STATE OF NEW JERSEY

DEPARTMENT OF AGRICULTURE

ALVA AGEE, Secretary

BULLETIN

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Ninth Annual Report

of the

New Jersey State Department of Agriculture

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Ninth Annual Report of the New Jersey State Department of Agriculture

REPORT OF THE SECRETARY

ALVA AGEE

The greater part of the work of the State Department of Agriculture is organized within three bureaus. The remaining work is administrative excepting a few lines that do not naturally come within bureau control and are taken care of in the administrative office. The policy of the Department is determined by the State Board of Agriculture, whose executive is the secretary of the Department. The work within the bureaus is under the control of bureau chiefs, who act with the advice of the secretary.

THE BUREAU OF ANIMAL INDUSTRY

The report of Dr. J. H. McNeil, chief of the Bureau of Animal Industry, presents a clear and quite complete statement of the outstanding activities of the Bureau. It is a matter of congratulation to the State Board of Agriculture that most satisfactory progress is being made in the control of animal disease within the State. Nine veterinarians on the staff of that Bureau give continuous field service, and in the work of tuberculosis control there is the assistance of representatives of the Federal Bureau of Animal Industry, who are cooperating with the State in this work. In addition to the regular staff, a large number of the leading veterinarians of the State render some assistance, for whose service direct appropriation is made. A brief study of the work performed within the year is convincing that results are proportionate to the investment of money, time and skill.

Tuberculosis

The control of tuberculosis in cattle is the leading project, not only as determined by the money expended, but also by the very heavy capital investment in cattle and the effect upon public health due to the eradication of tuberculosis in a considerable percentage of our dairy herds.

A few years ago we dared not say that we were on the road to such control of tuberculosis that eradication appeared to be a probability. We were making some herds clean and were barring the entry of tubercular cattle from other states so far as possible. The latter was a work of necessity, but any marked headway toward eradication was not apparent. Within the last two years all this has changed. The attitude toward tuberculin testing by herd owners has improved in a marked degree. Within a single county 425 herds have been entered for supervision under our accredited-herd plan, and one-seventh of the dairy cows of the State now belong to herds that are known to be practically clear of this disease. The methods of testing have been improved so that retests of 864 herds have shown only about 2 per cent of infected animals. If there were sufficient Federal and State money available for the payment of part indemnification of the owners of reacting cattle the progress toward a clean State would be rapid.

The livestock interests of the State are being saved heavy losses from various virulent diseases through the agency of this Bureau. Science has provided the means of stamping out epidemics, and those means are employed quickly when any danger presents itself.

THE BUREAU OF MARKETS

The report of the Bureau of Markets, of which A. L. Clark is chief, affords evidence that most definite projects are being pushed by the staff of that Bureau. The standardization of farm products continues to be a leading project. It is in the interest of producers and consumers alike that goods of known quality go upon the market. Much time has been given to the determination of proper grades and to the encouragement of producers to make use of them. Co-operation, with all its beneficent results, has been materially fostered

by the Bureau. Better transportation service has been secured through the hearty cooperation of railroads with the Bureau. Possibly the market reporting service is as widely popular as any project within the Bureau. Market information obtained from the Bureau's reporters in New York and Philadelphia early each morning, supplemented by other market information gathered daily, goes to shippers and daily papers throughout the season. Other lines of service add to the value of this Bureau's work, which is an important part of the State Board of Agriculture's endeavor to make full return for the State's investment in agriculture.

BUREAU OF STATISTICS AND INSPECTION

The Bureau of Statistics and Inspection, of which Mr. H. B. Weiss is chief, carries on two quite different lines of work, one of which is statistical. The crop reporting service is about as dependable as it can be made in view of the constant changes in condition of growing crops due to the vicissitudes of weather. This information has a large cash value to the producer.

This Bureau's full report upon its activities in the control of insect foes and infectious diseases of plants gives accurate information regarding the results obtained from the expenditure of the quite large appropriation made for use of this Bureau. The appropriation for the extermination of the gipsy moth has had so far an unusual degree of success, but on the other hand the State has profited by all the experience of the Federal government in past contacts with this pest. The report shows that the reduction in the amount of infestation in Central Jersey is sufficient to justify the belief that this dreaded pest will become extinct in this State. There is necessity that nearly all the territory be scouted thoroughly another year to make sure that no moth has been left behind. That means continuing expenditure of money on a considerable scale for another year or two, but the system of scouting and spraying is efficient and the work is done as economically as possible.

The report regarding the Japanese beetle is less encouraging. Probably nothing more could have been done than was done by the Federal and State governments in the attempt to destroy this beetle, but it was present without any native parasites and would not feed freely upon poisoned foliage. The introduction of parasites is a success,

and spraying is being made more effective. The State is compelled to carry on field inspection work on a vast scale to prevent the products of the southern half of the State from being barred from the markets of New York and other states. It is assumed that this requirement will not continue when some infestation of this beetle in all the eastern states renders further quarantine regulations useless.

LARGE ITEMS IN THE DEPARTMENT BUDGET

The State Board of Agriculture desires a record for all the economy consistent with rightful service to the State. It has been held back from some constructive work by the necessity of asking large sums for the protection of the public's interests. The invasion of the State by the gipsy moth, and that of the Japanese beetle, added heavily to budget totals. In the case of the gipsy moth, the interests at stake were not purely agricultural, but some department must take the responsibility for the work and the organization of our Bureau of Inspection made the Department of Agriculture the natural agent. The expenditures for control of the Japanese beetle are in the interests of the general public and not at all exclusively for agriculture, and there is the heavy item for the encouragement of herd owners to provide the most wholesome milk to our cities and towns. The policy of partial indemnification of herd owners is in force in all states having any considerable dairy production, and this policy is right and most directly in the interest of consumers. I am emphasizing these three items to say that a very large part of the total asking of the Department of Agriculture is for control work whose nature appears to be imperative.

JUNIOR BREEDERS' ASSOCIATION

Miss Grace M. Ziegler, assistant manager of the Frelinghuysen Fund, makes report of loans to members of the Junior Breeders' Association in which the State Board of Agriculture takes much interest. A great number of boys and girls are enabled to become the owners of pure-bred livestock and to give animals profitable care. A love for the farm is strengthened and incalculable good results.

MILK DEALERS' LICENSING LAW

The enforcement of the act providing for the licensing and bonding of dealers in milk and cream, which is made the duty of the Secretary of Agriculture, is directly in charge of Mr. Paul B. Bennetch, who is the specialist in market milk in the Bureau of Markets. Most responsible dealers now accept this law as a means of barring dishonest men from the business.

PUBLICATIONS

The following bulletins and circulars were issued during the past year:

BULLETINS

No.
37. Eighth Annual Report of the State Department of Agriculture.
38. Official Proceedings of the Ninth Annual State Agricultural Convention; Addresses at the Meeting of the New Jersey State Federation of County Boards of Agriculture.
39. The State Potato Association and the State Alfalfa Association.
40. The Production and Consumption of Food in New Jersey.

CIRCULARS

65. Eradicating Tuberculosis in New Jersey.
66. Factors Influencing the Price of New Jersey Potatoes on the New York Market.
67. Results of the Third Year's Work Against the Gipsy Moth in New Jersey.
68. The Chinese Mantis, a Beneficial Insect in New Jersey.
69. Miscellaneous Agricultural Statistics for New Jersey.
70. Costs, Profits and Practices of the Sweet Potato Industry in New Jersey, 1922.
71. Prices Received for New Jersey Produce in Philadelphia.
72. Requirements and Rules for the Inspection and Certification of New Jersey Second-Crop Seed Potatoes, as adopted by the New Jersey State Potato Association and the New Jersey State Department of Agriculture for 1924.
73. Poultry Flock Inspection and Certification.

REPORT OF THE BUREAU OF ANIMAL INDUSTRY

J. H. McNEIL, *Chief*

SWINE DISEASE CONTROL

Swine disease control has received the usual attention during the past fiscal year.

Requests are received from swine breeders for assistance in the diagnosis and treatment of infectious swine diseases. These calls are answered by sending Bureau veterinarians or employing private veterinarians if Bureau veterinarians are not immediately available.

The major portion of this work is executed in cooperation with the County Boards of Agriculture, especially in the districts where there are few private veterinarians; namely, Gloucester, Atlantic, Cape May, Ocean and Monmouth counties.

It is our plan to practice protective inoculation on animals in the districts mentioned in the early spring and late fall. This insures protection against cholera for both the fall and spring crop of pigs.

There are a number of garbage-feeding plants in the State, located in Secaucus, Asbury Park and Westville districts. The protective inoculation practiced in the Secaucus and Westville districts is done by private veterinarians. The major portion of the inoculation for the garbage-feeding plants in Monmouth County is carried out by Bureau veterinarians.

On account of the low price of pork and pork products, we have experienced some trouble in inducing swine breeders and feeders to keep all of their animals properly vaccinated. Because of this neglect on their part, we have had several outbreaks of cholera during the past year.

One of the greatest problems we are confronted with is the control of some of the dealers who sell unvaccinated hogs from their premises where a low grade of hog cholera infection exists, thereby spreading the disease to susceptible animals.

Through the issuance of permits for the removal of slaughter hogs from public stock yards, we have been able to control the spread of cholera from this source.

In all cases where requests have been received, investigation has been promptly made and inoculation or treatment instituted, which has materially reduced the mortality from infectious swine diseases.

HOG CHOLERA INOCULATION

Summary by Months—July, 1923—June, 1924

(Treated by Bureau and Private Veterinarians)

	Bureau Veterinarians		*Private Veterinarians*	
	Single	*Double*	*Single*	*Double*
July	36	1,429	5	923
August	8	195	28	866
September	29	36	39	1,151
October	12	140	52	1,896
November	15	145	88	322
December	6	397	124	315
January	12	62	8	642
February	..	19	56	106
March	21	77	39	235
April	..	45	196	246
May	26	572	120	283
June	50	344	55	251
Totals	215	3,461	810	7,236

TOTAL SINGLE 1,025
TOTAL DOUBLE 10,697

GRAND TOTAL 11,722

HOG CHOLERA INOCULATION

Summary by Counties

(Tested by Bureau and Private Veterinarians—July, 1923—June, 1924)

	Bureau Veterinarians		*Private Veterinarians*	
	Single	*Double*	*Single*	*Double*
Atlantic	29	429	..	..
Bergen	..	..	..	..
Burlington	1	32	..	..
Camden	13	110	15	1,166
Cape May	4	336	..	..
Cumberland	..	..	293	434
Essex	..	..	..	264
Gloucester	13	91	83	2,474
Hunterdon	5	35	2	213
Mercer	39	147	236	640
Middlesex	..	..	24	24
Monmouth	82	1,638	61	245
Morris	..	..	20	101
Ocean	29	511	24	..
Passaic	..	..	..	..
Salem	..	132	43	225
Somerset	..	..	..	..
Sussex	..	..	..	..
Union	..	..	..	1,437
Warren	..	..	9	13
Totals	215	3,461	810	7,236

TOTAL SINGLE	1,025
TOTAL DOUBLE	10,697
GRAND TOTAL	11,722

HOG CHOLERA INOCULATION

Comparison of Summaries, 1919–1924

Treated by Bureau Veterinarians	1919–1920	1920–1921	1921–1922	1922–1923	1923–1924
Double	4,051	4,005	3,954	2,999	3,461
Single	1,265	529	565	164	215
	5,316	4,534	4,519	3,163	3,676
Treated by Private Veterinarians					
Double	13,380	10,217	7,843	9,576	7,236
Single	2,106	772	620	614	810
	15,486	10,989	8,463	10,190	8,046
Totals					
Double	17,431	14,222	11,797	12,575	10,697
Single	3,371	1,301	1,185	778	1,025
	20,802	15,523	12,982	13,353	11,722

PASTURE DISEASE OR FORAGE POISONING

During the month of July, 1923, an outbreak of this disease was reported by a private veterinarian in the vicinity of Freehold. One animal died and five were treated with Polyvalent Botulinus Antitoxin, with no further development of the disease.

