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DEPARTMENT OF AGRICULTURE

ALVA AGEE, Secretary

BULLETIN

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New Jersey
State Department of Agriculture

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Annual Report of the New Jersey Department of Agriculture

REPORT OF THE SECRETARY

ALVA AGEE

The farmers of New Jersey are making a record in the war of which the state may well be proud. Notwithstanding the acute labor situation, due to the fact that our state is in the very heart of war industries, an increase in acreage of wheat, rye, oats and corn, as asked for by the national government, was made in the fall of 1917 and the spring of 1918. The shortage in labor during the summer of 1917 was so great that faith in any increase in plantings could be based only upon the known patriotism of the farmers who are in the war to win.

A big factor in the situation has been the reorganized County Boards of Agriculture that secure team-work among producers, and the efficient organizations of special interests, such as the State Potato Association, the State Dairymen's Association, the State Alfalfa Growers' Association, etc., working with the older agricultural associations of the state, among which the Grange has primacy in that it laid the foundation for organization and educational work.

It is with peculiar pleasure that I present the reports of the various bureau chiefs in the State Department of Agriculture, as they afford evidence of the efficiency of the staffs assembled in all lines of disease and insect control work, in marketing and transportation and in the educational and statistical work that is among the duties of the State Board in the promotion of the interests of agriculture. Even in these busy days I dare ask a careful reading of the report of each bureau chief, in order that the means being employed to promote our state's efficiency in food production may be known.

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BUREAU OF ANIMAL INDUSTRY

The public health and the dairy interests of the state constantly are imperiled by the prevalence of tuberculosis among cattle. During the eight months between the date of our last report and the beginning of the new fiscal year, marked headway has been made in this control work. Some new legislation given us by the last Legislature and some regulations adopted by the State Board of Agriculture upon the advice of the chief of the bureau, Doctor J. H. McNeil, have enabled the Department to protect the state more surely from heavy importations of diseased cattle from other states. It has seemed best to make the requirement that all inspectors in the bureau should give full-time service and receive full-time pay, in order that the employee may have no interest other than to carry out with exactness the policy of the bureau in control work. Some additions have necessarily been made to the staff and, while our dairymen have a sense of security that control laws will be enforced in a manner bringing the least hardship upon the honest producer, they know that they have an increasing degree of protection from importations of diseased animals and from the sale to them of reactors that should have been quarantined or slaughtered. The spirit in which leading breeders and dairymen are cooperating with the Department promises rapid improvement in control conditions year by year.

The bureau is now so well organized that sudden outbreaks of virulent diseases can be handled without delay, saving the state serious loss.

Close attention is constantly given to hog cholera, which has handicapped the swine interests of our state seriously. We are reaching areas of infection more quickly and effectively than in the past, and it is possible to limit our annual losses from this disease to a nearly nominal sum if thorough cooperation on the part of producers is secured.

OTHER CONTROL WORK

The Bureau of Inspection saves the state from immense loss through the destruction of plants infested by dangerous insects and

diseases. The Department is cooperating with the national government in an attempt to stamp out a pernicious Japanese beetle that has secured lodgment in a small area within Burlington County. The Legislature made a special appropriation of \$5,000 and the national government contributed \$10,000. At this date only progress can be reported.

The report of the state bee inspector will have special interest to 2,200 producers of honey in our state.

COST OF CONTROL WORK

One-half of the entire appropriation to the Department of Agriculture is expended in the control of animal and plant diseases that are a constant menace to the state's agriculture. A part of this money, used for indemnification of owners of animals condemned, comes back into the state treasury through sales of meat that is safe for food.

THE BUREAU OF MARKETS

There is a wide spread between the prices paid to the producer of farm products and those paid by the ultimate consumer. This is due in part to lack of standardization. The distributor does a most necessary work for which he is not given due credit. The consumer wants certainty that he will receive an article of a certain grade, and very few producers are in a position to furnish it continuously. It will be necessary that a heavy toll be permitted to the distributor until farmers form cooperative selling associations that will permit the standardizing of products and a more or less continuous shipment to market during the season. The report of the chief of the bureau is particularly encouraging respecting the number of cooperative associations, public markets, and similar means of shortening the road between producer and consumer that have been organized within our state. The disposition on the part of producers to grade and to standardize their products increases and the bureau's constant campaign of education is bringing valuable results.

Possibly the best appreciated work of the bureau has been done

in expediting transportation. In hundreds of instances shipments lost or delayed in transit have been located and pushed to destination. Empty cars have been obtained by direct dealing with transportation lines, and in other ways aid to the shipper has been given.

The State Board of Agriculture has placed in the Bureau of Markets a specialist in dairy products marketing. Dairymen will be assisted as far as possible in the effort to cut down the cost of distributing milk, and special effort will be made to keep the true food value of dairy products permanently before the public. Milk at present prices is a much cheaper form of food than most other products.

AGRICULTURAL STATISTICS

The voluntary service of several hundred crop reporters is giving value to the monthly crop reports of the Bureau of Statistics. There is need of a careful census of crop acreages by counties each year, as estimates made by the most careful observers cannot be absolutely dependable.

MILK DEALERS' LICENSES

The law requiring the licensing of dealers in milk and cream bought from New Jersey producers for sale or manufacture has had only partial enforcement. No special funds were provided for careful inquiry into a list of many hundreds of dealers coming possibly within scope of the original law, and there was the further handicap that dealers were more or less generally advised by counsel that the law was unconstitutional. Notwithstanding all difficulties, 221 licenses were issued before one case was finally brought into the Supreme Court. No decision respecting constitutionality has been handed down, but some amendment to the law by the last Legislature has made this law more acceptable to the public, and a more thorough enforcement is practicable for the fiscal year beginning July 1, 1918, if the law is not declared unconstitutional. There can be no doubt that this measure of protection is needed in great dairy sections that are dependent upon buyers for distant markets.

ORGANIZATION

The State Board of Agriculture, charged with the duty of promoting the interests of agriculture, believes that one of its greatest services has been the fostering of soundly based organizations of those engaged in food production. Our County Boards of Agriculture have assumed a lively sense of responsibility for the well-being of their counties and have tied up with them various state organizations of special interests. There is now such team-work among the forward-looking men of every rural section of the state that definite judgment is expressed on all matters affecting agricultural interests, and there is the will and the power to have some part in all decisions that affect the rural life of their state.

LABOR

The Department has cooperated with the State Department of Labor and the state representative of the United States Department of Agriculture in securing and placing labor on farms. While there has been a big lack of experienced farm laborers, the labor shortage has been somewhat less serious than was anticipated. This is due in part to the excessive hours that the farmer and his family have worked in many thousands of instances, and in very considerable part to the restrictions placed upon non-essential industries that stopped some of the drain that was so heavy upon farm labor. More women have worked in the fields than ever before and especial mention should be made of the Woman's Land Army of America, which has been doing good pioneer work this year demonstrating the value of girls and preparing the country and city for the extensive use of girls and women in the fields next year when more of the men will be in the army. As a rule the Land Army has commended itself to practical farmers who had doubted its value, and we confidently look to the women of the state as a very considerable source of farm labor next year. The school children have taken their work far more seriously this year than was the case last year and are a material addition to the working force.

UNUSED LAND

Our national government may decide to provide small homesteads for all crippled soldiers who desire rural life and who can contribute in any degree toward their own maintenance. The soil should be especially adapted to the production of vegetables, fruits and poultry. The government no longer owns any large areas of highly desirable agricultural land and should consider the condemnation and purchase of some areas of unused land within New Jersey that would furnish desirable homesteads. This land has no agricultural value at present and should be acquired at a low price. Soil experts could determine the areas of greatest value and if these were cut into blocks of 40 acres each to be acquired as homesteads by returned soldiers that had been unfitted for hard labor as employees much could be accomplished to make life bearable for these men. The government could well afford to put a portion of each homestead into condition for tillage and also supply seeds and fertilizers for the first year. Expert agricultural supervision should be given. The possibility of large areas of these vacant lands has been demonstrated by practical farmers who now produce excellent crops of tree fruits, small fruits and vegetables in many parts of Burlington and Atlantic Counties that were entirely neglected fifty years ago. The enterprise should be under rigid government control that would confine it to the areas of actual agricultural value, so that no returned soldier would be located where the soil could not make a proper response to intelligent treatment.

