most of the colonies found did not contain more than one or two clusters. It seems from this that the bulk of the spread from the original infestation at Somerville has taken place during the last year or two.

Aside from the scouting and treatment of egg clusters, extensive spraying operations were carried on over the entire area. Twelve machines operated during the caterpillar season. Over 2,400 acres were sprayed, and this does not include ridges of miscellaneous growth along fences, river banks, etc. Seventy-five tons of arsenate of lead were used and approximately 2,700,000 gallons of spray delivered. In addition approximately 20,000 trees were banded with sticky material and 15,000 with burlap.

The effectiveness of the work done is apparent in the fact that it was difficult to find gipsy moth caterpillars even in the most heavily infested localities. All of the control work is being conducted jointly by the New Jersey Department of Agriculture and the Bureau of Entomology, United States Department of Agriculture. Mention should be made of the cooperation of the Duke Estate and the support of the citizens in the infested territory.

A state quarantine has been placed on the infested territory. This furnishes adequate authority to prevent the movement of material carrying egg clusters, etc. It is being administered in cooperation with the Federal Horticultural Board. In addition to the large area, this quarantine applies also to the small outlying areas where only a few egg clusters were found. All nurseries or premises from which shipments are made of material likely to carry eggs have been inspected—some of them several times—and no material likely to carry infestations is permitted to move unless inspected at time of shipment.

The following table shows sources of money used in fighting the pest and distribution of expenditures for the past fiscal year:

State appropriation, $112,000	
Labor	34 per cent
Supplies (9 sprayers, hose, arsenate of lead, etc.)	63 per cent
Office expenses, insurance on machines, etc.	1 per cent
Travel	2 per cent
	100 per cent
Federal expenditure in New Jersey, $117,784.82	
Labor	66 per cent
Supplies, equipment	19 per cent
Supervision	15 per cent
	100 per cent
J. B. Duke appropriation, $25,000	
Equipment (2 sprayers, hose)	72 per cent
Supplies (arsenate of lead)	28 per cent
	100 per cent
Total amount, $254,784.82	

Other Gipsy Moth Work

The Somerville infestation called attention to the danger of estates, as these places have received in the past little or no attention in the way of inspection. Therefore it was thought advisable to detail a small force whose duty it would be to inspect estates, nurseries, plantings, etc., where there was the slightest possibility of the gipsy moth being present. Accordingly a force of six scouts was organized for this work in January, and since that time has been active in inspecting estates, private and municipal parks, park systems, nurseries, ornamental plantings, etc. Fortunately, the results so far have been negative. Only by work of this kind can a duplication of the Somerville infesta-

tion be prevented in another part of the state. Constant inspection of this sort is urgently needed and recommended as the only way of finding a pest before it has firmly established itself over a large area.

GIPSY MOTH STATISTICS

Number of Men Employed Throughout the Year

July	Aug.	Sept	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
3	12	21	28	92	100	100	100	132	140	172	145

Approximate square miles scouted	894
Approximate square miles infested	403
Total number miles of road scouted	1,919
Total number acres of woodland scouted	7,627
Total number trees banded with tree banding material	20,000
Total number trees banded with burlap	15,000
Total number larvæ killed beneath banding material or burlap	5,355
Total number acres sprayed	2,400
Total number shipments traced in New Jersey	318
Total number towns involved in tracing shipments	72

The figures showing miles of road scouted do not indicate total mileage covered, on account of difficulty of determining the mileage of borough and city streets. Neither does the number of acres sprayed cover the entire amount, as there were many individual trees, fence rows, etc., which were sprayed.

THE JAPANESE BEETLE*

Work against this insect in the southern part of the state continues under the direction of Mr. C. H. Hadley, and the following statements indicate briefly the activities during the past year.

Quarantine Enforcement

During the past season there have been in effect both a Federal quarantine and a New Jersey State quarantine. The provisions of both quarantines were practically identical, and enforcement of the State quarantine was delegated to the Federal authorities. This work has been performed under the immediate supervision of Mr. C. W. Stockwell.

Inspection and certification of practically all farm, nursery and greenhouse products was required, but where proper care was taken by the grower in handling his products in accordance with methods suggested by this office it was found that actual inspection was necessary

* Conducted in cooperation with the Bureau of Entomology, U. S. Department of Agriculture.

only in the case of sweet corn. During the season 62,137 baskets of this product were examined, and a total of 846 beetles were found during the course of the season.