In cooperation with the County Boards of Agriculture of Ocean and Cumberland counties, protective inoculation against this disease was practiced as indicated in the following summary:

	Monmouth County	Cumberland County	Ocean County	Total
July, 1923	5	..	..	5
August, 1923	..	..	58	58
September, 1923	..	78	47	125
Totals	5	78	105	188

BLACK LEG

The existence of black leg in the northern section of the State was reported by a private veterinarian during the month of August, 1923. The animals were treated and further deaths were not reported.

STALLION REGISTRATION

The records indicate a continued decrease in the registration of stallions and jacks, as the New Jersey breeders do not consider it profitable to breed and raise horses and mules. They usually purchase the replacement horses from western consignments. However, in the face of this lack of interest on the part of the breeders, statistics would seem to indicate that many of the large transportation companies are gradually replacing their motor-drawn vehicles by horse-drawn vehicles, especially where short hauls are made, as they believe this form of transportation is more economical.

STALLION REGISTRATION

Breed	1920	1921	1922	1923	1924
Percheron (Registered)	25	26	20	20	18
Clydesdale (Registered)	5	3	3	3	2
Belgian (Registered)	1	1	1	1	..
Standardbred (Registered)	9	4	4	4	5
Suffolk (Registered)	2	3	1	2	1
Thoroughbred (Registered)	6	5	6	4	3
German Coach (Registered)	2	6	1	1	1
Jacks (Registered)	2	4	3	2	2
Standardbred (Non-Registered)	6	5	5	4	3
Suffolks (Non-Registered)	..	1	1	1	1
German Coach (Non-Registered)	1	1	..	..	..
Jacks (Non-Registered)	2	1	2	2	2
*Grade Drafts	18	17	16	13	12
Hackney	2	..	..	..	..
Shetland	1	..	..	..	..
Totals	82	77	63	57	50

*Includes grade Percherons, Belgians and Clydesdales.

STALLION REGISTRATION BY COUNTIES

County	1920	1921	1922	1923	1924
Burlington	7	6	6	6	4
Camden	2	2	2	1	2
Cumberland	3	6	3	4	3
Hunterdon	19	14	12	12	12
Mercer	3	3	3	1	1
Middlesex	2	2	2	4	3
Monmouth	7	7	7	8	5
Morris	6	8	3	3	4
Salem	7	7	6	5	3
Somerset	7	5	4	1	3
Sussex	3	4	6	4	3
Union	1	1	..	..	..
Warren	15	12	9	8	7
Totals	82	77	63	57	50

GLANDERS

Few cases of glanders have been reported during the past fiscal year and, as the records show, there have been fewer animals mallein tested. This statement refers directly to the animals which are used in interstate traffic between New Jersey and New York.

A summary of the work follows:

GLANDERS—1923-1924

	Negative	*Positive*
July	1	..
August	1	1
September	10	..
October	6	..
November	7	..
December	12	..
January	24	..
February	167	..
March	178	..
April	32	..
May	5	..
June	11	1
Totals	454	2

GLANDERS

Comparison of Summaries—1919–1924

	1919–1920	1920–1921	1921–1922	1922–1923	1923–1924
Negative	356	460	277	208	454
Positive	17	70	10	4	2
Suspicious	...	2	...	...	...
Totals	373	532	287	212	456
New York and New Jersey Traffic					
Negative	2,670	3,087	5,493	4,208	2,754
Positive	5	4	....	....	....
Totals	2,675	3,091	5,493	4,208	2,754

ANTHRAX

The data indicate a gradual decrease in the number of vaccinated animals, probably due to the fact that when serious outbreaks occur only occasionally owners become indifferent and do not give the matter of protective inoculation against this disease serious attention.

It will be noted that during the year 1920, 1,468 animals were inoculated. During the last fiscal year only 543 were inoculated, although there are practically as many animals maintained in these districts as previously.

We have urged the owners to continue the practice, as it is carried out by the State free of charge and as no losses occur as result of the vaccination. The only expense to the owner is the time given in bringing the cattle together at one point for inoculation.

Below is a summary of the work:

YEAR	Cattle	Horses	Total
1924	497	46	543
1923	862	50	912
1922	985	52	1,037
1921	1,238	32	1,270
1920	1,442	26	1,468

RABIES

Outbreaks of rabies have been frequently reported from the various thickly-populated sections of the State. The disease affects the dog, principally, but may be transmitted to other animals and human beings, and unless proper treatment is instituted at once death usually occurs.

In order to control the disease, municipalities have passed ordinances requiring the vaccination of all unmuzzled dogs. The measures adopted only temporarily check the disease, and not until uniform laws are adopted and enforced will the disease be brought under control and finally eradicated.

The statutes of the State of New Jersey place the control of rabies under the supervision and direction of the Department of Health and local boards of health.

TUBERCULOSIS

In order to show the progress which the Bureau of Animal Industry of New Jersey has made during the fiscal year which commenced July 1, 1923, and terminated June 30, 1924, in the eradication of tuberculosis among cattle, the following summary is offered:

At the closing of the last fiscal year, June 30, 1923, we had in New Jersey 674 herds under supervision, with 15,843 animals. At the closing of our records, June 30 of this year, we have 1,540 herds, comprising 25,825 animals, or an increase of 128.48 per cent in the number of herds and an increase of 63 per cent in the number of animals under supervision.

During the past twelve months we tested 35,713 animals, with 4,296 reactors, or a percentage of reactors of 12.03 per cent of the total number of animals tuberculin tested in herds under State and Federal supervision.

Our appropriation for the payment of indemnities for reactors for 1922-1923 was $75,000. For the year 1923-1924 our appropriation was $100,000, and we received $35,000 in a supplemental appropriation, making our total State appropriation $135,000.

In addition to the State appropriation we have received from the Federal Bureau of Animal Industry sufficient funds to match the State appropriation.

During 1922-1923, indemnity was paid for 1,706 reactors—654 pure-breds and 1,052 grades. During 1923-1924, indemnity was paid for 3,912 animals—488 pure-breds and 3,424 grades.

During the year 1922-1923 the percentage of reactors on initial tests was 25.41 per cent of 5,646 animals, or 1,435 reactors, while during the twelve months of this fiscal year the percentage has increased to 29.09 per cent, with 12,988 animals tested and 3,789 reacting.

The percentage of reactors of imported cattle or from untested herds within the State which have been added to herds under supervision during the fiscal year 1922-1923, amounted to 2½ per cent, or 87 reactors, of 3,540 animals tested. For the year 1923-1924, we have tested 3,735 animals which have been added to herds, with 100 reactors or a percentage of 2.67 per cent.

Other tests include first, second or third retests of herds already under supervision, and during the fiscal year 1922-1923, 18,287 animals were tested, with 312 reactors or a percentage of reactors of 1.70 per cent. For the fiscal year 1923-1924, 18,990 animals were tested, with 407 reactors or a total percentage of reactors on such tests of 2.14 per cent. Probably the increased percentage of reactors on first, second or third retests from 1.7 per cent to 2.14 per cent is due to the fact that we have, during the past year, employed the intradermal and ophthalmic method in addition to the subcutaneous and ophthalmic which we have used in previous years, as it is a well-known fact that animals will react to the intradermal test which have passed other tests without reacting and will react to the subcutaneous and ophthalmic tests after having passed the intradermal test without reacting and prove tuberculous on autopsy. Therefore, we have adopted the plan of using all three tests in combination.

This excellent showing indicates that tuberculosis can be eradicated from the domesticated animals. The results attained are, in a great measure, due to the splendid cooperation given to the Bureau of Animal Industry by the breeders and dairymen in cleaning and disinfecting their premises following tests, and in the purchase of herd additions originating in herds under supervision or from areas declared to be free from tuberculosis.

A summary of the tuberculin testing of herds of cattle under the State and Federal accredited-herd plan for the entire United States during the period of July 1, 1923, to June 30, 1924, is as follows:

Number of herds tested	453,946
Number of cattle tested	5,291,970
Number of reactors	170,876
Percentage of reactors	3.22 per cent

A summary of the work of testing herds of cattle under this plan for the State of New Jersey during the same period is as follows:

Number of herds tested	2,175
Number of cattle tested	35,713
Number of reactors	4,296
Percentage of reactors	12.03 per cent

At the close of our fiscal year, June 30, 1924, our records show the following:

Total number of herds in New Jersey under supervision	1,540
Total number of cattle in New Jersey under supervision	25,825

It will be noted from the above summary that a number of the herds were tested twice during the year.

TOTAL NUMBER OF CATTLE TESTED UNDER ACCREDITED-HERD PLAN

July 1, 1923—June 30, 1924.

	Initial		Additions		Other Tests		Totals	
	Tested	Reacted	Tested	Reacted	Tested	Reacted	Tested	Reacted
Pure-bred	1,626	449	898	7	8,334	87	10,858	543
Grades	11,362	3,340	2,837	93	10,656	320	24,855	3,753
Totals	12,988	3,789	3,735	100	18,990	407	35,713	4,296
Percentage of reactors	29.09%		2.67%		2.14%		12.03%	

ACCREDITED HERDS BY COUNTIES

July 1, 1923—June 30, 1924

County	*Herds Under Supervision*	*Fully Accredited*
Atlantic	3	1
Bergen	6	2
Burlington	125	16
Camden	3	1
Cape May	22	1
Cumberland	109	41
Essex	41	3
Gloucester	79	34
Hunterdon	135	41
Mercer	97	30
Middlesex	76	43
Monmouth	45	7
Morris	89	21
Ocean	16	1
Passaic	22	1
Salem	35	18
Somerset	166	58
Sussex	34	3
Union	12	3
Warren	425	17 – 1 Tem. sus.
	1,540	342 – 1 Tem. sus.
	8,795 P. B.	4,497 P. B.
	17,030 Gr.	2,960 Gr.
	25,825	7,457

TOTAL PERCENTAGE OF INITIAL TESTS BY COUNTIES

From July 1, 1923, to June 30, 1924

ACCREDITED HERDS

COUNTIES	Number Herds	Number Tested		Number Reactors		Percentage Reactors		Total Animals Tested	Total Animals Reacting	Total Percentage Reactors
		Pure-bred	Grade	Pure-bred	Grade	Pure-bred	Grade			
Atlantic	1	1	.....	.....	.....	.....	.....	1	.....	.....
Bergen	1	15	4	2	.....	13	.....	19	2	10.5
Burlington	60	118	1,059	27	378	22.88	35.69	1,177	405	34.4
Camden	1	6	1	1	1	16.66	100	7	2	28.57
Cape May	21	20	178	.....	23	.....	12.9	198	23	11.6
Cumberland	47	57	500	14	107	24.56	21.4	557	121	21.72
Essex	37	57	1,489	2	293	3.5	19.67	1,546	295	19
Gloucester	20	32	138	16	44	50	31.88	170	60	35
Hunterdon	68	95	638	33	162	34.7	25.39	733	195	26.60
Mercer	35	83	273	6	114	7	41.75	356	120	33.7
Middlesex	19	51	62	19	10	37.25	16	113	29	25.66
Monmouth	30	41	283	3	34	7.3	12	324	37	11
Morris	38	17	361	2	88	11.76	24.37	378	90	23.8
Ocean	12	17	19	.....	7	.....	36.8	36	7	19
Passaic	19	31	388	18	261	58	67	419	279	66.58
Salem	8	41	55	5	25	12	45	96	30	31
Somerset	65	220	611	67	227	30	37	831	294	35
Sussex	29	234	585	89	271	38	46	819	360	43.95
Union	9	5	378	.....	133	.....	35	383	133	34.7
Warren	348	482	4,127	155	1,110	31.78	26.80	4,600	1,265	27
Totals	868	1,623	11,149	459	3,288	28	29	12,772	3,747	29