OUTSIDE RELATIONS

The State Board of Agriculture has reason to believe that New Jersey had a considerable part in bringing about the creation of the "Advisory Committee of Twenty-four" that was appointed by Secretary of Agriculture Houston and United States Food Administrator Hoover as a body to which all regulations affecting producers of food should be referred for consideration. A member of the State Board, Mr. H. W. Jeffers, was made a member of this Committee, and the chairman of this Committee was made a member of the price-fixing committee in the War Industries Board. It

thus comes about that various classes of producers in this state and in all other states have been able to reach the national government promptly and effectively when tentative regulations were under consideration. This Committee of Twenty-four has endorsed the proposal originating in New Jersey that lime and limestone be considered by the national government not only an essential, but that especially low freight rates be made by the government-controlled railroads and propaganda be used to secure the correction of soil acidity throughout our eastern states, as it is one of the greatest handicaps to maximum food production.

The State Department maintains close relations with all other State Departments having interests in common, and also with the New Jersey State Food Administration, assisting the administrator in the enforcement of regulations affecting prices of feed, etc. It also acknowledges its obligations to the State Chamber of Commerce, with which it is closely affiliated in various endeavors.

FARMS OWNED BY THE STATE

The Department is especially proud of the inauguration of the present system of supervision of farms connected with state institutions. This work was proposed only when it had been found practicable to secure the assistance of Mr. W. B. Duryee, who became the Department's specialist in farm management. The organization of the new Department of Charities and Corrections provided for the transfer of this supervision from the Department of Agriculture to itself, and necessarily this Department lost the services of Mr. Duryee, who had rendered great assistance to it in addition to the work done on the farms. His report for the year ending July 1 will interest everyone that is acquainted with any of the state's institution farms.

FARMERS' INSTITUTES

Last year the Department held 82 farmers' institutes, of which 75 were regular institute meetings. The total attendance was 15,995. The will of the State Board is carried out in that such meetings should be largely under local control, the County Boards

determining the number and location of meetings and the general character of subjects to be discussed. In this way these meetings are kept practical and directly helpful to local communities.

"AGRICULTURAL WEEK"

The regular Agricultural Convention and the annual meetings of various livestock and agricultural associations, forming what is now known as "Agricultural Week", were held January 22, 23, 24 and 25. The following associations were the guests of the State Board in so far that halls were arranged for and programs distributed:

New Jersey State Horticultural Society
 New Jersey State Poultry Association
 New Jersey Berkshire Breeders' Association
 New Jersey Holstein-Friesian Breeders' Association
 New Jersey Guernsey Breeders' Association
 The Jersey Cattle Association of New Jersey
 State Dairymen's Association
 New Jersey Alfalfa Association
 New Jersey State Potato Association
 New Jersey Beekeepers' Association
 State Nurserymen's Association
 Farm Demonstration Workers
 Home Economics Workers
 Public Market Officials

The attendance during the week taxed the capacity of city hotels and the interest was great.

STATE BOARD OF AGRICULTURE

As this report is made by the secretary, it may not be in bad form to call attention to the services rendered by the State Board of Agriculture. Not only are the policies of the Department determined by the State Board, but the members, who are men of affairs and necessarily busy at home, have cheerfully given the time necessary to careful consideration of all matters of importance that have arisen during the year. They are representative of the farmers of the state and through such a State Board the will of the farmers is carried out just so far as it is known to the State Board and its secretary.

PUBLICATIONS

A list of bulletins and circulars for the year is as follows:

Bulletins

- No. 10 State Institution Farms
- 11 Official Proceedings of the Third Annual Agricultural Convention
- 12 Report of the Proceedings of the State Dairymen's Association and the State Alfalfa Growers' Association, Agricultural Week
- 13 The Prevention and Treatment of Hog Cholera.
- 14 New Jersey Market Standards for Home Canned Fruits and Vegetables

Circulars

- No. 14 Information for Nurserymen
- 15 Profitable Beekeeping
- 16 The Home Vegetable Garden
- 17 Boys' and Girls' Garden Clubs
- 18 Potato Recipes
- 19 Digest of the Laws and Regulations Governing the Shipment of Nursery Stock from New Jersey into Other States and Canada
- 20 Crop Statistics, County Boards of Agriculture and Granges
- 21 Animal Disease Control Legislation
- 22 New Jersey Market Standards for Home Canned Fruits and Vegetables

REPORT OF THE BUREAU OF ANIMAL INDUSTRY

DR. J. H. McNEIL, *Chief*

The reorganization of the Bureau and the work which pertains thereto has progressed in a very satisfactory manner. The force of bureau inspectors has been augmented and the arrangement changed from part- to full-time in order to give better service to the livestock interests and place the bureau on a solid footing by leading and educating the livestock and dairy interests to a better understanding of the disease conditions which affect their herds and make them unprofitable. There are now employed, giving full time to the bureau service, 9 inspectors, eight of whom are graduate veterinarians. Requests made by dairymen and breeders necessitate the expansion of the service to include work which has heretofore remained untouched. There is a large field which awaits development, and the bureau should be placed on a basis calculated to serve the livestock and dairy interests in a degree commensurate with their importance.

There are at least two important factors to be considered in the intelligent handling of infectious and contagious diseases, and especially tuberculosis. The first factor is agricultural, concerning the breeder and dairyman, and is economic in nature. The second must be considered from a public health standpoint and refers to both milk and meat production. The bureau is speeding every effort and cooperating with all agencies in an attempt to bring about a closer relationship, looking toward the control and eradication of such diseases as tuberculosis, hog cholera and glanders. There are districts in the State of New Jersey which are well adapted to dairying and the breeding of livestock, to which aid must be given if the industry is to remain on a profitable basis.

ANTHRAX

During the fiscal year of 1917 a very serious outbreak of anthrax occurred in southern New Jersey, in Salem and Cumberland Counties. Animals died on 33 farms only, but in order to check

the spread to the adjacent farms vaccination was practiced on about 1,200 head of horses, cattle and mules on 79 farms. The loss before vaccination totaled 88 head. Because of the extensive overflow of the bottom lands in this section, it was feared that this disease would prevail again this year later in the season. In order to avoid this unnecessary loss vaccination was practiced on 1,083 cows, 242 heifers, 65 bulls, 20 calves, and 66 horses, totaling 1,476 animals on 97 farms in this low-land section. This vaccination was accompanied by no losses. Two animals had died of the disease on one of the farms before vaccination. In order to insure the vaccination and thereby the protection of all of the animals in this district, the serum was furnished by the state and the work was done by bureau veterinarians. On the whole, the results were quite satisfactory.

Early in the year a very serious outbreak occurred in Hunterdon County. There were 32 animals on the farm, 16 of which died from anthrax before bureau assistance could be rendered. The remaining animals were vaccinated and the disease promptly checked. The infection in this outbreak is supposed to have originated from feeding ground alfalfa which had been shipped in fertilizer bags.

GLANDERS

The glanders situation in New Jersey remains unchanged. Efforts to remedy the existing conditions, enact laws and provide for an appropriation to compensate owners of animals slaughtered failed, because the necessary funds were not provided by the Legislature. However, the conditions are such that some action should be taken in the immediate future to control the spread of this disease and prevent its introduction from the outside. The laws prohibiting the entrance of the New Jersey horses into the City of New York continue in force, which requires that they be mallein-tested and banded. We have received to date reports covering a total of 5,113 head of horses tested for glanders and banded as required by the New York City law. Of this number there were reported but five reactors, which is undoubtedly a very small percentage of the total number tested. As a result of mallein-testing and physical examinations of horses and mules in other sections of the state, thirty-nine animals have been reported as being affected with glanders. These were destroyed, the premises disinfected and all other requirements of the law fully complied with.

STALLION REGISTRATION

The results of the examinations of stallions for public service for the season of 1918 show that 130 animals were licensed, of which 105 were renewals and 25 first registrations, against 145 registered for 1917—a decrease in registrations of 15 animals. A considerable number of stallions are owned and maintained on the premises, but are not being offered for public service. Some few of the animals registered in 1917 have died and others have been sold out of the state. There is a general lack of interest on the part of the owners of breeding animals, as they claim that because of the increased cost of maintenance, horses can be purchased much cheaper than they can be produced.

HOG CHOLERA

Hog cholera control and eradication forms a very important part of the program for the control of infectious diseases. In certain sections of the state a large amount of uncooked garbage is fed, and hog cholera is very prevalent. It also exists in the more sparsely settled districts and causes a great annual loss. We are now in the midst of a campaign in an attempt to develop a better system for the control of this disease. The work of vaccination heretofore has been done by farmers, county agricultural agents and veterinarians with varying degrees of success. We have adopted the plan of investigating all reported outbreaks, advising vaccination and furnishing services where the owners are unable financially or are not inclined to incur the expense. We deem it advisable to follow this plan in order to control completely and eventually to eradicate the disease from that particular infected district.