The proper enforcement of the quarantine, including scouting, required the services of 37 men besides the officer in charge, and two Ford trucks, in addition to a number of bicycles.

Scouting to Determine Limits of Infestation

In general two areas were scouted: the border of the known infested area and the area lying just outside the border of known infestation. Considerable emphasis was placed on scouting the border of the known infested area, daily collections being made at extreme outside points of infestation, whether within this area or in the supposed non-infested area. Experience has shown that finding and destroying the occasional beetle or beetles outside the area of "real" infestation is extremely important in retarding the spread of the insect. The inspection men, when not engaged in inspection work, are utilized in scouting and collecting in the areas of lightest infestation, and scouts are assigned to inspection when circumstances require such shifts.

In addition, scouting along the Delaware River was carried out in order to detect at the earliest possible moment any infestation resulting from spread of the insect through this agency.

Insecticidal Investigations

During the past season the insecticidal investigations have been carried on under the immediate supervision of Mr. B. R. Leach, assisted by Messrs. F. J. Brinley, J. W. Thomson and J. C. Sager. While some preliminary work had been done along this line previously, there was available very little data which was in any way conclusive. Consequently it has been necessary to do a great deal of more or less preliminary work in order to arrive at a definite course of procedure and to eliminate other lines which proved to have no bearing on the problem from further consideration.

This investigation has been considered under the following divisions: (1) beetle-killing material; (2) methods of treating balled earth infested with grubs, and (3) grub-killing materials in the field.

Investigations to Find Materials for Killing Beetles

Previous work had indicated that the Japanese Beetle would not eat spray deposits of standard insecticides. During the past season the work was planned along two lines—to find out why the beetle would not eat the standard insecticides, and to develop a poisonous spray which the beetle would eat with indifference.

During the ten weeks of the beetle season a large number of powdered materials insoluble in water were sprayed on foliage. The list of these materials, totaling 56 combinations in all, ranged all the way from finely powdered hydrated lime and other similar innocuous compounds to the standard powdered arsenated and arsenites of lead, calcium, zinc, etc. All these compounds, when they dry on foliage, result in a coarse, granular spray deposit which stands out prominently on the leaf. The beetles were repelled to a greater or lesser extent by all the compounds of this general class, whether an arsenical or not.

The data at hand indicate very clearly that the beetles object to eating spray deposits consisting of small powdered grains of any material. Color of the spray deposit seems to make little or no difference to them in this respect.

In addition to the field work metioned above, practically all the standard arsenicals on the market have been carefully studied in the field and laboratory, and it has been found that all give a gritty, granular spray deposit which repels the beetles. As a result of these rather extensive tests, and a laboratory study of the preparation of the arsenates of various cheap metals, the men engaged in this work have been able to prepare arsenates which give the desired smooth, amorphous, inconspicuous spray deposit or film of the type needed in connection with this problem.

Since the quarantine regulations prohibit the shipment of nursery stock requiring soil around the roots during shipment, except where such stock and soil is known to be uninfested, an obligation is laid on us to devise a means of treating such stock when infested; in fact, such treatment is really necessary when there is any reason to even suspect the presence of grubs in such shipments, since it is impracticable to examine successfully such stock without removing the soil from the roots, a practice which would be injurious if not fatal to the plant. A series of tests were planned and carried through to determine the practicability of dipping such plants.

As a result of this work, the fact is plainly evident that concentrated toxic solutions cannot be used as dips for balled earth. Since the completion of this work by Mr. Thomson in September, another "lead" has been obtained involving the use of dilute solutions. A study of the literature of soil physics, and experiments conducted recently, indicate that by a method of proper manipulation this factor of soil absorption can be controlled. Enough experimental data have been obtained to indicate very clearly that this method can be applied to the killing of such *Popillia* grubs as may be present in the soil in potted plants. The data also indicate that the type of herbaceous plants ordinarily grown in pots has considerable resistance to these dilute solutions.

The problem of overcoming the factor of soil absorbtion when these dilute solutions are used as dips for balled earth is decidedly more complex. The literature on soil physics and chemistry affords very little information on this point. Experiments conducted at the laboratory during the past six weeks, while not as yet resulting in a definite positive treatment, nevertheless indicate that this problem can be solved. Just how much further experimentation will be necessary is not known, since the problem is entirely empirical.