ACCREDITED HERD WORK

Tested by U. S. B. A. I. Veterinarians	Initial					Additions					Other Tests				
		Tested		Reactors			Tested		Reactors			Tested		Reactors	
	Lots	P.B.	Gr.	P.B.	Gr.	Lots	P.B.	Gr.	P.B.	Gr.	Lots	P.B.	Gr.	P.B.	Gr.
1923—July	7		72		8	1	3				5	23	32		
August	2	1	24			5	10	2			3	29		1	
September	1	7	34								5	17	25	1	
October						3	8	14			5	155	28	6	
November	3		41		18	5	1	35		4	10	46	83		14
December						2	2	3			7	231	459	4	
1924—January	1		6		1	2	9	5			7	46	57		
February	1		5			1		2			8	57	31	1	1
March	1		9			1		1			4		133		
April	9		28			5	53	12			14	498	72	2	
May	1		2			3	5	1			2		17		
June											6	387	52	2	8
Totals	26	8	221		32	28	91	75		4	76	1,489	989	17	23
Percentage of Reactors					14.48					5.33				1.14	2.32
Average percentage				13.97					2.41					1.61	

Tested by N. J. B. A. I. Veterinarians	Initial					Additions					Other Tests				
		Tested		Reactors			Tested		Reactors			Tested		Reactors	
	Lots	P.B.	Gr.	P.B.	Gr.	Lots	P.B.	Gr.	P.B.	Gr.	Lots	P.B.	Gr.	P.B.	Gr.
1923—July	43	185	436	20	102	42	106	250	1		71	813	497	4	12
August	77	343	844	89	286	45	87	229		1	64	523	374	5	15
September	80	79	875	11	225	22	50	47	1	1	50	368	304	1	11
October	79	134	963	68	221	15	65	301		16	50	468	178	9	25
November	96	184	1,059	61	374	15	31	68		7	79	1,025	1,318	7	14
December	36	32	390	19	123	24	40	275	1	16	43	456	687	4	13
1924—January	47	46	379	22	111	31	118	247	1	13	59	466	560	9	18
February	23	29	231	3	53	42	76	352		4	121	769	1,009	9	34
March	30	37	743	14	183	33	27	177		6	68	473	1,211	6	16
April	78	104	1,457	49	373	13	14	189		1	24	354	389		4
May	73	125	1,476	27	588	22	63	187	1	4	49	420	1,684	7	46
June	89	107	1,250	23	356	16	46	208		9	57	463	1,115	4	62
Totals	751	1,405	10,103	406	2,995	320	723	2,530	5	78	735	6,598	9,326	65	270
Percentage of Reactors				28.89	29.64				.69	3.08				.98	2.90
Average percentage				28.68					2.55					2.10	

ACCREDITED HERD WORK

Tested by Accredited Veterinarians	Initial					Additions					Other Tests				
		Tested		Reactors			Tested		Reactors			Tested		Reactors	
	Lots	P.B.	Gr.	P.B.	Gr.	Lots	P.B.	Gr.	P.B.	Gr.	Lots	P.B.	Gr.	P.B.	Gr.
1923—July	3	11	33	4	9	5	5	7		1	1		3		
August	8	4	54		6	3	8	2			4	13	34		4
September	13	29	113	3	13	2	12	1			2	4	8	1	1
October	2	52		12		2	4	25			4	18	2		
November	1	7	23	1		4		24		2	1		8		
December	2	5	8	4	8	3	4	9			4	13	68		
1924—January	19	17	185	2	49	11	13	24	2	2	10	50	91		4
February	5	20	35	7	11	8	5	21		2	1	3	1		
March	3	7	29		5	2		8							
April	22	27	247		88	10	14	24			5	65	14	4	3
May	14	20	200	4	85	8	6	21			15	66	93		15
June	14	14	106	6	39	12	10	27		2	6	15	19		
Totals	106	213	1,033	43	313	70	81	193	2	9	53	247	341	5	27
Percentage of Reactors				20.18	29.33				2.47	4.66				2.02	7.92
Average percentage				28.56					4.01					5.44	

Tested by Private Veterinarians	Initial					Additions					Other Tests				
		Tested		Reactors			Tested		Reactors			Tested		Reactors	
	Lots	P.B.	Gr.	P.B.	Gr.	Lots	P.B.	Gr.	P.B.	Gr.	Lots	P.B.	Gr.	P.B.	Gr.
1923—July															
August															
September															
October						4		27							
November															
December						1		5							
1924—January						2	3	1							
February	1		5												
March						1		1							
April															
May															
June						1		5		2					
Totals	1		5			9	3	39		2					
Percentage of Reactors										5.18					
Average percentage									4.76%						

CATTLE SLAUGHTERED—ACCREDITED

Reactors Slaughtered	Quarantined Last Fiscal Year	Quarantined This Fiscal Year	Quarantined Same Month as Slaughtered	Reactors Not Slaughtered in Month Quarantined
1923				
July	137	....	101	70
August	....	87	187	220
September	1	182	140	129
October	2	108	196	161
November	....	197	160	65
December	....	252	162	30
1924				
January	3	96	123	111
February	....	103	74	51
March	....	57	118	112
April	6	230	257	272
May	....	267	306	471
June	1	957	175	328
Totals	150	2,536	1,999	2,020

TOTAL INDEMNITY PAID BY COUNTIES

From July 1, 1923, to June 30, 1924

County	*Total 12 Months*
Bergen	$825.83
Burlington	13,703.54
Camden	136.67
Cape May	752.00
Cumberland	3,688.30
Essex	8,465.01
Gloucester	4,980.40
Hunterdon	4,768.81
Mercer	5,040.14
Middlesex	3,196.67
Monmouth	1,322.98
Morris	4,120.44
Ocean	15.00
Passaic	7,156.66
Salem	1,093.35
Somerset	14,883.75
Sussex	12,788.58
Union	1,151.60
Warren	46,899.77
	$134,999.50

STATE, COUNTY AND MUNICIPAL HERDS

The following list includes the State, county and municipal herds that are under State and Federal supervision.

It will be noted that all of the State institution herds are fully accredited, three of the county herds are fully accredited, and two of them are under supervision in the process of accreditation. We have one city herd in the process of accreditation, owned by the city of Newark and located at Verona.

STATE INSTITUTION HERDS—FULLY ACCREDITED

	P.B.	GR.
N. J. Agricultural Experiment Station, New Brunswick	82	8
N. J. Manual Training and Industrial School, Bordentown,	7	37
N. J. Reformatory, Rahway	2	35
N. J. State Prison, Leesburg	3	41
N. J. Sanatorium for Tuberculosis, Glen Gardner	3	84
N. J. State Colony for Feeble-Minded Males, New Lisbon,	1	21
N. J. State Home for Boys, Jamesburg	2	89
N. J. State Hospital, Trenton Junction	18	165
N. J. State Hospital, Morris Plains	6	202
N. J. Reformatory for Boys, Annandale	..	7
N. J. State Institution for Feeble-Minded, Vineland	18	65
N. J. Village for Epileptics, Skillman	57	45
N. J. State Reformatory for Women, Clinton	1	40
Total	200	839—1,039

Percentage of pure-bred animals in State Institution Herds, 19.24%
Percentage of grade animals in State Institution Herds 80.75%

COUNTY HERDS—FULLY ACCREDITED

	P.B.	GR.
Cape May County Farm, Cape May Court House	2	9
Cumberland County Almshouse, Bridgeton	..	23
Morris County Almshouse, Morris Plains	3	10
Total	5	42—47

Percentage of pure-bred animals in County Herds 10.63%
Percentage of grade animals in County Herds 89.35%

COUNTY HERDS—UNDER SUPERVISION

	P.B.	GR.
Essex County Hospital, Cedar Grove	113	18
Warren County Farm, Oxford	14	22
Total	127	40—167
Percentage of pure-bred animals in County Herds under supervision	76.04%	
Percentage of grade animals in County Herds under supervision	23.95%	

CITY HERDS—UNDER SUPERVISION

	P.B.	GR.
Newark City Boys' Home, Verona	..	11
Total	..	11—11
Grand total	332	932—1,264
Percentage of pure-bred animals in State, County, and City Herds	26.27%	
Percentage of grade animals in State, County, and City Herds	73.74%	

CERTIFIED DAIRIES

The production and sale of certified milk is under the direct supervision of the State Board of Health. One of their requirements, however, is that all of the herds producing certified milk must be under the direct supervision of the State and Federal Bureaus of Animal Industry with regard to tuberculin testing.

The following list gives the number fully accredited and those that are not accredited but are under supervision and regularly tested:

CERTIFIED DAIRIES—FULLY ACCREDITED

	P.B.	GR.
Fairfield Dairy Company, Montclair	15	379
E. T. Gill, Haddonfield	60	39
Joseph W. Miller, Princeton	12	90
Shoemaker Dairies, Bridgeton	2	69
Total	89	577—666
Percentage of pure-bred animals in Certified Dairies	13.36%	
Percentage of grade animals in Certified Dairies	86.64%	

CERTIFIED DAIRIES—UNDER SUPERVISION

	P.B.	GR.
Noe Farm, Madison	..	159
Purity Farm, Pennington	..	374
Raritan Valley Farms, Somerville	6	107
Sheffield Farm, Pompton Plains	..	225
Walker-Gordon Laboratories, Plainsboro	46	1,059
Walker-Gordon Laboratories, Juliustown	14	288
Woodbrook Farm, Metuchen	35	171
Total	101	2,383—2,484
Percentage of pure-bred animals in Certified Dairies under supervision	4.07%	
Percentage of grade animals in Certified Dairies under supervision	95.93%	
Grand Total	190	2,960—3,150
Percentage of pure-bred animals in Certified Dairies, Fully Accredited and Under Supervision	6.03%	
Percentage of grade animals in Certified Dairies, Fully Accredited and Under Supervision	93.97%	

IMPORT SHIPMENTS OF LIVESTOCK FOR IMMEDIATE SLAUGHTER ENTERING ON PERMIT—1923–1924

MONTH	Cattle	Sheep	Hogs	Goats	Cattle for Feeding	Sheep for Feeding	Sheep for Breeding
1923							
July	5,307	9,308	19,920	.....	26	.....	60
August	8,362	5,941	54,714	.....	.....	7	85
September	4,841	4,175	414,657	.....	.....	.....	1
October	3,978	1,775	47,608	.....	43	.....	5
November	3,466	1,279	53,250	.....	40	10	.....
December	2,096	1,569	71,466	.....	24	.....	.....
1924							
January	1,782	941	8,357	.....	.....	.....	.....
February	4,157	1,259	57,740	.....	.....	.....	.....
March	4,200	1,902	49,458	1	.....	.....	.....
April	9,413	2,482	58,160	.....	32	.....	.....
May	6,569	13,677	13,622	.....	.....	.....	.....
June	5,159	4,268	40,684	.....	67	2	.....
Totals	9,330	44,616	889,636	1	232	19	151

NATIVE CATTLE

Tested by Private Veterinarians	Herd Tests				Other Tests				Tests for Export			
	Number Lots	Animals Tested	Number Reactors	Per cent Reactors	Number Lots	Animals Tested	Number Reactors	Per cent Reactors	Number Lots	Animals Tested	Number Reactors	Per cent Reactors
1923—July	87	155	5	3.22	22	111	7	6.3	4	7		
August	20	130	6	4.61	26	414	14	3.38	4	7		
September	18	284	18	6.33	43	304	15	4.93	3	12		
October	35	616	29	4.7	11	95	3	3.15	1	1		
November	53	706	52	7.36	8	27	2	7.4	5	12		
December	18	319	12	3.76	8	87	5	5.74	1	19	4	21.05
1924—January	18	191	25	13.08	9	16	1	6.25	2	8		
February	20	277	17	6.14	10	36	9	25.	3	5		
March	21	262	24	9.16	3	23	1	4.35	2	16	4	25.
April	75	1,142	61	5.34	8	14	2	14.28	7	16		
May	47	478	20	4.18	11	23			5	11		
June	79	536	35	6.53					6	31	1	3.23
Totals	491	5,096	304	5.97	159	1,150	59	5.13	43	145	9	7.14