The law which passed the last Legislature prohibits the use of vaccine or virulent blood in hog cholera outbreaks, except when used under permit from the Department of Agriculture. This will eliminate most of the objectionable features with which the bureau has come into contact heretofore. A great deal of work remains to be done along these lines and should be provided for in the very

near future. Hog cholera is a very highly infectious disease of hogs, and should be handled only by those qualified by education or experience to deal with contagious diseases. The vender of the so-called hog cholera cures does a great deal of harm and the sale of such remedies should be discouraged.

TUBERCULOSIS

Of the contagious and infectious diseases with which we have to deal, tuberculosis in cattle and swine, and cholera, which affects swine, are probably the most widespread and cause the greatest loss. Tuberculosis is recognized as being prevalent among most of the breeds of pure-bred cattle and pure-bred animals because the conditions under which they are maintained are probably the most prolific of all the sources of the spread of this disease, and are the means of infecting grade and cross-bred animals. Measures should be adopted looking toward the complete control of the sale and shipment of animals from pure-bred herds where tuberculosis is known to exist. Such control would serve as an absolute check on the spread of tuberculosis within specified areas. The adoption of the plan for the establishment of tuberculosis-free accredited herds offers the best solution we now have for the control and eradication of tuberculosis. Arrangements have been completed with the Federal Bureau of Animal Industry for cooperative work in tuberculosis eradication and tuberculin-testing of herds of pure-bred cattle for the purpose of establishing tuberculosis-free accredited herds.

The following is a summary of activities for the eight months from November 1, 1917, to June 30, 1918, and refers to the release of imported cattle by the New Jersey bureau inspectors, native cattle tested by the New Jersey bureau inspectors and private veterinarians, tests by United States bureau inspectors, appraisements of reacting cattle from native herds and investigations of tubercular and suspected tubercular animals reported by the boards of health:

Native Cattle tested by the New Jersey Bureau of Animal Industry Veterinarians.....	558	
Number of Reactors.....	105, or 20	per cent
Native Cattle tested for Owners by Private Veterinarians	2,944	
Number of Reactors.....	311, or 10.4	per cent
Native Cattle tested for Export.....	811	
Number of Reactors.....	36, or 4.4	per cent
Cattle tested by the United States Bureau of Animal Industry Inspectors to remain in the State	163	
Reactors	10, or 6.1	per cent
For Export	8	
Reactors	1, or 12.5	per cent
Total Number of Native Cattle tested.....	4,484	
Total Number of Reactors.....	463, or 10.3	per cent
Number of Cattle tested before entering the State	6,363	
Reactors before entering the State.....	152, or 2.3	per cent
Number of Imported Cattle tested after entering the State.....	2,693	
Number of Imported Cattle reacting on test and slaughtered	135, or 5	per cent

Statistics for suspected or pronounced tubercular animals reported by State and City Boards of Health:

Reported as suspected tuberculosis on physical examination and slaughtered	110
Reported as reactors in tuberculin tests and slaughtered.....	243
Reported as suspected tuberculosis on physical examination and when tested found to be non-reactors.....	9

Of a total of 816 tubercular animals, we slaughtered, appraised and paid for 236, or about 29 per cent. Eighty-two animals, mostly pure-breds, are held in quarantine awaiting slaughter; 497 animals were slaughtered under inspection, and the owner received the carcass value. The total appraised amount was \$10,688, or about \$45 per head. Of this amount, three-fourths, or \$8,016, was paid.

REPORT OF THE SPECIALIST IN FARM MANAGEMENT

WILLIAM B. DURYEE

The principal work of the specialist in farm management is concerned with the state institution farms and the period included in the present year is not a time of great activity on these farms. This report, therefore, deals with the plans made during the winter and which are being put into effect during the present growing season. Aside from assisting in the development of the institution farms the work has included considerable correspondence, carrying on office routine in the absence of the secretary, who was frequently called to the federal service, and in the management of the Agricultural Week program.

In the previous report a complete list of the farms was given with their acreage and principal crops. At the present time the farms which are cooperating include the following:

- Burlington County Colony, New Lisbon, Burlington County.
- Home for Disabled Soldiers, Sailors, Marines and Their Wives, Vineland, Cumberland County.
- Home for Boys, Jamesburg, Middlesex County.
- Home for Girls, Trenton, Mercer County.
- Institution for Feeble-Minded Women, Vineland, Cumberland County.
- Manual Training and Industrial School, Bordentown, Burlington County.
- New Hospital Farm, Annandale, Hunterdon County.
- New Jersey Reformatory, Clinton, Hunterdon County.
- New Jersey Reformatory, Rahway, Middlesex County.
- Sanatorium for Tuberculous Diseases, Glen Gardner, Hunterdon County.
- State Hospital, Morris Plains, Morris County.
- State Hospital, Trenton, Mercer County.
- State Prison Farm, Leesburg, Cumberland County.
- Training School, Vineland, Cumberland County.
- Village for Epileptics, Skillman, Somerset County.

The Training School at Vineland has been added to the list since last year. While this is not a state institution in the strict sense of the word, Director Johnstone has cordially cooperated with us and this farm is therefore included.

During the last eight months more detailed attention has been given to the management of each farm and the development of definite lines of work. This development was made possible by a

study of the farms during the previous year and as time passes we hope to make the work more intensive and helpful. Close study and accurate knowledge of each farm is being greatly assisted by means of the farm accounting and reporting systems which have been worked out in conference with the farm managers and others during the winter. We have developed a produce report blank upon which each institution makes a statement of the returns from the farm during each week and mails it to this office where the values of said produce are inserted. A specimen of this sheet is shown below:

WEEKLY PRODUCE REPORT

Name of Institution.....

For the week ending.....191

Crop and Unit	Grade	Unit		Con- sumed		Sold		Canned		Stored		TOTAL VALUE
		Value	Qty.	Val.	Qty.	Val.	Qty.	Val.	Qty.	Val.		
Apples	1											
	2											
	3											
Asparagus	1											
	2											
	3											

There are two objects in mind in using this system, the first being to set a uniform price on all produce at all institutions so as to have an accurate method of comparison between institutions as to the quality and value of produce raised. The other, and most important object in mind, was that such a reporting system would enable us to study the crop system, particularly in the truck gardens, and suggest rearrangements so as to provide more food during the year and have a continuous supply. For example, when we find that one institution has developed a planting system of sweet corn,

which gives a regular and continuous supply sufficient for the institution's needs, we can then advise practically the same varieties and planting times to another institution which does not have sufficient corn for its population. We have developed other reporting blanks for each department in the institution. For example, the daily herdsman's report, which shows the number of cows in the herd, the number of milkers, the number of cows milked, the number of pounds of milk supplied the institution and the amount of milk fed to calves. Space is provided for the kind and amount of ration fed, including both grain and roughage. The number of individual cows bred and the cows calved is included as well as the number of cows sold and the calves sold that day. Daily blanks have also been devised for the poultry departments and for the orchards on the farms showing the returns from each of these industries for each day. A monthly summary also has been provided which contains a statement of the income from each of these lines of work during the year. These will be available for inspection on a visit to the institution and are designed primarily for the institutions' own records.

The report of last year, mentions the cost accounting system which we planned to put into effect. This system has been fully developed during the winter and four conferences were held to consider it and make it practical for the institution farms. We were assisted in the work by Mr. H. W. Jeffers and Mr. Stultz, of the Walker-Gordon Farms, and by the bookkeepers of several institutions who were familiar with such work. Time records have been devised, showing how the time of each man is spent with columns for the hours of man labor, inmate labor and horse labor. The hours of inmate labor can be valued only in comparison with the cost of doing similar work with paid labor. By the use of these time records, combined with the ledger of expense accounts and receipts in connection with each crop, the profit or loss on each industry or department of the farm is ascertained. We can determine also which crops can be raised to best advantage at each institution with inmate labor, thus obviating the necessity for hiring so much skilled labor in these times of shortage. The cost accounting system is the only method which enables us to determine the profitable crops and a practical system of farming for each institution. Another object which will be attained by the system is a record of

the time spent by the farm labor and teams for the institution, such as hauling and the general upkeep of the grounds and buildings. The farm department should receive credit for this work since it would be necessary to hire this labor if the institution were not so equipped. This information is also needed by the New Jersey Budget Commission so that a fair appropriation may be made to enable each institution to work its departments to the best advantage.