During the last two seasons a large amount of cyaniding of heavily infested fields has been done as part of the control work. The work is expensive, however, running on the average around $65 per acre. It seemed advisable, therefore, to endeavor to find a material less expensive than sodium cyanide for this purpose, as well as perhaps a more satisfactory method of applying materials under our conditions. A number of field experiments were planned, to be carried out during the fall season, but owing chiefly to delays in receipt of the necessary chemicals the major portion of the work was done when the soil temperature was too low for the most effective work. About twenty-five plots of sod ground were treated with various chemicals in varying amounts, the material being spread on the surface by hand and worked in lightly with a rake. The soil was dry and hard at the time of application, and the weather was warm. The materials tested in this way included paradichlorobenzine, calcium chloride, lime sulphur, cyaninid, calcium carbide, and sodium cyanide. The results were largely negative except with paradichlorobenzine at the rate of 200 to 300 pounds per acre, which gave about 50 per cent control when the soil was dry and hard. Experiments were made with this material, placing it in

inch drills in the sod, but the soil was too cold and the material did not volatilize. Pot experiments gave poor results largely for the same reason. Further work along this line will be planned for the coming fall.

Parasite Investigations

During the past season a good start has been made in the parasite work. Mr. C. P. Clausen has been in Japan since early in the spring of 1920, and has made remarkably good progress there. Very valuable information has been aquired there about the insect and its habits, and two shipments of a predacious ground beetle, *Crespedonotus tibialis,* have been received from Mr. Clausen. The survivors of these shipments, to the number of about 250, have been released in a large, specially-made cage under the most favorable conditions obtainable here. Mr. J. L. King left for Japan recently to assist Mr. Clausen in this work.

From time to time, various members of the staff of the laboratory have noted facts of interest relating to possible native parasites, but no serious effort has yet been made to investigate this phase of the problem. In anticipation of this work being taken up in earnest the coming season, a study of available literature dealing with parasite problems and methods in general has been started by Mr. Hadley.

Control Operations

During the season of 1920, the control operations consisted of maintenance of the barrier band and cyaniding.

Barrier Band Work

The barrier band work may be divided into two phases: (a) the clean-up, including salting, and (b) the spraying and dusting work.

(a) *Clean-up work*—The cleaning up of headlands, roadsides, etc., was carried on throughout the winter of 1919-1920, and into the spring of 1920. During the spring and up to the middle of summer, salt was used to hold down the wild vegetation, following the clean-up work. Approximately 200 tons of salt were used in this way. Early in the season, fuel oil was used to keep down growth and proved even more satisfactory than salt; but about as soon as we had demonstrated this fact, the oil situation became so acute that oil of this character could no longer be obtained at any price.

(b) *Spraying and Dusting work.* This work as originally planned called for repeated spraying and dusting of band from one-half to one mile wide entirely surrounding the known infested territory. The band was approximately 40 miles in length, and for this work a total of seven power sprayers and seven power dusters were available. For the spraying, commercial concentrated lime-sulphur (32 Baume) 1 to 50 was used, with the addition of about 2½ pounds of hydrated lime. At this strength there was only occasional burning of foliage. During the season, a total of approximately 200,000 gallons of this spray mixture was applied.

For the dusting, a mixture of equal parts of superfine sulfur and hydrated lime was used. Approximately 100 tons of dust were applied during the season.

The season itself was not at all favorable for work of this nature. The spraying and dusting season extended from July 1 to September 8, and included a total of 59 working days, excluding Sundays. We actually sprayed and dusted on 39 days in that time, the remaining 20 days being lost on account of inclement weather. The band as a whole was completely covered four times during the season. We were also handicapped early in the season by the failure of our spraying and dusting materials and equipment to arrive in time.

In general, the barrier band work may be considered as having failed to attain its object—the prevention of the spread of this insect—and this feature of the control work will be dropped.

Cyaniding

During the fall, about 15 acres of heavily infested fields were cyanided. However, owing to adverse field conditions and the heavy cost of this work, less cyaniding was done than originally planned.

More or less in connection with the cyaniding work, an extensive grub survey was made. Practically all the fields within the heavily infested area which were at all suitable for breeding purposes were examined for grubs. This survey has revealed much information of value regarding places of infestation, degree of infestation and other points. Cyaniding will be continued only in an experimental way.

Funds Expended

During the past fiscal year, the State of New Jersey appropriated $15,000, and the Federal government appropriated $100,000 for this work.

Report of the Bee Inspection Service

HARRY B. WEISS, *Chief*
THOMAS J. HEADLEE, *State Entomologist*
ELMER G. CARR, *Deputy to the State Entomologist in Bee Inspection*

As in previous years the two foremost problems in the work of the advancement of beekeeping in New Jersey have been the control of bee diseases and the introduction of better beekeeping practices. During the past fiscal year very satisfactory progress has been made along both these lines.