Tested by Bureau Veterinarians (N. J.)	Herd Tests				Other Tests				Tests for Export			
	Number Lots	Animals Tested	Number Reactors	Per cent Reactors	Number Lots	Animals Tested	Number Reactors	Per cent Reactors	Number Lots	Animals Tested	Number Reactors	Per cent Reactors
1923—July												
August					5	5						
September												
October												
November												
December												
1924—January					1	1	1	100.				
February					1	1						
March												
April												
May												
June												
Totals					7	7	1	14.28				

IMPORT CATTLE

Tested Before Entering by Private Veterinarian	Number Lots	Animals Tested	Number Reactors	Percentage Reactors
1923—July	63	1,134	29	2.55
August	72	1,438	45	3.12
September	78	1,646	50	3.03
October	98	1,931	56	2.9
November	64	1,184	29	2.44
December	48	887	32	3.6
1924—January	45	654	34	5.19
February	44	819	34	4.15
March	27	487	8	1.64
April	76	1,397	42	3.
May	50	1,194	16	1.34
June	75	1,338	36	2.69
Totals	740	14,109	411	2.91

Tested Before Entering by U. S. B. A. I. Veterinarians	Number Lots	Animals Tested	Number Reactors	Percentage Reactors
1923—July	12	211	3	1.42
August	17	356	6	1.68
September	12	219	4	1.82
October	10	180		
November	7	163		
December	6	118		
1924—January	7	130		
February	4	90		
March	1	22		
April	7	156	2	1.28
May	15	252	12	4.76
June	11	227		
Totals	109	2,124	27	1.27

IMPORT CATTLE

Tested After Entering by Private Veterinarians	Number Lots	Animals Tested	Number Reactors	Percentage Reactors
1923—July	1	7	2	28.57
August	.....	.....	.....	.....
September	.....	.....	.....	.....
October	.....	.....	.....	.....
November	.....	.....	.....	.....
December	.....	.....	.....	.....
1924—January	.....	.....	.....	.....
February	.....	.....	.....	.....
March	.....	.....	.....	.....
April	3	9	4	44.44
May	.....	.....	.....	.....
June	.....	.....	.....	.....
Totals	4	16	6	37½%

Tested After Entering by U. S. B. A. I. Veterinarians	Number Lots	Animals Tested	Number Reactors	Percentage Reactors
1923—July	8	34	4	11.76
August	11	43	8	18.60
September	2	21	.....	.....
October	7	33	7	21.21
November	2	26	6	23.07
December	.....	.....	.....	.....
1924—January	3	53	6	11.32
February	5	103	7	6.79
March	3	61	6	9.83
April	2	24	1	4.16
May	2	27	2	7.4
June	2	13	2	15.38
Totals	47	438	49	11.18

PHYSICAL CONDEMNATIONS

The following animals were reported by the Boards of Health as suspected tuberculous on physical examination and slaughtered:

1923

July	5
August	4
September	2
October	..
November	2
December	2

1924

January	2
February	1
March	..
April	..
May	..
June	..
Total	18

The following cattle were reported by the Boards of Health as tuberculous as shown by tuberculin test and slaughtered:

1923

July	..
August	8
September	10
October	10
November	3
December	..

1924

January	..
February	..
March	..
April	..
May	..
June	..
Total	31

CATTLE SLAUGHTERED—NOT INCLUDING ACCREDITED

Reactors Slaughtered	Quarantined Last Fiscal Year	Quarantined This Fiscal Year	Quarantined Same Month as Slaughtered	Reactors Not Slaughtered in Month Quarantined
1923				
July	9	.....	14	4
August	2	9	13	10
September	.....	9	11	22
October	1	22	23	16
November	.....	29	44	10
December	.....	8	9	12
1924				
January	.....	13	23	7
February	2	12	17	10
March	1	10	8	24
April	3	45	31	14
May	2	15	14	8
June	2	11	17	18
Totals	22	183	224	155

EXTENSION WORK

The Department of Agriculture has purchased for use in extension work two films dealing with tuberculosis control and eradication, one film of two reels entitled, "Out of the Shadows," and one of four reels entitled, "Clean Herds and Hearts." We also have a two-reel film dealing with hog cholera.

During the past two years we have used these films extensively, showing them in sixty-seven different places with an approximate attendance of 5,197 persons.

At all of the meetings there has been a very good attendance, and the pictures have been used to illustrate lectures and to create an interest in the work of tuberculosis eradication and control, with the result that breeders and dairymen have placed their herds under State and Federal supervision.

Our representative has also been present at the Mercer and Essex County Health Exhibits during each of the past two years. We have also sent representatives to meetings of parent-teachers' associations, Kiwanis clubs, exchange clubs and local boards of health in connection with discussions relative to the passage of ordinances pertaining to the production of clean milk from tuberculin-tested cattle.

REPORT OF THE BUREAU OF MARKETS

ALEXIS L. CLARK, *Chief*

Greater demands for services of many kinds were made upon the Bureau during the year ending June 30, 1924, than in any other year since it was organized in 1916. The same program covering eight lines of work has been adhered to. Particularly noteworthy progress has been made this year in the newer projects of city marketing and market research. The following publications have been issued during the year:

Circular No. 66, Factors Influencing the Price of New Jersey Potatoes on the New York Market.

Circular No. 71, Prices Received for New Jersey Produce in Philadalphia.

Circular No. 73, Poultry Flock Inspection and Certification.

PROJECT I—STANDARDIZATION

A. Fruits and Vegetables

Standard grades for peaches, apples, white potatoes and sweet potatoes have been established and are used more and more each year. Some work on onions, lettuce, tomatoes and asparagus has been done. In the work on tomatoes we have studied the grading problem both from the standpoint of the market crop and of the canning factory crop. Requests have come in for advice on the grading of sweet corn. We have had no opportunity to look into it thoroughly, but we are convinced that the practice of selling poor quality green corn, which is becoming more prevalent in seasons of high prices, must be discouraged. Nothing will cut the demand for sweet corn so completely as poor quality. Field corn looks attractive, but is tough and unpalatable when cooked.

As our work in establishing standards and in shipping point inspection is carried on jointly with the Federal Bureau of Agricultural

Economics, it is of interest here to show something of the development of the work nationally. During the fiscal year 1923 there was a total of 72,456 carloads of fruits and vegetables inspected by Federal and State agents on the basis of definite standard grades. This number was increased to 127,354 carloads during the year ending June 30, 1924. The standardization of farm products for market will doubtless be a much slower process in New Jersey than in distant states where the costs of preparation, transportation, storage and handling place such a high tax on the products that only those of high quality can bear it.

The poor growing season was partly responsible for the small amount of potatoes offered for inspection, and we look forward to a greatly increased service on this crop in the years to come. The total number of carloads of all fruits and vegetables inspected in this State was seven hundred and fifteen.

B. Eggs

This Bureau for several years has been emphasizing the importance of improving the quality of eggs through the use of a definite system of grades based upon the internal quality of the product as well as upon external appearances. The inauguration and wide use of a definite system of standard grades for eggs will enable consumers to purchase eggs with more assurance of getting what they want. The Federal Department is placing inspectors in some of the larger markets for the purpose of making inspections of eggs on the basis of the Federal tentative grades. The marketing of eggs under these grades, using an official seal provided by the Bureau on cartons by an authorized inspector, was attempted by a small producers' association in an experimental way in New Jersey during the past year. Considerable interest has been shown by producers in the use of such grades, and a concerted effort is to be made in cooperation with the Poultry Husbandry Department of the Experiment Station to accomplish concrete results in the improvement of the quality of eggs marketed from the State under a definite standard grade program in line with the Federal grades.

C. Milk

Active interest in the improvement of the quality of milk supplies continues to exist in many of the smaller towns and cities in the State, and the Bureau has been called upon in numerous instances for advice regarding the adoption of the "model ordinance" recommended by this Department and the State Department of Health. This ordinance was drafted by the Bureau of Foods and Drugs of the State Department of Health after representatives of State-wide producers' and consumers' organizations had met in conference and approved the standard grades proposed by the Bureau. These standard grades were incorporated in the model ordinance and provide for the sale of certified, raw milk from cows which are free from tuberculosis, and of pasteurized milk.

Already an aggregate of almost 200,000 consumers of milk are enjoying the benefits of this ordinance and the standard milk grades provided by it in towns and cities which have made the ordinance a part of their laws. A number of other towns and cities have the ordinance under consideration, and the movement is being aided by various civic organizations interested in improving the milk supplies and at the same time the health of the community.

The enforcement of the ordinance, where adopted, is a distinct benefit to the conscientious producer who is endeavoring to put out a high-class product. It also widens the demand for milk from herds which have been tested under State and Federal supervision, the number of which is growing rapidly, thus adding another incentive to the freeing of herds from tuberculosis, particularly where it is possible to secure a slight premium for this kind of milk.

Producers of milk, particularly those in close proximity to cities where the standard ordinance has not been adopted, will undoubtedly help their business and that of the dairy industry as a whole, as well as the general health of the community, by assisting in securing the adoption of the ordinance.

Enforcement of the Milk Dealers' Licensing Law—The enforcement of this law, on the statutes since 1917, resulted for the license period 1923-24 in the issuance of 203 licenses to dealers for the purchase of milk from producers in this State, together with 89 exemptions, a slight decrease from the year preceding. Producers of milk selling to dealers are again urged to cooperate with the Department in the enforcement of this law by reporting all violations.

D. Hay

During the past few years the Federal Department of Agriculture has been developing standard grades for hay to take the place of the more or less indefinite multiple standards and grades developed by the various hay trade associations. These grades are now in force, Federal inspectors are stationed in all the large hay markets, and the quotations of hay prices in these markets are based largely on these grades.

While New Jersey is not a large producer of market hay, there is nevertheless a considerable quantity of hay marketed every year in different parts of the State. Believing that the Bureau could be of service to hay producers in the State in marketing this hay according to grade, a representative of the Bureau took a very thorough course of training in grading hay under the Federal grades and is now a licensed inspector authorized to make shipping point and receiving point inspections of all kinds of hay for which standard grades have been adopted.

There is a considerable market for hay graded and sold under these grades, which will furnish a more direct and more profitable outlet than through the ordinary channels of marketing. Furthermore, hay so graded and sold under a joint State and Federal inspection certificate furnishes valuable selling insurance to the shipper.

This service is now being developed in the State and has resulted in requests for service at a few points. Growers of hay for market should familiarize themselves with the grade requirements so that better hay may be marketed. The service is self-supporting through an established fee.

E. Poultry Certification

The Bureau undertook an entirely new line of work during the fall of 1923, when, in cooperation with the Poultry Department of the New Jersey Agricultural Experiment Station and at the request of an organized group of breeders of Jersey Black Giant poultry and the agricultural agent of Mercer County, 7,360 birds in 46 flocks were inspected by a representative of the Bureau for breed type under a plan of poultry flock certification adopted by the Department. Of the number inspected, practically 71 per cent were passed as being representative of the breed and therefore might be kept as breeders. These birds were leg-banded with an official, numbered and sealed leg band, while those not so passed were sold by the flock owner.