LIVESTOCK IMPROVEMENT

Dairy

A uniform ration for all institution herds was adopted during the winter, the standard formula to be fed with ensilage and mixed hay. Where these forms of roughage were not available the formula was necessarily modified, but the standard formula as adopted is as follows:

600 lbs. corn and cob meal
 or
 500 lbs. hominy
 or
 500 lbs. corn meal
 200 lbs. wheat bran
 200 lbs. cottonseed meal
 50 lbs. gluten

This ration is fed at the rate of $3\frac{1}{2}$ pounds to each pound of milk produced. This individual feeding of the cows, based upon their production, has resulted in a great improvement in the appearance of the herds, an increase in milk production and is far more economical than feeding at the whim of some inexperienced person. Partly through our efforts good herdsmen are being secured at several state institutions which have not had such men in the past and this is resulting in much better conditions. A herd book for the state institution herds has been devised which contains an individual sheet for each cow, giving her name or number, breed and age with diagram. Statement is made of the ancestry of the animal for four generations and a record made of the produce, showing date of dam breeding, sex of calf, name of sire and how the offspring was disposed of. The reverse of the sheet contains a summary of the milk and butter-fat production and sufficient room is provided for the records of each month for eight years. This herd book is

uniformly used at all institutions having dairies and will be a guide in the development of the herds and in the raising of better heifer calves. A calving table is included in the herd book, showing the date of freshening of each cow in the herd.

During the past few months considerable emphasis has been placed on tuberculin testing of the institution herds. We believe that the state herds should be freed of tuberculosis as rapidly as possible in order to serve as an example to milk producers in the state and to enable us to raise stock which will be free from this disease. The actual direction of the tuberculin tests is under Dr. J. H. McNeil, chief of the Bureau of Animal Industry in the Department of Agriculture, in consultation with the local veterinarian. Five institution herds have been tested to date, namely,

New Jersey State Hospital, at Trenton
 Manual Training and Industrial School, at Bordentown
 New Jersey Reformatory for Women, at Clinton
 Institution for Feeble-Minded, at Vineland
 New Jersey State Hospital, at Morris Plains

Other institution herds will be tested this fall, and as rapidly as reactors are discovered, they will be disposed of for beef where passed by the inspector, or sold for tannage. Within two or three years we believe that the institution herds will be freed from tuberculosis and the animals and their progeny will be much sought after by buyers in the state who recognize the importance of freedom from this contagious malady. The demonstration by the state institutions that tuberculosis can be practically eradicated from dairies will serve as an example to practical dairymen of the state.

This office has prepared temperature charts showing the results of the tests of each cow. As each test is made the temperature will be recorded on these charts and kept with the individual cow. This will furnish a valuable record as to the possible reaction of the cow in the future and will serve as a guide to producers who will know that these animals have never reacted to the test. This system has been adopted in the herd of the New Jersey Agricultural Experiment Station, and it is our plan to make all the state institution herds members of a state breeding association which will make possible the interchange of breeding stock and will result in the general improvement of all the herds. This will be a comparatively easy matter at all the state institutions, as all have grade or pure-

bred Holsteins except one. The State Home for Boys at Jamesburg has Guernseys, and this herd cannot be treated as part of the breeding association unless it is gradually developed into a Holstein herd. We believe that for institution purposes the Holstein is better adapted than any other and recommend that this be the breed for general use under these conditions.

Special emphasis has been laid on the construction of silos and these will be built this year at the institutions which do not have them. The usefulness of ensilage is established and at the present price of feed it offers the most economical source of food. It has been our work to secure good ensilage corn for institutions which do not have it and the prospects this year are better than formerly as a result of this selection. The value of soybeans for ensilage purposes has been demonstrated at several institutions during the past year. The State Home for Boys, in particular, had a considerable acreage of soybeans ensiled with corn with excellent results. This year other institutions are growing soybeans and we believe that as a source of protein they will make a valuable addition to ordinary ensilage.

Swine

Because of the high price of feed it is becoming a vitally important matter to produce pork economically. In the past many institutions have been able to feed large quantities of garbage and this has brought the pigs to the fattening period at a comparatively low cost. The conservation of food has resulted in a decided lessening in the quantity of garbage available and also in reducing its value, particularly in protein. The most economical way to supplement garbage is to pasture the growing pigs on forage crops which are rich in protein. This method of swine production is not only more economical but is very beneficial to the health of the animals, giving them plenty of exercise and fresh air, and providing them with a bulky food which develops their digestive systems and induces steady growth. One year ago there were practically no forage crops grown on the institution farms. At the present time nearly every institution in the state has devoted a considerable area to these crops and their usefulness has been demonstrated. The crops used are rape, oats, sweet clover and alfalfa.

Self-feeders have been made at some institutions and the use of these will become more general as soon as they can be built. In

these feeders we place middlings, corn and tankage in separate compartments where the young animals can have ready access. This is particularly valuable for young stock, insuring a complete ration. Emphasis has been placed upon having a mineral mixture available to the animals. This consists of the following:

Charcoal	2 bu.
Wood ashes	1 bu.
Air-slacked lime	10 lbs.
Steamed bone meal.....	10 lbs.
Bicarbonate of soda.....	10 lbs.

After mixing, 5 pounds of ferrous sulfate (copperas) is added in solution. The mineral ration supplies the materials lacking in the feed and assists in normal and healthful development. Blue-prints of "A" houses, or colony houses, have been sent to the institutions and their use will become more extensive next year.

Success in raising hogs depends on getting back to nature and getting away from the filthy and unsanitary hog pen and close confinement. Hog cholera is a menace which still confronts us and we are hoping to devise a plan successfully to immunize the growing pigs at the state institutions so as to prevent an outbreak of this disease. It is necessary to use the double treatment with virus and serum. This requires careful work and it will be under the direction of the Bureau of Animal Industry.

In order to develop further the swine department, a "Breeding Record of Improved Swine" has been sent to each institution which has swine departments. This is a simple record showing the most prolific sows and the number of pigs which are brought to maturity or sold at weaning time. This record is not concerned with the development of pure-bred stock, but is a step in the direction of efficient and economical production and the upbuilding of the herd.

Poultry

Under present conditions poultry can be kept at a profit only by utilizing the most scientific and efficient methods. The poultry at the state institutions is receiving especial attention and will be put on a more efficient basis if plans already made mature. The present

method of hatching and brooding chicks at some institutions is not as efficient as it should be, because of inadequate equipment and lack of expert supervision. At a recent conference a suggestion was made for a central hatching and brooding system which would supply state institutions with 10-weeks-old chicks. This plan has been approved by the poultry department at the State Agricultural College, and Professor H. R. Lewis and Mr. V. G. Aubry of that department are working out the plans for its development this year. Under this plan one institution centrally located will provide all the institutions with the needed pullets and will be able to supply them more cheaply than the individual institutions can raise them. Furthermore, we expect through this plan to standardize the breeds, using the Leghorn as a sample of the egg type and the Barred Plymouth Rock as a sample of the meat and egg type. The plant will be under the direction of a poultry expert and the poultry department at the College will give supervision to insure its success. The plan includes an increase in the number of laying hens at several institutions based on the need for fresh eggs daily.

FERTILIZERS AND LIME

Together with the standardization of a ration for dairy cows, mentioned in the foregoing report, the mixture of fertilizers for specific purposes have also been standardized. These formulas are as follows: For potatoes, a mixture of 4 per cent ammonia, 8 per cent phosphoric acid and 3 per cent potash. For potatoes, where no potash seems to be needed and for truck, we use a mixture composed of 5 per cent ammonia and 10 per cent phosphoric acid. The mixture for corn, grain and grass is composed of 3.5 per cent ammonia and 11 per cent phosphoric acid. Many institutions used top-dressing on grass sods for the first year with good results, the mixture being composed of 9 per cent ammonia and 11 per cent phosphoric acid. The quantity applied per acre varied with the conditions, depending on whether manure was applied to the land as well. For the coming year we should like to see some arrangement made so that the fertilizers for the state institutions might be mixed at a central farm and distributed from there. We believe this would mean a great saving to the state and would insure at least as good results as are now being secured from commercial mixtures.

In the spring of 1917 we brought to the attention of the State House Commission the need of a crusher to grind lime at the Anandale farm in Hunterdon County and supply the other state institutions with this important material through the labor of inmates. After considerable delay a crusher was secured and some lime has been made, but principally because of the lack of a satisfactory engine, the lime is not available in sufficient quantity to supply the needs of the state institutions. Under the new Department of Charities and Corrections, with its centralized control, we anticipate that this source of lime will be utilized much more extensively than in the past. The analysis of the lime shows it to be composed of calcium and magnesium, and that it averages 96 per cent of total carbonates, making it an especially high grade of lime for soil purposes. This lime quarry should be worked intensively, for there is no limit to the supply and practically no limit to the demand for it on the state farms, as they have been insufficiently supplied with this material in most instances. This is a case where reformatory inmates can be of great use to the other institutions of the state and in the increased production of food. An alkaline soil condition is necessary for maximum crop production, and therefore every ton of lime applied adds that much more producing power to the state's land.