A most encouraging sign is the desire on the part of bee owners to secure larger profits from their holdings and also the fact that they appreciate the need of disease control, better stock and more up-to-date beekeeping practices. This is evidenced by a greatly increased correspondence and number of calls for inspection, which makes it a problem for the deputy to give all calls prompt attention.

LAW ENFORCEMENT

While this work is so entitled, the attitude of beekeepers toward the work, except in rare cases, is one of eager compliance with instructions for the control of disease in their bees.

During the year 157 apiaries have been inspected. In these were 1,866 colonies of bees, all except 21 being housed in some type of movable frame hive.

There were discovered 126 colonies infected with American foulbrood, 53 with European foulbrood, 37 with sacbrood and 8 with paralysis. When these figures are compared with those of 1919-20 (Page 82, Department of Agriculture Bulletin 26), it will be seen that a larger per cent of disease is recorded for this year. This is accounted for by the fact that the work has been done more largely where there was reason to believe disease existed.

The use of better stock and better practices is giving good results in the control of European foulbrood, and the recognized treatment for American foulbrood when carefully followed is proving satisfactory.

To prevent any possible spread of disease from the apiaries of queen breeders, those doing business in the state were examined, found free of disease and certificated as follows:

J. Field Garretson, Bound Brook, Somerset County, July 30, 1920, and May 9, 1921.

Robert B. Spicer, Wharton, Morris County, May 10, 1921.

Albert G. Hann, Glen Gardner, Hunterdon County, June 21 1921.

EDUCATION AND ORGANIZATION

It is a matter of some surprise to learn how few of the manipulations necessary in securing good returns from bees are familiar to the rank and file of beekeepers. Then, too, the fear of stings and the lack of knowledge to avoid much stinging deter many bee owners from attempting the necessary work.

This being true, no opportunity to teach these principles by precept and demonstration is neglected. To this end eight schools for beekeepers were held the past year in connection with the Extension Department of the New Jersey State Agricultural College and the County Farm Bureaus, with an attendance of 414.

Under the management of the New Jersey Beekeepers' Association, eight field demonstrations have been held at the following named places: Haledon, in July; Mt. Pleasant, in July; Hope, in August; Plainfield, in September; Vineland, in May; Orange, Stewartsville and Harmony, in June. The attendance at these demonstrations was 388. This Association held a two-day session at Trenton during "Agricultural Week." The attendance at the four sessions was 282, the largest in its history.

The writer serves as the secretary of this organization, which has shown a good growth and now numbers 576 paid-up members. Two lectures were delivered before the Connecticut Beekeepers' Association in October.

A lecture was given before a meeting of the Ramsay Grange, also one at a meeting of the Essex County Beekeepers' Association. This last named Association was organized in February and is doing good work.

The edition of "A Manual of Bee Husbandry" issued in 1913 has become exhausted. Familiarity with the problems of the beekeepers of the state has indicated the lines on which a new manual should be written, and copy for this has been prepared. A publication of this kind seems necessary in order that information may be furnished to the great number of persons asking for literature.

An exhibit of beekeepers' appliances was maintained at the Trenton Fair, September 27—October 2, and in the Armory, Trenton, during "Agricultural Week."

It was suspected that New Jersey beekeepers were not getting as good control of bee diseases as were those in other states. In order that the true state of affairs might be known a visit to the Bee Culture Laboratory at Washington was made, and it was there learned that the control in New Jersey compares favorably with that in any other state, notwithstanding the fact that New Jersey beekeepers have the worst type of European foulbrood to deal with.

BEE POISONING

For a number of years bees in the vicinity of Freehold have been dying from some obscure cause, and this trouble has appeared over much of Monmouth County and a part of Mercer County. From the evidence now at hand it would seem that poisoning is the cause of this loss. Many samples of dead and dying bees have been sent to the Bureau of Chemistry at Washington. In each case enough arsenic has been found in the bees to cause death. How the bees obtain this poison and a practical means to prevent the loss are problems yet to be solved.

QUEEN REARING

Seventeen queens were mated under control conditions, not all of which proved to be satisfactory. An importation of queen bees from Italy has been secured for use in further breeding work.

The list of beekeepers of the state is constantly being increased, and over 100 before unknown have been listed the past year and literature furnished them.