For a number of years a breed of poultry, to which the name of Jersey Black Giant was eventually given, has been developed in the central part of the State, particularly in southern Mercer and northern Burlington counties. The breed is a composite breed, carrying crosses of a number of the larger meat breeds of poultry. It was developed by the farmer to meet a particular demand on the part of the many discriminating consumers for certain qualities that they desired in table fowl. These qualities this breed now carries to a surprising degree. The characteristics of the breed which make it so valuable were not sufficiently well fixed, however, to enable the farmers to feel that they could develop it fully without some assistance, and it was for this reason that the aid of the Bureau was requested.

This work, while new in the State, is similar to work conducted in several other states, mostly by Departments of Agriculture, in connection with certification of commercial chick hatcheries. During the summer of 1924 the Bureau was requested by the State Association of Baby Chick Producers to outline a plan for certification of baby chicks. New Jersey is the home of this industry, which has grown to gigantic proportions. Plans were outlined and received the approval of representatives of this organization, as well as of the other prominent poultry organizations in the State.

The plan provides for the certification of breeding flocks for breed type, egg production and general health, the certification of hatcheries producing certified chicks, and in addition a plan of accrediting flocks free of bacillary white diarrhea. It is expected that the plan will be put into operation prior to the 1925 hatching season. The work is to be self-supporting, each applicant paying a nominal fee covering the actual cost of the service.

An Example of Determination of Grade Requirements

As an illustration of the Bureau's method in deciding upon proper standard grade requirements we offer a brief summary of a report of a study made by representatives of the Bureau on the subject of lettuce grades.

Number of farms covered—11
Number of acres—123
Number of acres irrigated—81
Number of acres without irrigation—42
Period of inspection—six days between October 25 and November 14, 1923
Number of heads examined—3,633

Of the 1,975 heads from irrigated fields, 1,321 were classified as "firm," 619 as "fairly firm," and 37 as "not firm." The average weight per crate was 20.4 pounds.

Of the 1,658 heads from non-irrigated fields, 1,182 were classified as "firm," 423 heads as "fairly firm," and 54 heads as "not firm." The average weight was 20.8 pounds per crate.

These examinations were made from packed crates ready for shipment. The Federal suggested tentative grades were kept in mind throughout this study.

In addition to the degree of firmness of the head, the various defects and damages not allowed in the tentative grades were looked for. Some of the most important ones found were: (a) *Burst head,* one which during growth has opened, exposing the white leaves to dirt and air, and hence offering a fertile ground for decay. (b) *Doubles,* a head in which two buds have reached a separate development of inferior size and quality, but are covered by the same outer leaves. (c) *Seed stems* (not harvested this year), those heads which have seed stems showing or in which the formation of seed stems has plainly begun. All of these defects appeared only occasionally. In no case was there a wilted or decayed head found in the packed crate; in fact, they very seldom appeared in the field. Tip burn, which is a serious defect many seasons, was not visible at all this year. The insects apparently had other fields to conquer, as no trace of insect injury was discovered.

To sum up, of all the lettuce examined there was only one lot that failed to meet the United States tentative grades for lettuce, and in this case it was due to the fact that it was a poor stand of lettuce. This lot should have been sold as No. 2 instead of No. 1. It was very gratifying to the investigators to find that the grades met the common usage and practice of the growers and could be used readily for grading, marking and selling New Jersey lettuce whenever the growers wished.

PROJECT II—COOPERATION

The Bureau seeks to keep itself informed upon the latest developments in cooperation throughout the nation and world and to encourage the study of its basic principles by all those interested in its actual operations.

There are now about seventy-five incorporated groups of farmers in New Jersey which can be listed as cooperative under the limits laid down by recent State and Federal legislation. Of these, about fifty

make marketing their principal object and twenty-five concentrate their activities on purchasing. Many changes in their by-laws, as well as in their business policies, have been discussed with representatives of this Bureau during the year. One association was reorganized and five new associations incorporated. Seven of the largest cooperative purchasing associations federated themselves together and incorporated as the New Jersey State Cooperative Purchasing Association. Under this plan each local association will maintain its own name and individuality, but will pool its orders for certain commodities with the orders of the other associations. Practically all of the cooperative associations report a prosperous and successful year.

PROJECT III—TRANSPORTATION

Our transportation specialist is considered by all that know of his work as in a class by himself. His untiring efforts in promoting efficient transportation service is widely known and appreciated by producers, shippers, receivers and carriers. A well-known railroad official made the statement during the winter that, "he has sold our railroad cooperation."

The matters of terminal rail facilities at Jersey City, Newark and Camden have received attention during the year, and a constant oversight of service conditions all over the State has been given. The third annual conference with railroad officials was held in May, at which time special attention was given to loss and damage prevention methods.

PROJECT IV—MARKET REPORTING

This continues to be one of our most popular lines of work. Through cooperative arrangements with the Federal Bureau and the Pennsylvania Bureau, trained reporters have been maintained on the New York and Newark, and Philadelphia markets. The federal leased wire was given up and all news was telephoned into our Trenton office. From here it has gone out by mail and the press agencies each morning. Ten daily newspapers, including one or more in the cities of Paterson, Hackensack, Passaic, Newark, Elizabeth, Trenton, Camden, Asbury Park, Atlantic City and Millville, with a total circulation of 275,000, carry this daily market report regularly. Other dailies carry small portions each day, or occasionally, and most of the weekly papers published in the State carry a part or all of our

weekly reports. Several papers published in New York and Philadelphia carry more or less of these reports regularly. The wireless reports had to be discontinued from Newark, but have been maintained from Philadelphia.

The Cumberland County Board of Agriculture appropriates sufficient funds to receive a special wire direct from our New York representative each morning, and has made good use of such information. The station agent at Millville relayed this news to the various agents on the Maurice River branch, and these agents posted copies in conspicuous places for the benefit of all shippers. With the facilities now available it should be possible for every farmer in the State to know the previous day's market prices and conditions before noon each day, and those who are especially interested ought to be able to get it before twelve o'clock of the same day. We are now anxious to get accurate information from the larger city markets about the State, and this we hope to arrange for through the city marketing director plan which we have proposed to several cities.

PROJECT V—MARKET RESEARCH

This is one of our newer projects and one which is giving most encouraging results. The studies on the possibilities of forecasting prices is opening up an entirely new viewpoint in marketing. Our specialist in research work, taking the hint from some investigations in Minnesota, has completed an algebraic formula which attempts to forecast an average price of potatoes by using a few of the important factors, such as the trend of potato production, the estimated crop for the year, the index number of the level of wholesale prices, and the change in demand for New Jersey potatoes. It seems quite technical, and it is, and yet in reality it endeavors only to present in a scientific manner the guess-work by which all staple commodities have been handled for centuries so far as immediate or future sales are concerned. This formula, when tried out on the basis of August 1 crop estimates and index numbers for each year since 1902, gives an average error of around 9 per cent. On August 1, 1923, this formula showed the average price for New Jersey Cobblers from that date to November should be $2.74. These potatoes were then selling at $4.25. The price soon began to fall, and after November, when the average price was figured up, it was found to be $2.81. We look forward to a great development in this new field.

The studies with retail storekeepers were continued. In Trenton twenty grocers are cooperating in a study of price margins on twenty commodities.

Some interesting data on prices of New Jersey produce sold in the wholesale markets of Philadelphia were secured upon the invitation of the merchants themselves. Fourteen produce firms gave the information we desired on one and one-half million baskets of fruits and vegetables raised in New Jersey. This amount represented about one-fourth of the total New Jersey receipts on the Philadelphia markets. The outstanding fact brought out was that almost one-fifth of the number of baskets included in the survey sold for 25 cents per five-eighths bushel basket or less.

PROJECT VI—ACCOUNTING

Many cooperative associations have asked and received our services in auditing. We have opened the books for new associations and set up new systems of accounting for others.

PROJECT VII—EDUCATIONAL PUBLICITY

Newspapers are giving splendid cooperation in presenting marketing facts as prepared in story form by our specialist in this work. From one to three statements are sent to the newspapers each week.

PROJECT VIII—CITY MARKETING

Our aim in this work is to induce the larger cities in the State to assume some responsibility in efficient food distribution. We have combined other activities with the work of public markets and have received very encouraging cooperation from half a dozen cities. The city of Trenton has adopted the entire project and has invited us to recommend a qualified city marketing director. Under this project the city marketing director will have four major duties: first, an informational service to consumers on the character, quality and quantity of foodstuffs available every day; second, the management of all public markets; third, a study of the wholesale and retail market methods, with daily reports of prices and other information which may be to the advantage of all food merchants, and fourth, a correlation of nearby farm supplies to the city's needs.

REPORT OF THE FRELINGHUYSEN LOAN FUND

GRACE M. ZIEGLER, *Assistant Manager*

The young people of the State have shown increased activity in the securing of pure-bred livestock during the fiscal year closing June 30, 1924. Again, by far the greatest number of loans were made for the purchase of calves. The loans made during the year, by counties, were as follows:

County	*Calves*	*Pigs*	*Poultry*
Atlantic	..	..	..
Bergen	..	..	..
Burlington	12	2	..
Camden	..	..	..
Cape May	..	..	..
Cumberland	10	..	5
Essex	..	..	..
Gloucester	..	..	..
Hudson	..	..	..
Hunterdon	13	..	..
Mercer	10	2	..
Middlesex	3	..	..
Monmouth	7	3	5
Morris	13	..	..
Ocean	2	..	4
Passaic	..	..	..
Salem	1	3	..
Somerset	4	..	..
Sussex	5	..	..
Union	..	..	..
Warren	16	..	..
Totals	96	10	14

The number and amounts of loans made for each kind of livestock since the fund was established are as follows:

Year Fiscal	Calf Loans		Pig Loans		Poultry Loans		Total Loans	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount
1921	30	$2,815.00	....	.....	....	.....	30	$2,815.00
1922	92	7,985.00	16	$1,074.98	16	$824.25	124	9,884.23
1923	81	6,365.00	21	1,267.25	13	636.25	115	8,268.50
1924	96	8,670.00	10	409.50	14	932.00	120	10,011.50
	299	$25,835.00	47	$2,751.73	43	$2,392.50	389	$30,979.23

During the year there were three charges against the Calf Insurance Fund, amounting to $280, on account of the death of three calves. This increased the deficit in the Calf Insurance Fund to $563.41, but it has been the desire of the managers of the fund not to make an assessment upon the members, as agreed in their contract, unless it was absolutely necessary, and so far the deficit has been carried by the interest received from loans. As there are many other items taken care of from this interest, such as cash awards at the Interstate Fair, administrative and other expenses, it would become necessary to make such an assessment if the number of losses should become unduly great.

The competition at the various local, county and State exhibits has been very keen, and the prizes offered by the Frelinghuysen Fund at the Trenton Interstate Fair are intended mainly to induce the boys and girls to show their animals along with others, in order that they may gain the knowledge regarding breeds, etc., that is secured by such competition, and that they may receive encouragement in their effort to secure better animals. An additional inducement has been offered this year by President Frelinghuysen, of the State Board of Agriculture, who has contributed $200 to be used as special sweepstake prizes as follows: $100 for the best cow and her first calf; $50 for the best pen of poultry, and $50 for the best sow and litter.

The value of this fund in enabling the young people of the State to purchase animals and to enter into the regular livestock club work of the State is becoming increasingly evident, and credit is due to the untiring efforts of State Club Leader A. M. Hulbert, and to his staff of county club agents, together with county agricultural agents, breeders and others.

REPORT OF THE BUREAU OF STATISTICS AND INSPECTION

HARRY B. WEISS, *Chief*

Report of Statistical and Related Work

Monthly crop reports have been issued as usual in cooperation with the Federal Bureau of Agricultural Economics, and these have been strengthened by the inclusion of statistical information on various truck crops. The staff was enlarged by the addition of a statistical reporter, who has been giving most of his attention to the building up of a force of truck crop reporters and to securing facts relative to acreages, production, etc.