GOOD SEED

The importance of good seed is recognized by every practical farmer in the state and the successful farmer is usually the one who seeks quality in seed rather than minimum price. By the co-operation of the State Purchasing Department we have been able to supply the institutions with seed of high quality and the result so far this year indicates the wisdom of this course. Three kinds of seed potatoes are used on the state farms; Irish Cobbler, Green Mountain and Red Skin, which mature in the order named. The Cobblers were certified seed grown in Maine. The bulk of the Green Mountains were an improved strain of exceptional vigor from Franklin County, New York, and the Red Skins, which are produced at the institutions in Cumberland County, are from home-grown seed. During this year we are planning to grow as many seed potatoes as possible on the state farms and in this work we

have the cooperation of Mr. Joseph Sutton, manager of the State Prison Farm at Leesburg, Cumberland County. This farm is best adapted to this work and is in a section where late-crop potato production is very successful. Nearly 100 bushels of the best Green Mountain seed were put in storage this spring and will be planted at the Leesburg farm in July. As these will not have a sufficient growing season to mature they will make the best possible seed and we anticipate a good crop. Cobblers also will be planted for the purpose of producing seed, and sufficient Red Skins will be grown to supply the southern institution farms. Thus we expect to become largely independent of outside sources of seed, save money to the state and at the same time develop seed potatoes which are more prolific than imported stock.

This year much of the seed corn in this and other states was practically worthless for seed purposes. As soon as this general condition was determined we got samples of corn from all institutions and had them tested by the state seed analyst at the State Experiment Station. As a result of these tests we were able to advise institutions as to whether the corn would be satisfactory. In several cases the germination was poor and we advised a vendor who had satisfactory seed. The Manual Training and Industrial School at Bordentown was fortunate in having seed of good germination and this was distributed among some other institutions. As a result of our work along this line all the farms have good stands of corn and in this respect are in better condition than many privately owned farms in the state. The result of this corn testing will mean an increase in production, mainly because corn of known germination and producing power was planted at our direction.

Similar care is exercised in the purchase of alfalfa and grass seeds. Alfalfa seed must come from Kansas or the Northwest, and grass seeds must come up to high standards of purity and germination. We believe that one of the most efficient ways of increasing the production on the farm is by securing good seed and, therefore, these matters have received careful attention.

DRAINAGE

Last summer a drainage survey was made of the farms at the State Village for Epileptics, the Hospital Farm at Annandale, the

State Home for Boys, the Women's Reformatory, the Manual Training and Industrial School and the New Jersey Sanatorium. The survey of these areas was outlined and the probable cost was ascertained by a Federal Government expert. A considerable amount of this work has been done this year. The high price of labor and tile has militated against the full development of this plan, but good results have been secured wherever the work has been done. A sample of this is the State Home for Boys at Jamesburg, where a large force of boys has been kept busy cleaning ditches and drains this spring. As a result of this draining the heavy rains which have occurred this year have not been as serious as they would otherwise have been, and the work has meant an increase in production and a saving of hundreds of dollars on this farm alone. There is further need of this work and we believe that there is no better investment of money than in the proper drainage of productive land.

STANDARDIZING MACHINERY

The State Purchasing Department refers all requisitions calling for farm supplies for state institutions to this office. This enables us to standardize machinery and secure the advantages of such methods. We are usually able to advise as to the best place of purchase, taking into consideration the best interests of the state institutions and the matter of economy. Plows, cultivators and harvesting machinery are bought from the manufacturers at wholesale as much as possible, except when immediate delivery is necessary and then nearby purchase is recommended.

There are now three tractors in use on institution farms and they have proved their usefulness beyond question where the area is sufficient to permit of their being worked a considerable part of the year, or where belt power is needed frequently. The total area of all the farms, divided according to cropped and uncropped areas, is given in the table below. The crop area is based on the food needs of the institution or of some others which it can help support:

TOTAL AREA OF INSTITUTION FARMS

Crop	Acreage
Alfalfa	180
Apples	88
Corn, broom	8
Corn, field	560
Corn, silage	416
Cowpeas	16%
Hay	480
Oats	137
Oats and Peas	79
Onions	29½
Peaches	41
Potatoes	303
Rye	250
Soybeans	42
Swine Pasture	68½
Tomatoes	58¼
Truck	272½
Wheat	248½
Woods and Uncultivated Lands	2,741
Other Pasture	409½
Total	6,428¾

SUMMARY OF LIVESTOCK

Livestock	Number	Breed
Horses and Mules.....	186	
Cows of Milking Age.....	534	Grade Holstein
Young Stock	270	
Hogs of Breeding Age.....	238	Chester White
Pigs and Shoats.....	1,173	Duroc-Jersey, Berkshire, Poland China, Mixed
Sheep	24	
Lambs	27	
Laying Hens	4,817	Barred Plymouth Rock
Chicks	1,576	Rhode Island Red Leghorn White Plymouth Rock Ancona
Total	8,845	

These crops and livestock are utilized in helping maintain the eight thousand inmates at the institutions. We have advocated the interchange of products among institutions wherever possible, thus obviating the possibility of selling them by an institution in a low market and the purchase of the same products in a high market.

Thus the interchange of seeds, potatoes and other crops is made possible by a study of the reserve supply of each institution and the needs of the others.

COORDINATION AND COOPERATION

We have already indicated that the institution farms are treated as a whole in many matters and we are fostering the spirit of co-operation which will work out to the general advantage of all. The conferences which we have held during the winter and spring have been well attended and the interest has been maintained. At these conferences we have been fortunate in securing Comptroller N. A. K. Bugbee, Purchasing Agent E. E. Grosscup, Secretary Agee and Director J. G. Lipman. These men have presented various matters to the farm managers and superintendents which affect the farms in one way or another and the result has been a better understanding of each others' problems. We believe the spirit of co-operation has been strengthened by the publication of the "State Farm Bulletin," issued by this office, which gives a statement of the work being done on the state farms or gives the minutes of a previous conference.

The cooperation of the State Agricultural College has been especially helpful and we wish to acknowledge the assistance rendered by Professor W. M. Regan and Mr. J. W. Bartlett of the dairy department. Mr. Bartlett has given a great deal of time and has been of especial help in developing the Dairy Herd Book and the general improvement in some of the herds. Prof. H. R. Lewis and Mr. V. G. Aubry of the poultry department have rendered assistance whenever called upon and their work has been invaluable. Mr. J. M. Hunter, animal husbandman at the College, has rendered efficient service in connection with the swine departments. Prof. M. A. Blake, horticulturist, and his staff have assisted in many problems relating to the orchards and small fruit plants. Dr. J. H. McNeil, of the Bureau of Animal Industry, has been at our service whenever needed in matters concerned with animal diseases, and the co-operation of his bureau promises to be of especial benefit in a constructive way in the future. The cooperation and helpful assistance of the various state departments has been of inestimable value in carrying on our work. The superintendents of the institutions have welcomed our suggestions and the results in some cases have been made possible by their direct attention and interest.

Secretary Agee of the State Department of Agriculture has allowed the farm management specialist to give practically his whole time to the work and to be largely relieved from office routine and other department matters this spring. This has made it possible to keep the institution work up to date in spite of obstacles encountered as a result of war conditions. We have made 118 visits to the farms during the past eight months.

The pressure of work made it necessary to secure the temporary services of Mr. C. C. Basley, of Monmouth County, who has successfully filled the position. His expert knowledge of truck crops and his general knowledge of practical farming has been of great value at all of the state institutions and we have been able to carry out a number of plans which would have been impossible without his assistance.

At the present time it would seem that arrangements should be made for the greater utilization of the best inmate help on the farms. The production of food is a service which unfortunate wards of the state can render at this time, and no service is more important for the welfare of the country and for the general population who must fight or carry on the industries of the country.

We wish to emphasize that we meet the same problems on institution farms that are met by the average farmer of the state. The shortage of help, the difficulty of transportation and the deficiency in supplies has caused some inconvenience which was unavoidable. We have been able to supply several institutions with farm help and have assisted some in getting heads of departments, such as farm managers, herdsmen and others.

The emphasis placed on the importance of the institution farms during the past year and the state's obligation to develop them to the utmost has resulted, we believe, in a much more efficient use of the land. This will be shown in the reports from the several institutions. Our aim is to make state institution farms models of practical progressive farming in their respective communities.

DEPARTMENT WORK

Considerable office work has been done for the Department of Agriculture during the period just passed and especially in the absence of Secretary Agee, who was frequently called from the

state for national service. The preparation, editing and issuing of department bulletins occupied attention during the winter up to the time the farms demanded close attention and supervision. Twenty-five addresses were made at community meetings, meetings of county boards of agriculture and the granges throughout the state. A good deal of correspondence and daily work was necessary in preparing for "Agricultural Week" held in Trenton on January 22, 23, 24 and 25. The securing of speakers for the twelve visiting organizations' meetings and the preparation of a program which would be attractive and meet their wishes, together with the arranging of meeting places, took up most of the time for several weeks. We believe that close attention given to the details at that time helped to make "Agricultural Week" the success it was pronounced by visiting farmers.

Report of the Bureau of Markets

ALEXIS L. CLARK, *Chief*

It became apparent to us, as it did to all thoughtful Americans when our country entered into this war, that every energy must be conserved and extended to gain an overwhelming victory and secure a lasting peace. Applied to the particular duties entrusted to this bureau, we realized that all efforts not directly and immediately related to the efficient distribution of farm products and purchasing of farm supplies, were not in order.

After seriously studying our program of work we could not find any of our important projects which came under such a category, hence, our program in this period of emergent war measures is not greatly different from the program first selected when, in the last half of the year 1916, this bureau was organized. It seemed that the continuation in a large way of our efforts already begun would be a decided advantage, and we believe that the following reports of progress in the projects will show that this was so.

PROJECT I. ORGANIZING AND ASSISTING FARMERS' COOPERATIVE BUSINESS ASSOCIATIONS

After two years of study and work on this project, we are more convinced than ever that through organization and cooperation must come much of the needed relief in farm buying and selling. These are terms long used, and often without a sense of their true significance. All such efforts must absolutely be based on sound economic principles and governed by the best business methods. It is possible that a farmers' business organization may do more harm than good; but out of the fifty or more associations and branches now organized in New Jersey, we are unable to find a single one that is not benefiting its members and its community to some extent. Most of them are not appreciated in the fullest degree by those most actively engaged in them. It seems that one from the outside with a knowledge of general conditions and no acquaintance

with the details involved can best measure the comparative value of an organization against the absence of such cooperative effort. Frequently we have been convinced that the faults of an organization have restricted the benefits to members to such an extent that the non-members in the community reaped the greater advantages. A cooperative association certainly spreads its good influence over the whole community. We have sometimes been alarmed when the leaders of some cooperative efforts, who showed little interest in the counsel of this bureau or in the experience of others, feared that if their trial should be a failure, it would exert a discouraging influence over a wide territory.

So far, during the two years in which this Bureau has been at work, we are pleased to report no serious setback to cooperative organization work. Some have hesitated and reorganized along somewhat different lines, but none have failed in a really serious way. In fact, we are coming to believe that short term or seasonal experiments in cooperative buying and selling may be steps toward larger and more permanent undertakings. Under a plan involving little or no capital, where no money can be lost even through a complete failure, we have little to fear from hastily-formed units, although we do urge that the services of this bureau be sought whenever such an organization is needed or contemplated.

As stated in our annual report for 1917, the need of farmers' cooperative business associations is vital. Confidence between buyer and seller is the first step toward increasing efficiency in distribution. Under our old system suspicion and distrust have always predominated. Producers have taken little interest in grading because they felt that the dealer was trying to buy for less than market value. Dealers have seldom exerted themselves to improve conditions because they were in a hazardous and difficult business. Good judgment and quick decision were necessary, and the perishable nature of many products tended to sharpen the wits and emphasize the necessity of buying as low as possible. Just so long as perishables are bought and sold at country points, the markets will continue to fluctuate and gambling tendencies will continue. The greatest benefits from cooperative work have been from shipping to points of consumption, receiving there the true market value based on the supply and demand, and then returning to the grower that price less the selling and shipping charges. The fundamental

lessons in quality values, grading, market appearance, etc., which are forced home to growers where this system prevails, are in strong contrast to the "I stick you or you stick me" system of out-right buying at country points.

Notwithstanding the bad features in country buying, it is a system which has given many growers, especially small shippers, better results than the consignment method, which became worse and worse up to the period when the Food Administration forced all wholesalers to take out a license and make reports to them. The character of the wholesale produce trade changed very markedly in the twenty-five years prior to 1916. Many old established houses continued in business and apparently thought that they dominated the trade. The various state and national associations in the trade always stood for high ideals and strong principles, but they absolutely failed to rid their business of unprincipled scoundrels who could do more harm to the reputation of their trade in one transaction than the association could overcome in a whole year. Then, too, with a nation-wide tendency in speeding up competition, and because of the nature of the commission business, the most reliable dealers got into habits which, while not dishonest, did not build up confidence among distant shippers. Any business which allows a man or firm in a distant city to receive goods and dispose of them in any way or manner desired with no check from the owner, can never hope to be above suspicion. Opportunities for unprincipled persons to make easy profits were recognized and seized. Now that a national system of licensing wholesalers has been established, it is hoped that the produce trade and the farmers' organizations will come to understand each other so that never again will the business revert to the old conditions.

The standardization of market grades and packages is second only in importance to the system of selling. The production of food is different from all other industries in that the uncontrolled factors are greater. The perishable nature of these products and the consequent relation of market values to weather and other conditions render their distribution tremendously difficult.

The more of these uncontrollable factors which we can eliminate the quicker will we develop a more economic system of marketing. Standardization affords a sound basis for values and so eliminates some of the causes of unreliable quotations and unfair practices. Actual costs of distribution are reduced. We undertook at first to

make a standard grade a project by itself, but we have become convinced that we can gain greater headway in this important line by emphasizing its importance in our relations with organized marketing schemes.

Thus in the fall of 1917, the Sussex County Fruit Growers' Association sold several thousand barrels of apples graded, packed and labeled uniformly. It was a very small beginning, but it was a practical demonstration and the movement is bound to grow. For years it has been held that early tomatoes from Gloucester County ought to be graded. In the early summer of 1918 fifteen growers resolved to try it. As in the case of the apple growers, this bureau furnished an inspector to assist in establishing a satisfactory grade. The South Jersey Farmers' Exchange was engaged to do the selling, and we are convinced that a beginning has been made which will sooner or later affect other kinds of fruit and vegetables.

In the South and West growers easily recognize that it is a case of standardize or fail. They cannot hope to market mixed lots three thousand miles away with any degree of satisfaction. Here in the East, with our wonderful marketing facilities, we can produce anything and get something for it, no matter what condition it is in. In many states the importance of standardizing has been appreciated to such an extent that standard grading laws are popular. In the East standard grading must come, at least for a while, through voluntary cooperative effort. Its value is probably just as great in the East as in the West, and is proving so in many cases. Where dealers must change the product or the manner of packing, too much opportunity is given for wide "spreads," and large profits. It is often held that the farmer's duty is to produce—others could prepare and distribute. For the small individual farmer nothing could be more nearly opposite. Independent buyers naturally cling together to buy advantageously and compete in selling. No advance in distribution methods can come out of such a condition.

Unless the handling of these important food products is under strict regulation by the state or federal government, growers must do a considerable part of the preparation work in order to insure efficient distribution. With most products this can be done economically only through cooperative organizations where large quantities can be handled, and a large output can gain its reputa-

tion in the market. Our Eastern markets have reflected the development of organized marketing in distant parts of the country. The carefully-graded products from California and other states have already cast their comparison on ours. Dealers lose less, and, therefore, make more on Western-graded products and the demand grows each year. The total cost in marketing is at least cut in two and everybody from producer to consumer enjoys the system.

Corporate farming has increased. Through their business training, the heads of these large undertakings recognize the value of reliability and uniformity. Cooperative selling is about the only course by which individuals can maintain successful competition in the open market. The small "independent" farmer is less independent than almost any other citizen in the land. Ordinarily, he depends upon someone else absolutely as to the price he pays for supplies, and upon someone else absolutely for the price he receives for his product. In cooperation with his neighbors he submerges his own independence and receives back the power of the total independence of all the members, thereby being unable to buy largely at his own price and to sell at his own price.

The wisdom of purchasing only goods of known high quality is being proved in the buying of supplies each year. How much more confidence can be put in fertilizers, for instance, which have been purchased by one who has been paid to work for the interest of the members of an organization than in a dealer, be he ever so capable and honest, who must of necessity first figure on his own profits. Many of these supplies do not show their quality easily. A grass-seed mixture with 5 per cent of noxious weed seed may not show the impurity in more than forty per cent of the fields sown, and perhaps then not for two or three years. It may actually cost fifty dollars an acre to overcome its evil influence, but who can determine just where the trouble came from? An association works for the long-run benefit of every member.

Cooperative buying seems to work out a little more easily than cooperative selling. It seems to be less difficult for the average farmer to accept the manager's judgment in buying than in making sales. Some of the best organizations commenced by purchasing supplies.

A few cautions are here mentioned which have suggested themselves in our study of the work about the state:

Beware of credit to members.

Begin in a small way.

Seek counsel from those who have had experience.

Any saving made must come through more efficient methods.