During the year a survey on the cost of growing alfalfa in New Jersey was made in cooperation with the New Jersey Agricultural Experiment Station, and the material gathered is being tabulated. This will be printed as a Department circular. A study was made also of cranberry prices in relation to certain factors which are supposed to influence them, and this will be reported upon in detail later. The Bureau of Markets, on account of the resignation of one of its men, turned over to us some work which it had started on the canning industry of New Jersey. This was completed and a report will be published separately. Considerable attention was given to the production and consumption of food in New Jersey, in cooperation with Mr. A. G. Waller, and the results of this study have been published in Bulletin 40 of the Department.

Inspection Service

HARRY B. WEISS, *Chief*
THOMAS J. HEADLEE, PH.D., *State Entomologist*
WILLIAM H. MARTIN, PH.D., *State Plant Pathologist*

During the fiscal year ending June 30, 1924, the inspection and seed certification work was carried on along lines similar to those of the preceding year. Our seed certification work was extended somewhat, upon request, to include corn and barley. Brief mention of the varied activities of the Bureau will be made in the body of the report.

REPORT OF INSPECTION AND SEED CERTIFICATION*

FOREIGN STOCK INSPECTION

During the year, 199 cases of foreign-grown nursery stock were inspected. In addition, over 100 cases of seeds and nuts for propagation, about 300 cases of bulbs and 496 cases of foreign-grown stock, imported under special permit, entered New Jersey during the past fiscal year. The seeds and bulbs were not inspected as they are not likely to carry serious pests and a lack of time precluded inspection of all stock. The stock imported under special permit is thoroughly examined by the Federal Horticultural Board inspectors in Washington and a report of their findings forwarded to the chief inspector of this State. Infested plants are removed and treated or destroyed.

The 199 cases inspected were distributed as follows:

FALL, 1923

Origin	Cases	Kind of Stock
Australia	13	Palm seeds
Brazil	22	Palm seeds
England	40	Rose stocks
Holland	11	Rose stocks
Holland	36	Bulbs
Ireland	1	Rose stocks
Spain	1	Palm seeds
Trinidad	1	Palm seeds
Total	125 cases	

SPRING, 1924

Origin	Cases	Kind of Stock
Australia	4	Tree seeds
Brazil	1	Palm seeds
England	27	Rose stocks
France	1	Seeds
France	6	Rose stocks
France	3	Fruit stocks
Germany	3	Seeds
Holland	24	Rose stocks
Japan	5	Tree Seeds
Total	74 cases	

*By Erdman West.

This stock was clean, with the exception of fruit stocks from France. A total of 411 apple stocks was rejected for being infected with Crown Gall (*B. tumifaciens*).

DOMESTIC STOCK INSPECTION

During the past fiscal year 180 inspections were made of incoming nursery stock from neighboring states. This consisted of 14 carloads and 340 cases distributed as follows:

FRUIT STOCK—FALL, 1923

Origin	Cars	Cases	Shipments Infected	Plants Destroyed
Connecticut	0	15	7	534
Delaware	1	7	1	9
Maryland	0	4	1	67
Missouri	0	2	1	3
Nebraska	..	1	..	..
New York	1	25	3	201
Ohio	0	1	..	..
Pennsylvania	0	3	1	3
Tennessee	1	11	5	215
Totals	3	69	19	1,032

The rejected trees were infected with Crown Gall.

ORNAMENTAL STOCK—FALL, 1923

Origin	Carloads	Cases
California	1	35
Colorado	0	2
Connecticut	0	1
District of Columbia	0	50
Maine	0	2
Massachusetts	0	4
New Jersey	0	2
New York	0	18
Ohio	1	1
Oregon	0	1
Pennsylvania	0	3
Wisconsin	0	2
Totals	2	121

This stock was all clean.

FRUIT STOCK—SPRING, 1924

Origin	Cars	Cases	Shipments Infected	Plants Destroyed
Alabama	1	0	..	..
Connecticut	0	9	9	73
Delaware	1	6	..	..
Iowa	0	5	1	45
Maryland	0	7	..	..
Missouri	0	8	2	33
New Jersey	0	8	7	328
New York	0	40	1	1
Ohio	0	5	1	13
Pennsylvania	0	2	..	..
Tennessee	0	1	..	..
Washington	0	2	..	..
Totals	2	93	21	493

The rejected trees were infected with Crown Gall.

ORNAMENTAL STOCK—SPRING, 1924

Origin	Carloads	Cases
California	6	0
Delaware	0	5
Illinois	0	5
Iowa	1	17
New Jersey	0	1
New York	0	7
Pennsylvania	0	12
Virginia	0	1
Washington	0	1
Wisconsin	0	6
Totals	7	55

This stock was clean with one exception. One shipment of *Juniperus* from Washington was infected with a rust (*Gynosporangium sp.*) and was destroyed.

NURSERY INSPECTIONS

Two hundred and fifty-eight nurseries and dealers' establishments were inspected and certificates issued as follows:

General certificates	160
Berry certificates	18
Rose certificates	17
Greenhouse certificates	10
Peach certificates	6
Dahlia certificates	5
Privet certificates	3
Grape certificates	3
Lilac certificates	2
Aquatic certificates	1
Fern certificates	1
Hydrangea certificates	1
Orchid certificates	1
Dealers' certificates	30
	258

SPECIAL CERTIFICATES

Forty special certificates were issued following inspection to permit the shipment of small lots of nursery stock to points outside of New Jersey. These certificates cover stock shipments by persons not doing a regular nursery business.

Thirty-nine shipments were certified as apparently free from soil and Japanese beetle larvæ to comply with Georgia and Florida regulations.

Forty-seven certificates of fumigation were issued in compliance with the Canadian regulation on that condition.

SPECIAL INSPECTIONS

Twenty-one inspections were made following letters of inquiry from residents of the State. The inquiries concerned plant diseases and pests of such a nature as to demand a personal visit.

WHITE PINE BLISTER RUST

Infestations Found Since 1916

Locality	1916	1917	1918	1919	1920	1921	1922	1923	1924
Rutherford	15	9	0	0	0	0	0	0	0
Little Silver	*1	*1	0	0	0	0	0	0	0
Clementon	0	0	2	0	0	0	0	0	0
Eatontown	3	0	0	0	0	0	0	0	0
Red Bank	*1	*1	*4	*1	0	0	0	0	0
Millburn	1	0	0	0	0	0	0	0	0
Morristown	48	6	3	0	0	0	0	0	0
Blue Anchor	0	0	0	*1	*1	*1	*1	0	0
Pine trees infected	67	15	5	0	0	0	0	0	0
Currant plantings	*2	*2	*4	*2	*1	*1	*1	0	0

*Numbers starred (*) refer to plantings of currants infected with rust. All other figures refer to number of individual pine trees infected.

The above table shows the gradual apparent extermination of the white pine blister rust. All of the infestations, whether on pine or currant, have occurred in nurseries or on plantings. No native growth has ever been found infected. The last infestation, that on currants at Blue Anchor, was allowed to remain on a few bushes after the rest of the infected plants were removed. In cooperation with the United States Department of Agriculture, these bushes were covered to see if the infection came from the outside or whether the pest overwintered on the bushes. Due to severe weather conditions the covering became slightly porous. Both covered and exposed bushes contracted the disease, but those on the outside were more heavily infected. Rather than risk spreading the disease, the bushes were all removed in 1922. Young plants in the same vicinity have not shown any symptoms of the disease, from which it is concluded that the disease has been eliminated.

SEED CERTIFICATION

1. *Late Crop White Potatoes.* This work is conducted by the New Jersey Department of Agriculture in cooperation with the New Jersey State Potato Association. The standards for certified seed remained about the same as in 1922, but some changes were made in the methods. The "approval" of seed was discontinued and another method of entering new strains for certification was instituted. When it is desired to enter a strain not previously certified, a bushel of seed is grown in the spring certified seed test or proving plots. Here it may be directly compared with strains already certified and its fitness for certification determined.

The past year was marked by a 60 per cent decrease in the number of acres entered, but only a 35 per cent decrease in the acres certified. This indicates a marked improvement in the quality of the seed entered for certification.

The following tables give a resumé of the work:

VARIETY	Entered		Rejected Acres	Certified	
	Acres	Growers		Acres	Growers
Irish Cobbler	435.75	54	207.75	228	33
Green Mountain	9.50	4	4.50	5	3
Burbank	5	1	5	0	0
Spaulding Rose	1	1	0	1	1
	451.25	54	217.25	234	37

The relative importance of the various causes for failure at the several inspections is indicated in the table below. No potatoes were rejected at the third or bin inspection.

CAUSE	First Inspection (per cent)	Second Inspection (per cent)	Total Rejections (per cent)
Leaf roll	95	97.5	95.9
Mosaic	4	2.5	3.4
Weak hills	1	0	.7
	100	100	100

2. *Sweet Potatoes.* During 1923, seventy-nine acres of sweet potatoes were entered for certification by sixteen growers. Seventy-seven acres were certified as follows:

COUNTY	Entered		Certified	
	Acres	Growers	Acres	Growers
Cumberland	30	2	28	2
Atlantic	49	14	49	14
Totals	79	16	77	16

Two acres of yams were rejected on account of varietal mixture. According to varieties, the acreage was distributed as follows:

VARIETY	Entered		Rejected	Certified	
	Acres	Growers		Acres	Growers
Yellow Jersey	66.75	13	0	66.75	13
Big Stem Jersey	8.75	4	0	8.75	4
Jersey Red	1.50	3	0	1.50	3
Yams (miscellaneous)	2.	1	2	0	0
	79.0	16	2	77	16

The very unfavorable marketing conditions in 1922 caused the decided falling off in the acreage entered.

3. *Tomato Seed.* The following table gives a resumé of the work of certifying tomato seed in 1923:

VARIETY	Entered		Certified	
	Acres	Fields	Acres	Fields
Bonny Best	110	14	106	13
Greater Baltimore	137	23	113	19
Totals	247	37	219	32

One field was rejected for early defoliation by leaf spot disease; in the others the fruit was not true to type.

4. *Grain.* In response to a demand for the certification of seed grains, plans have been made to certify corn and barley. Rules and regulations have been drawn up in cooperation with the New Jersey Agricultural Experiment Station.

The Gipsy Moth*

In the fight against the gipsy moth another successful year was concluded. Only 48 colonies were found, and these contained a total of 723 egg masses. Rainy weather during June interfered considerably with the spraying and necessitated two applications in many cases. The infestation in the Watchung Ridges continues to remain small, and the territory north of the ridges appears, after scouting, to be almost free from the moth. Extermination of the insect in New Jersey appears to be feasible if the necessary future work can be done. There remain large acreages of wooded territory to be scouted before it can be said definitely that the State is free from infestation. A complete account of the fourth year's work will be published as a Department circular.

For the purpose of comparison the following table shows the reduction which has taken place since the work was started:

	First Year	*Second Year*	*Third Year*	*Fourth Year*
Number of colonies found	855	216	98	48
Number of egg clusters found	3,003,039	909	1,182	723

In addition to the reduction from 855 colonies the first year to 48 colonies the fourth year, it should be stated that the infested area has decreased from about 400 square miles to less than 200 square miles.

GIPSY MOTH QUARANTINE WORK

Shipments from sawmills, lumber yards, etc., in the infested territory were inspected when the occasion demanded it, as were all shipments from the Duke estate. Nothing was shipped from the Duke estate during the caterpillar season.

*Work conducted in cooperation with the U. S. Bureau of Entomology.

Expenditures During 1923–1924

State Appropriation		$125,000.00
Labor	89 per cent	
Supplies	4 per cent	
Office expense, rentals, insurance, etc.	2 per cent	
Travel	5 per cent	
	100 per cent	
Federal expenditure in New Jersey for labor, supplies, field supervision, etc.		140,644.00
Total amount expended		$265,644.00

WORK OF SPECIAL INSPECTION FORCE

This force, which is engaged mainly in gipsy moth inspection work, is detailed to other forms of inspection work during the summer months. Its activities during the year can be summarized as follows:

New England inspections	1,814	cases
Corn borer inspections	2,019	acres
Special inspections	78	
Nursery inspections	132	
Nursery reinspections	40	
Blister rust inspections	27	
New England forest and stone shipments inspections	240	
New England Christmas tree inspections	129	firms
	3,703	trees
Foreign inspections	42	cases
Tuber moth inspection (seeds)	29	
Tuber moth inspections (field)	93	acres
Camphor scale inspections	16	
Gipsy moth scouting work	28	infestations scouted in 21 different towns or 5,364 acres or 800 square miles

During the inspection of nursery stock from New England, two shipments infested by the gipsy moth were intercepted. These were as follows:

To Mr. George Taylor, 40 Lewellyn Avenue, Montclair, New Jersey,
From R. & J. Farquhar, Dedham, Massachusetts,
One badly broken and untreated egg mass.

To Mr. Schnitzspahn, Bound Brook, New Jersey,
From V. H. Vanieck, Newport, Rhode Island,
Two large untreated egg masses.

In the corn borer work, the inspections were made in the sweet corn areas of the State. No signs of the European corn borer were found. The results of the white pine blister rust work are to be found in another part of the report.

Twenty-nine cars of seed potatoes consigned to New Jersey from the eastern shore of Virginia and Maryland were inspected for the potato tuber moth. In addition numerous towns in the central and southern part of the State were visited in order to ascertain if they had received seed potatoes from the eastern shore. Slight indications of the insect were noted on several shipments. On account of the usual climate in New Jersey and the method of handling potatoes by New Jersey growers, taken in connection with the habits of the insect in doing its worst damage in hot, dry areas, it is thought that the species is unlikely to do serious damage in this State.

The camphor scale inspections were made necessary because of shipments of greenhouse stock from Louisiana to New Jersey. Nothing was found. The gipsy moth work took place in nurseries in addition to the inspection of nursery stock from New England and also covered the sites of 28 former infestations in 21 towns.

The canker-worm survey was started in Morris County at the request of the board of freeholders, and was extended into surrounding counties. Morris, Warren and Sussex counties were found to be generally infested in the wooded sections, and the same is true for the northern halves of Hunterdon and Somerset counties.

QUARANTINES

On October 1, 1923, a quarantine against Christmas trees and greens from the New England States was made effective in view of the discovery of several large colonies of the moth in New England,

outside of the known infested area, and on account of the danger of introducing the moth into New Jersey at a time when the Somerville infestation was yielding to the anti-moth work. In view of steps taken later by the Federal Horticultural Board designed to give New Jersey the needed protection, this quarantine was repealed March 31, 1924.

A Japanese beetle quarantine, effective intrastate only, was put into force on April 15, 1924.

Japanese Beetle*

WORK ACCOMPLISHED

An intensive study was made during the past two years on the question of refrigerating soil-balls about the roots of conifer plants for the purpose of destroying the larvæ of the Japanese beetle, and the data will constitute material for a paper on this subject next autumn. It was found that, in general, when plants were subjected to low temperatures the grubs were destroyed in the soil-ball, but with most of the plants the margin of safety was so small between the temperature which would kill the grub and one which would injure the plant as to make this method of treatment of doubtful value from the standpoint of commercial practice. It was found that the larvæ could withstand very low temperatures, approaching zero in many cases, providing the changes in temperature were not sudden. On the other hand, lowering the temperature 30 or 40 degrees within 8 to 12 hours would in most cases give 100 per cent kill.

The experiments which have been conducted for the past two years on the removal of the soil-ball from conifer trees, then remaking the ball with uninfested soil, have been carried to a point where they can be discontinued. It was found that in the case of evergreen nursery stock trees up to six of seven feet tall, the soil-ball could be removed, the roots washed, puddled in clay and repacked in uninfested soil, and the average loss was not more than 10 per cent greater than the average loss which occurs in transplanting the trees from one situation to another. With certain plants this loss is very much less, in fact, the data accumulated indicate that it was very little greater than the

*By Loren B. Smith, conducted in cooperation with U. S. Bureau of Entomology.

loss occurring through transplanting, whereas some less hardy species, particularly varieties of *Retinospora,* suffer a much greater loss due to the removal of the soil-ball. The cost of remaking the soil-ball with uninfested soil, added to the average loss from transplanting which may be expected to occur, was found to be equivalent to approximately 13 per cent of the cost of the trees.

A study of the effect of the more common cultural practices and the effect of different methods of fertilization upon the larvæ of the Japanese beetle was completed during the spring of 1923. These investigations have shown that by late fall and early spring cultivation as high as 40 to 50 per cent of the larvæ may be destroyed. It was also found that 8 or 10 summer cultivations during the egg-laying season of the beetles destroyed 25 to 30 per cent of the eggs. In relation to the general time of cultivation and plowing it is not always practicable to perform these operations when they would be most effective from the standpoint of destroying the immature stages of the beetles, and it may be said that under the usual conditions as found on the farms in central New Jersey the percentage of beetles destroyed through cultural methods is probably relatively small in comparison with the total beetle population.

The problem of treating the soil about the roots of rhododendrons, blueberries, azaleas, etc., which normally grow in heavy mixtures of peat and sand, has been completed, and a paper by Mr. B. R. Leach on this phase of the work is now in press. It was found in this connection that satisfactory treatments could be made with definite percentages of carbon-bisulphide emulsion, which would ensure 100 per cent kill of the larvæ.

WORK UNDER WAY

As heretofore, the project has been divided into six main divisions as follows: the administration, control or quarantine division, biological investigations, beetle insecticide investigations, soil insecticide investigations and field or maintenance division.

Administration—The administration division is responsible for the general supervision of the entire project, purchasing of supplies, handling of accounts, keeping and copying of notes and records and all other general duties of an administrative nature.

Quarantine Enforcement—During the winter, regulations provided by the Federal Horticultural Board, Quarantine No. 48, Second Revision, were enforced. A third revision became effective April 9, 1924. Since the city of Philadelphia was included within the infested area, it has rendered the quarantine enforcement a much more complicated problem than it was previously. During the summer of 1923 the inspection of farm products included corn, cabbage, lettuce and grapes. These inspections were made on the farm before the product was shipped. Several hundred thousand baskets of corn were inspected during the summer of 1923, and many thousands of beetles were removed from the corn before it was certified for shipment. The inspection of nursery, ornamental and greenhouse products, soil, compost and manure, was carried on throughout the year.

Scouting to determine the limit of infestation has also been carried on by this division, and at the close of the season of 1922 it was found that the infested area included some 770 square miles. At the close of the beetle season of 1923 the beetles had spread over a territory of 2,460 square miles. Careful scouting was carried on at points some distance outside of the infested territory, and it is believed, on the basis of this long-distance scouting, that the beetle has been confined to the one unit area. During the summer of 1923 the beetles spread rapidly across the pine barrens of central New Jersey and reached the Atlantic coast. This movement of the beetles was undoubtedly facilitated through being carried in automobiles. It has been impossible to inspect the machines passing through the infested area and remove all beetles which may have flown into them while passing through an infested section. On some Saturdays and Sundays, as many as 20,000 automobiles have been reported as passing from Camden to Atlantic City, and to inspect this number of automobiles properly would be a task impossible to perform with any facilities which have been available for this phase of the work. The spread westward in Pennsylvania was normal, and the outward movement of the beetles has extended the line of infestation between 15 and 20 miles surrounding the area. Beetles were found on the border of the State of Delaware, and the present quarantine includes one township within that State. The beetles have now passed out of the coastal plain region into the Piedmont plateau in Pennsylvania, and are apparently able to thrive under the conditions found in this geological formation. Hilly country tends to retard their distribution to some extent, but their movement has been fairly rapid in the valleys where ideal conditions occur for their feeding and development.

Biological Investigations—A large amount of additional data has been accumulated in connection with the life-history studies and ecological investigations. Studies are now being undertaken of the physiology of the insect in all its stages, with particular reference to the effect of environmental conditions upon the development of the insect. The object is to determine the probable future distribution of the insect and its reaction toward new environmental conditions when it reaches such regions as the corn-growing belt in the middle-west, the cotton regions in the south and the fruit regions in the north.

Large shipments of parasites were received from Japan last year and in the summer of 1923 approximately 7,000 adults of the Tachinid *Centeter cinerea* were released on what is known as Doppler's farm, about half way between Riverton and Moorestown, New Jersey. Several days after the flies were released, numerous beetles were collected in the field, bearing fertile eggs of this parasite. The parasitized beetles were kept out-of-doors throughout the winter, and the adult flies emerged from them in June, 1924. Later examinations in the field showed that many beetles had been parasitized by flies which came through under natural conditions in the field. Beetles bearing the eggs of *Centeter* are now being taken at a distance of 3 to 4 miles in each direction from the point where the flies were liberated last season. Throughout this area of 15 to 16 square miles, parasitized beetles are fairly common at the present time. It could hardly be hoped to secure a more successful establishment of a parasite than has apparently occurred in the case of this species. Releasement was made during the season of 1923 of several hundred adult Dexiids (*Prosena siberata*). To date no evidence has been secured indicating that this species has become established, although they are exceedingly difficult to find and it is quite probable that proof of establishment will not be obtained for two or three years. It is anticipated to release several thousand adults of this species during the present season.

Studies of the fungus and bacterial diseases of the Japanese beetle have been carried on. These investigations require considerable time before actual results can be obtained. Several distinct species of bacteria have been isolated which apparently cause specific diseases when inoculated in the Japanese beetle larvæ. Twenty-nine different cultures of bacteria were distributed in field plots in the autumn of 1923. As yet, it is impossible to determine how effective these have been in destroying the larvæ. In some cases apparently very favorable results

are being secured. A culture of *Isaria densa,* obtained from France, was disseminated in the field in 1923. Recoveries of this fungus have already been made from grubs collected in the spring of 1924. The percentage attacked by the fungus, however, has been small, and the data collected during the next year should give considerably more information as to how successful this organism will be in destroying the larvæ.

Chemotropic studies with reference to the adult beetles were conducted during the season of 1923. It was found that certain essential oils, when either sprayed on the foliage or mixed with bran and used as a bait, were decidedly attractive to the beetles. The various constituents of these oils which were found attractive were tested, and it was found that geraneol, one of the higher alcohols, was distinctly attractive. It was also found that all the oils which were attractive to the beetles contained this compound. Tests were made of a series of the preferred food plants, and in all cases these plants contained geraneol in various amounts. This work is being continued during the summer of 1924, in order to verify the data which were obtained last season.

Beetle Insecticide Investigations—Substantial progress has been made during the year in connection with the study of the effect of insecticides on the beetle. The recommendation of 4 pounds of arsenate of lead powder to 50 gallons of water, with the addition of 2 pounds of flour as a spreader, which was made last year has been changed on the basis of the results secured in 1923 to 3 pounds of powdered arsenate of lead to 50 gallons of water, and directions for the control of the beetle were issued in Circular No. 68 of the New Jersey Experiment Station. The relative kill resulting from the use of this material in accordance with the recommendations given is not high, probably not more than 15 or 20 per cent on an average. On the other hand, fairly good protection has been secured to both foliage and fruit from the use of the arsenate of lead as recommended.

A study was made during the summer of 1923 on the digestive system and the physiology of the digestion of the adult beetle. Attempts were made to determine the degree of alkalinity or acidity of the digestive tract, but these were not altogether successful, particularly because of the small quantity of material available. It was found that the saliva is normally alkanine, having a hydrogen ion concentration of 8.2. The digestive juices from the foregut are distinctly acid in reaction. It was not possible to determine the hydrogen ion con-

centration, since the juice collected was of such a dark, opaque color that colorometric methods could not be used. It was found that the juice collected from the foregut showed an acidity equivalent to 0.26 per cent HCl. The juice of the midgut was found to have a hydrogen ion concentration of 7.8 to 8. The hindgut juices have about the same degree of alkalinity as the midgut. The alkalinity of the saliva probably offers an explanation for the fact that arsenate of lead, when eaten by the beetle is broken down and acts very quickly. For this reason experiments were undertaken to devise a method of delaying the action of the poison.