Not all dealers are getting rich on their profits.

Make the organization truly cooperative; have faith in the motives and capabilities of your neighbors.

New Jersey is maintaining her place in the strides that Eastern states are making in organized buying and selling. The members of the Bureau of Markets are probably more interested in this work than anyone else, and they will exert themselves to the utmost in studying local conditions and working out suggestions and recommendations for any community. The work which the county agricultural agents are doing is fundamental to cooperative efforts, and we place great confidence in their advice in all of our undertakings.

It may be that this bureau has placed too great emphasis on cooperative work in marketing. The East needs some very drastic changes in the methods of distributing farm products. Laws or government regulations cause uneasiness and suspicion. There is real danger that such rules may not meet the real problems of the average farmer. If we can promote marketing organization, where the farmers themselves are brought together and into close touch with the underlying principles of distribution and the faults of present methods, we are convinced that they will assume the initiative and work out among themselves solutions to their own marketing problems.

PROJECT II. CITY DISTRIBUTION

This branch of marketing, we believe, has never received the attention it should have from many who have studied the subject of farm marketing. The greatest evils are the numerous demands made upon dealers by consumers, and the failure of retail prices to reflect the supply and wholesale values. During June, 1918, string beans, a most important food crop, became so plentiful that wholesale prices barely met the costs of picking and shipping, and yet retail prices remained where they had been when the supply was limited and wholesale prices four times as great. When they

were worth \$2.00 a bushel, retail prices were 10 and 12 cents a quart; when wholesale prices were 75 cents a bushel, retail prices kept up to 10 cents. If 10 cents a quart supplies consumers with beans on June 20, it is difficult to see why they should use more on July 10 at the same price. If, on the other hand, when beans became so plentiful as to bring only 75 cents a bushel on July 10, the retail prices had been lowered to four or five cents a quart, probably twice as many would have been bought and a very great saving in food and money effected. Retail dealers persistently maintain prices for two reasons. In the first place, they do it to make a big profit when the opportunity is offered, because, of course, there are many losses in handling these perishables. In the second place, consumers have not learned that perishables can fluctuate quickly in value according to weather and other conditions. They are always ready to accept a dealer's reason when prices go down, but they unreasonably argue and criticize whenever prices go up. Accordingly, retailers keep the prices up and in that way meet with least criticism.

We decided long ago that a small farmers' retail market in a city would correlate retail values to the actual supply. Nearly thirty cities have now adopted the public market idea in one form or another, and the results are most satisfactory. Our opinion has not changed and our report for 1917 contains our conclusions on this subject.

Some of the best examples are found in the following cities: Perth Amboy, Elizabeth, New Brunswick, Plainfield, Westfield, Bayonne and Morristown.

Through our Weekly News Letter, which goes to some seven hundred addresses, but only on request, we endeavor to place before consumers important seasonal and market items. In this way we are confident that glut periods have been materially helped. This news letter goes to all libraries in the state, to all newspapers who have requested it and to many food committees and women's organizations.

We are trying out a monthly issue to farmers, but our thought has been that producers are now receiving and always have received more bulletins and reports than they knew what to do with, so that we have confined most of our educational efforts to the consumers in the cities.

Under this project we endeavor to call the attention of consumers to market conditions, seasonable crops, efficient practices, etc. We assist groups of consumers and city authorities in establishing farmers' market-places. A number of consumers' clubs have been formed among the employees of large business enterprises, and we hope this year that two hundred carloads of potatoes will be sold directly from the farms to groups of consumers. Many meetings of men and women have been addressed and many committees advised as to ways and methods. A few magazine articles have been published in addition to the weekly news letters, which many papers print. A Potato Campaign was carried on throughout the state in March and April. In the beginning farm prices averaged about 80 cents per bushel and retail prices \$2.25. At the end of the campaign, farm values remained at 80 cents and retail prices were around \$1.25. Close observation and records in some cities convinced us that the campaign resulted in an increase of 50 per cent in the consumption of potatoes. One storekeeper wrote us, "Potato Week in our twenty-four stores gave us an increase in sales over any previous week of about 70 per cent." Another grocer said, "I sold during the campaign (in one store) over two hundred half-bushel baskets, and I know of one grocer here who sold 110 baskets in one day." Still another store reported, "It increased our sales of potatoes fully 100 per cent." A large chain store company wrote us, "The ten days previous to this campaign our main store sold ten bags of potatoes. During the ten-day campaign this same store sold two hundred bags."

For the period of the war we believe we can be of material help in maintaining efficient retail distribution by keeping the volunteer food committees in the various cities accurately informed, and by promoting measures through them to take care of unusual and difficult problems. We have received the most cordial cooperation from the Food Administration for New Jersey and have always had the support of the county administrators in this work. The home economics division of the State Agricultural College has been of the utmost assistance to us. Their trained workers have prepared recipes to help in stimulating consumption and have cooperated in giving instructions and demonstrations in line with our work. State and county chairmen of the Women's Branch of the New Jersey Council of National Defense have extended their

cooperation, and we feel sure that the realization of distribution problems thus brought about among consumers, and the development of mutual interest between producers and consumers, will be of material advantage to all citizens of the state.

PROJECT III. TRANSPORTATION.

The secretary of the Department, soon after its organization, emphasized the importance of an experienced transportation specialist in the Bureau of Markets. Mr. Harry B. Bamford, of Bridgeton, has rendered most valuable services in this capacity for the past year. From the Federal Railroad Corporation officials down through regional directors and division superintendents, apparently a realization that it is our aim to help them in giving service to New Jersey farmers has been established. Through the confidence of railroad officials and shippers thus won, many difficulties each week have been straightened out. During the past winter hundreds of carloads of fertilizers, seeds and implements were located in congested yards and transfer points, and hurried forward to their New Jersey destinations through Mr. Bamford's experienced efforts. Such matters as lower lime rates, time-table changes, and loading and unloading facilities are being persistently followed up.

Early in January it was assured that a very serious shortage in packages would result unless materials could be obtained by the basket and crate manufacturers in the state. A visit to Washington where the exact needs of the state were placed before the transportation officials resulted in some headway. A system of reporting needs and securing transportation permits was designed and through January, February and March, when freight transportation was at its worst, we were able to keep most of the factories running. Very close observations have been kept in the package supply and we believe few growers will suffer greatly because of lack of packages this year.

PROJECT IV. SPECIAL LINES OF WORK

Under this project we have taken up a number of short-time and special subjects. Mr. W. P. Duruz made a study of market packages which will be continued another year. From this work we

have been able to give some practical advice to growers and organizations. We invited farmers having hay and grain to sell to list them with us and then notified stock raisers and poultrymen that we could advise them of some sources of feed nearby. Many sales were thus effected directly between farmers.

In cooperation with the agronomy department of the State Agricultural College we assisted farmers to buy and sell good seed corn.

When the United States Food Administration announced that all licensed dealers in commercial potato-growing districts should sell only potatoes graded according to the standards recommended by the United States Department of Agriculture, this bureau realized that it would cause much hardship to our growers. We immediately took the matter up and were assured by the Potato Division of the Food Administration that the grades would be strictly enforced. We recognized, of course, that this was a very much needed advance in our potato selling system, but we knew that the labor shortage and drastic changes involved would create serious difficulties to their enforcement. We have held three demonstrations in machine grading and have constantly endeavored to assist our growers in preparing for this extra work this year. We are urging that this grading be not left to dealers, but that it be done either on the home farm or at cooperative loading stations.

A particular service on hay and grain market conditions was rendered to the Cooperative Association of Mercer County and to the Central Jersey Produce Growers for twenty weeks. A letter was sent each week to the members giving the results of our findings on the values and market conditions. Mr. Edward L. Dilatush had charge of this work. The members of the association reported some practical benefits from his efforts.

Mr. W. F. Kroemmelbein, among other lines of work, studied the conditions surrounding egg shipments from Cumberland County. Many complaints were received on express shipments and after taking the matter up with parcels post authorities and finding no immediate solution, two recommendations were made. One was made after the transportation specialist had it worked out with the Central Railroad Company. It was for carlot shipment to a single consignee in Jersey City, who should be responsible for the New York City delivery. The poultrymen were not able to get together and carry this

out. The other was for an auto truck route to be established, running from Millville through Vineland and Hammonton to New York. In cooperation with the United States Department of Agriculture, this was tried out and proved to have some good features. So far, it has not met with the best support but has at least given us some experience in this kind of transportation. The members of the Hunterdon County Poultry Association have carried out such a method and are well pleased with the results.