A process was devised of coating the particles of arsenate of lead with an insoluble soap, such as lead oleate. This led to the large series of experiments relative to the effect of coating particles of lead arsenate, calcium arsenate and zinc arsenite with various metallic soaps. The sprays have been suspended in mixtures of insoluble soaps of lead, zinc and aluminum, prepared with various fatty acids, such as Stearic acid, Oleic acid, Linoleic acid, Clerpanodonic acid and Ricinoleic acid. In all about 96 different soaps were used. It was found that a mixture of arsenate of lead paste containing 2 per cent of lead oleate, on the basis of dry weight, gave the most perfect mixture from the standpoint of spreading and sticking on the foliage. Cage experiments carried on during the latter part of the summer of 1923 indicated that the beetles fed readily on leaves sprayed with this mixture. The spring of 1924 has been cold and late, with much rainfall during the month of May. It was found that the arsenate of lead-lead oleate mixture remained on the foliage the best of any preparation which has been used at the laboratory and preliminary tests against the beetle in the latter part of June have confirmed the experiments of last season in that high percentage of kill had been obtained with this mixture, as compared with the kill obtained from arsenate of lead and flour without the addition of the soap. The cost of the mixture of arsenate of lead and lead oleate will be about one cent a pound greater than the cost of arsenate of lead paste.

Efforts also are being made to determine methods for controlling the beetle on early ripening varieties of apple and peach. At the present time no definite method of control or protection of such plants has been devised.

Studies are being made on the influence of insecticides upon the beetle. This is a continuation of work which has been under way for the past two years and includes various factors, such as the feeding habits of the beetle, their movement to and from sprayed foliage as compared to their movements to and from unsprayed foliage, the determination of the factors influencing the percentage of kill, the amount of arsenic necessary to kill and the general activity of the beetles as affected by various sprays, weather conditions, etc.

Grub Insecticide Division—Considerable progress has been made during the past year in the perfection of methods of treatment of outdoor-grown nursery stock to ensure freedom from the larvæ of the Japanese beetle. Experiments have been continued on the treatment of conifer nursery stock, which is normally shipped with soil about the roots. A method of treating the soil about the roots of the plants while they are standing in the row has been devised. The treatment used is an emulsion of carbon bisulphid applied in dilute solution with a large quantity of water. It has been possible to obtain a kill of the grubs placed 24 inches beneath the surface of the soil. Treatments have been applied both in the autumn and spring, and thus far the plants have not been injured under these conditions. Much further work, however, is needed to verify these preliminary results, as well as to determine more efficient means of applying the solutions recommended. An alternative method has been devised, although it has not been proven under commercial conditions of fumigating the soil-ball around the roots of conifer stock with carbon bisulphid gas. This method contemplates the inversion of the tree in a tank of water to protect the top from the effects of gas, and exposing the roots and soil-ball to a vapor of carbon bisulphid for a period of 6 to 12 hours. In the experiments thus far conducted there has been no difficulty in killing the grub, and the plants have shown very little injury resulting from the treatment. It is anticipated to build a special fumigation chamber for testing out this method.

RECOMMENDATIONS FOR FUTURE WORK

It is recommended that all of the major investigations now under way be pressed vigorously, particularly those methods having to do with the securing of an effective method of control for the adult beetles, with the prevention of distribution of the insect through infested nursery stock, and with the prevention of injury to grasslands by the larvæ. The success which is apparently in sight of obtaining a valuable insecticide for the control of the adult beetle

warrants the continuation of the problem to completion. It should not be understood that any arsenate of lead spray will solve the problem of the Japanese beetle control, since the problem of preventing injury on early ripening varieties of peaches and flowering plants still remains to be solved. It appears that the only possibility of protecting such plants as these will be in the development of an efficient repellent. Therefore, the investigations of attractive and repellent agents, and the factors limiting these, should be advanced as much as possible in the near future.

A large amount of work will be necessary in order to devise more economical methods of treating nursery stock, which will not require highly trained experts to apply. For this reason the writer strongly advises that every effort be made to continue investigations along soil insecticide lines, and particularly on methods of treatment of conifer nursery stock. A question which is becoming of more importance each season is that of field treatment to destroy the grubs. Under favorable conditions the fairways in golf courses, large lawns, such as are found on the larger estates, and permanent pastures may be very heavily infested with the grubs. Such a condition not only causes injury to the sodland, but offers an ideal breeding place for the beetles. At the present time no method has been devised of treating large areas. The demand for an economical method of treating such situations is becoming more pressing each year, and it will be very advisable to work out a method which will be economical and effective from the standpoint of the control of the grubs.

The success which has thus far attended the importation of parasites for the purpose of establishing them in this country fully warrants continuation and enlargement of the parasite work.

It is recommended that the prevention of spread of the Japanese beetle over long distances through the agency of nursery stock be strictly enforced. It is anticipated that the enforcement of this quarantine during the fiscal year 1925 will include regulation of most of the larger nurseries in eastern Pennsylvania and New Jersey, and, unless the beetle increases its distribution much more than is anticipated, the cost of enforcing the nursery quarantine should be held within reasonable limits for the next several years. The farm products quarantine has reached a magnitude where it will be almost impossible to enforce during the summer of 1925 in the same manner as it is now operated. While it is impossible to make definite recommendations until the end of the 1924 season, it is believed that the most effective results would be had if the quarantine line is moved out sufficiently to include the area fed from Philadelphia and New York and to place an absolute embargo on the movement of green produce likely to carry the beetle beyond the limits of such an area. Those familiar with the operation of the quarantines are cognizant of the fact that it is impossible to operate the farm products quarantine with anything like the efficiency and success that is obtained in the case of nursery quarantine. Therefore, it is recommended that the whole farm produce situation be thoroughly reviewed at the end of the summer of 1924.

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*

The bee disease control work for the fiscal year ending June 30, 1924, was carried out on practically the same lines as during the previous years, there having arisen no circumstances which seemed to indicate that a change in procedure would prove more effective.

There still exists the paramount problem of teaching every bee owner the nature and control of bee diseases and the improvement of beekeeping methods so that more profitable crops may be secured.

Although it is still a minor factor, some attention is being given to popularizing the use of honey. At present New Jersey produces much less honey than is consumed in the State; nevertheless, the marketing situation may in time prove a prominent factor in New Jersey beekeeping.

TABLE OF INSPECTIONS

Fiscal Year	Apiaries Inspected	Colonies Inspected	Average Number Colonies Per Apiary	Box and Immovable Frame Hives	Colonies Infected With American Foulbrood	Per Cent Colonies With American Foulbrood	Colonies Infected With European Foulbrood	Per Cent Colonies With European Foulbrood	Colonies Infected With Sacbrood	Per Cent Colonies With Sacbrood
1919–20	190	1,943	9.6	73	69	3.7	35	1.8	*	*
1920–21	157	1,866	11.8	21	126	6.7	53	2.8	37	2.0
1921–22	190	3,330	17.5	22	211	6.3	44	1.3	78	2.3
1922–23	161	2,263	14	66	221	9.7	119	5.3	28	1.2
1923–24	173	2,805	16	50	212	7.5	49	1.6	90	3.2

*No records.

A study of the above table shows a considerable increase in the average number of colonies of bees per apiary in the apiaries inspected. This is an encouraging situation, as the State could profitably support many more bees than are now kept therein.

The factor of box and immovable frame hives is a negligible one, and they are steadily being displaced by modern bee apparatus.

The figures for the number of colonies found infected with American foulbrood would seem to indicate that the amount of this disease is on the increase. The fact is, however, that later figures more nearly represent the entire number of colonies in the State showing infection with this disease, since the infected areas are better known and the work is being concentrated there, working toward the entire clean-up of these infection centres.

European foulbrood, according to the figures in the table, showed a sharp rise in 1922-23, only to slump back again the following year. As the methods of control of this disease become better known it steadily declines as an important beekeeping trouble.

It is noticeable that there is a considerable rise in the number of colonies infected with sacbrood. Except as an interesting study, this disease so far has not merited any serious attention. It has not been known to cause any noticeable damage to colonies of bees in New Jersey, notwithstanding a very few colonies have shown a considerable number of larvæ dead from this disease. The areas in the vicinity of Moorestown and Milford, although still showing a few cases of American foulbrood, are showing encouraging signs of the complete eradication of this disease in those areas.

QUEEN REARERS' CERTIFICATES

The following queen-rearing apiaries were examined, found free of contagious or infectious bee diseases and certificated as follows:

July 23, 1923—Robert B. Spicer, Wharton, Morris County.
July 24, 1923—J. Field Garretson, Bound Brook, Somerset County.
July 26, 1923—Albert G. Hann, Glen Gardner, Hunterdon County.
May 16, 1924—Albert G. Hann, Glen Gardner, Hunterdon County.
May 26, 1924—Robert B. Spicer, Wharton, Morris County.
June 5, 1924—J. Field Garretson, Bound Brook, Somerset County.

INTERSTATE SHIPMENTS OF BEES

An increasing number of States are enacting laws requiring that incoming bees be certified. To comply with these acts, certificates have been issued to Leonard Waynicz, Deans; Albert G. Hann, Glen Gardner; Mrs. C. H. Diener, Elizabeth, and Herman E. Lerch, Tinicum, Pennsylvania, for interstate shipment of bees.

SCHOOLS FOR BEEKEEPERS

As a means of improving beekeeping and bee-disease control in the State, schools for beekeepers were held at Swedesboro, Morristown, New Brunswick, Hackensack, Washington, Belvidere, Princeton, Sussex and Newton. The total attendance was 182.

EXHIBITS

A display of beekeeping apparatus was made at the Morris County Fair, at Morristown, and a display of apparatus and honey, and honey-extracting demonstrations were made at the armory, Trenton, during "Agricultural Week."

LECTURES

Three lectures were given at meetings of the Essex County Beekeepers' Society, at Newark, and one before the nature study class of the Princeton high school. A community meeting at Stillwater was also addressed.

SPECIAL CIRCULARS

As a safeguard against dysentery in bees, a circular was sent in September to the entire mailing list of about 3,000 beekeepers in the State advising them to feed each colony at least five pounds of sugar in addition to the winter stores in the hive.

In an effort to reduce the spread of American foulbrood by the bees robbing out the contaminated honey from diseased colonies which had died, a notice was sent to all beekeepers in the areas where this disease was suspected, warning them to prevent all such robbing.

ANNUAL BEE CONVENTION

The Annual Convention of the New Jersey Beekeepers' Association was held in Trenton during "Agricultural Week." The attendance at the five sessions was 203.

FIELD MEETINGS AND DEMONSTRATIONS

The State Department of Agriculture and the New Jersey Beekeepers' Association have cooperated in holding nine field meetings and demonstrations as follows: July 6, 1923, at Blairstown, attendance 14; August 23, at Swedesboro, attendance 16; August 24, at Pattenburg, attendance 35, and Lebanon, attendance 26; August 25, at Florham Park, attendance 74; September 15, at Nixon, attendance 26; June 10, 1924, at Cape May Court House, attendance 9; June 12, at Ralston, attendance 9; June 20, at Halsey, attendance 26. Total attendance, 235.

STATISTICS

Considerable work has been done in collecting statistics of New Jersey beekeeping, at the same time checking up and correcting the mailing list.

PUBLICITY

Seven articles on timely bee manipulations have been published in the "Trenton Evening Times," also five short sketches on honey.