SUMMARY OF MARKET CONDITIONS IN EACH COUNTY WITH
SUGGESTIONS FOR IMPROVEMENTS

Sussex County

This county is one of the most intensive dairy sections in the United States. There are fifteen local branches of the Dairymen's League, and the Sussex local association, which is the largest branch, has some two hundred members with over four thousand cows. Some isolated efforts have met with success in cooperative feed buying, but there is good opportunity for a county non-stock cooperative buying organization. Cooperatively-owned shipping stations could without doubt be worked out successfully. Many winter apples are produced in this county and all growers should join the Sussex County Fruit Growers' Association. There is a great demand for high-class winter apples and a reputation for large quantities of uniformly-graded fruit should add from 10 to 50 per cent to the selling price. The commercial egg farmers in the northern part of the county are becoming interested in cooperative feed buying.

Warren County

A little study of grain selling methods in the Stewartsville section has convinced us that the growers there should organize and protect the interests of the individual farmer. It is in just such a county as Warren where farmers' organizations are most needed, and now that an emergency farm demonstrator is at work there it is hoped that the spirit of cooperation will develop and some definite steps taken both in buying and selling. The apple growers around Blairstown are growing better fruit each year but need to spray more before they can demand the prices which Sussex County

apples bring. An organization to consider cultural methods as well as marketing would be profitable. Some poultry feed buying has been done at Blairstown. Twelve branches of the Dairymen's League are located in this county.

Morris County

The Farm Service Exchange was organized and incorporated during 1918. Its paid manager has an office in Morristown and is pushing the buying of feeds and fertilizers. It is difficult to see just how an organization can be of immediate help in selling the various products of Morris County, but if it can get the sympathy and support of the farmers it can be of inestimable service in buying their supplies. A farmers' market was opened in Morristown and gave good service during 1917. About six to eight farmers participated in this direct selling on certain hours two days a week. Some of the ladies in Dover have shown interest in the same subject and the county agricultural agent has in mind a similar market for this city. The North Jersey Farmers' Association has its office in New York City, but most of its members reside in Morris County. It purchases all kinds of agricultural implements and supplies for a number of the large estates in that section of the state. There is one branch of the Dairymen's League in Morris County.

Passaic County

The poultry raisers in North Haledon incorporated the North Haledon Farmers' Exchange during 1917. It has made purchases of many carloads of poultry feeds for its members. With representatives of Bergen County and Passaic County a non-stock cooperative association is now being considered. Mr. W. L. Hundertmark, secretary of the State Poultry Association, has his headquarters in Passaic and has been of value in assisting many groups of poultry raisers all over the state, and especially in his section, to buy poultry feeds cooperatively. Paterson has three farmers' markets. One is not used at all, one a very little and the third one has about all the trade. It is under private management. Several conferences have been held as to how to promote more retail selling, but no results have been accomplished. In Passaic a splendid farmers' retail market was established in 1917. As many as twenty farmers have sold their loads there in a forenoon.

Bergen County

After several years of study and trials, at last delegates from every grange in Bergen and Passaic counties met at Hackensack in May, 1918, with delegates from the two county boards of agriculture, and seriously undertook the organization of a farmers' cooperative business society. With the advice of the county agricultural agents of these two counties, this bureau suggested certain points which were incorporated in a set of proposed by-laws. The committee has adopted the by-laws and will report to the Pomona Grange in July. In Hackensack some ladies have desired a farmers' retail market, but so far the city authorities have done nothing toward it. Some serious work has been done by the county agricultural agent in aiding peach and apple growers to pack their fruit. Some cooperative poultry feed buying has given encouraging results.

Somerset County

A farmers' club at Belle Mead has been purchasing feeds and fertilizers for several years. It is the only effort we know of in the county, but there is a need for more such work. Somerset County is the home of several large and very noted pure-bred herds of Holstein cattle, and some well-directed work supported by all these breeders might easily make Somerset County a term associated with choice Holsteins all over the country. Farmers' markets were opened at Bound Brook and Somerville during 1917. This county has five branches of the Dairymen's League located in it.

Hunterdon County

Hunterdon is a county with no large money crops. The poultry raisers around Lambertville organized during 1917 and are enthusiastic over their prospects. The peach markets at Lebanon and White House railroad stations that used to attract so many buyers have not been active for the past few years. The Inter-State Milk Producers' Association has two branches in this county. The farmers of this county would do well to join with those of Warren County in a cooperative buying organization. There are thirteen branches of the Dairymen's League located in this county.

Mercer County

The Farmers' Cooperative Association of Mercer County has its headquarters in Trenton. This organization has increased its buying business each year on practically no capital. A cash basis in all transactions has led to a strong realization on the part of most farmers in the county that goods of the best quality can be secured through this agency, always at the lowest possible price. Men from adjoining counties make purchases through this truly cooperative society. Beginning with the crop of 1918, this association will market certain products. In 1917, the Mercer County Potato Growers' Association was organized and was very successful in finding good outlets for high-quality, graded stock. A shipping station is now being constructed at Yardville, and the Cooperative Association will ship from there. We look to see this organization become one of the most powerful in the state and it merits the support of all. The dairy interests are being cared for by four local branches of the Inter-State Milk Producers' Association. The city of Trenton has invited our assistance in establishing a wholesale and retail farmers' market during the summer of 1918.

Middlesex County

A few growers in the county purchase supplies through the Mercer County Cooperative Association and many potato growers in the southern end belong to the Monmouth County Farmers' Exchange. During 1917 hay and rye growers organized the Central Jersey Produce Growers and entered into an agreement with the Mercer County Association so that accurate market information on hay and grain was furnished to the members weekly. A farmer-owned centrally located hay press and threshing outfit ought to do much toward creating a more satisfactory attitude in marketing these crops. Apparently there is too little discrimination by the buyers in the quality of the hay. The rye is sold unthreshed by the ton and, as is often the case where dealers are given so great an advantage, a decided feeling of distrust is found among the growers. The growers ought to know just what the difficulties are and the costs in marketing which the dealers have to consider, and then, of course, all chance of stifling competition should be eliminated. One well-supported farmer-owned plant, we believe, would go a long way in brightening the situation.

Perth Amboy was the first city in New Jersey to make a decided success with a farmers' retail market.

Monmouth County

The Monmouth County Farmers' Exchange has steadily grown in strength and scope. Without doubt the benefits of this organization's work are found in such things as increased land values, better homes, more progressive farming methods and a generally prosperous condition.

At Hazlet a group of fruit and vegetable growers are working out a cooperative selling plan for their great variety of perishables. If the Exchange could broaden out its activities and assist local groups of fruit and vegetable growers in marketing, it would eliminate the necessity for several small organizations.

Burlington County

The Burlington County Farmers' Exchange is once more on its feet in a more substantial way than ever. Most of the potatoes shipped away go through this agency. More local groups of small fruit and vegetable growers could with profit put out uniform graded shipments under the Exchange's directions, and more of the farm supplies could be bought through the Exchange with a saving to the farmers. The Burlington County Tomato Growers' Association was the original organization of canhouse tomato growers. It was their inspiration that started the other counties to follow.

Burlington has a fairly large wholesale market and some agitation has been raised by citizens against its location in the center of the city. The city decided in the spring of 1918 to allow the market to remain as usual for another year, but emphasized the necessity of a different location as soon as possible. Milk marketing is being taken care of by eight branches of the Inter-State Association.

Camden County

At the organization meeting of the Camden County Tomato Growers' Association, the suggestion was offered that carefully worked costs on tomato production would be the best basis on which to work in asking for an increase in the price for 1918. This suggestion was adopted and carried out by committees in several coun-

ties. Most growers, in consequence, are this year receiving from \$25 to \$30 a ton. Camden County farmers should join either the Burlington County or South Jersey Exchange. In buying their supplies the advantage would be especially realized. The city of Camden, we are convinced, could well afford to study its food distribution system. There ought to be a way of stopping a certain proportion of the products going through from South Jersey to Philadelphia and of establishing a wholesale and retail farmers' market. The city of Brooklyn did this under similar conditions many years ago and has saved for itself millions of dollars.

Gloucester County

The South Jersey Farmers' Exchange is slowly reaching up into Gloucester County and should be more appreciated by the farmers there. During 1918 the Swedesboro Growers' Association was formed and is now shipping two to four carloads of early tomatoes, peppers, etc., through the Exchange each day. An inspector was furnished to these growers to help them in standardizing their pack, and we believe that this beginning will have a far-reaching effect upon the marketing of mixed vegetables throughout the southern counties. The Woodbury city council asked our aid in establishing a farmers' market, and we hope that a beginning will be made this summer. The Gloucester County Vegetable Growers' Association was organized when the asparagus raisers were meeting with difficulties in shipping. We believe that it would be of material advantage to these truckers if local groups would standardize their pack and ship through the South Jersey Exchange. One branch of the Inter-State Milk Producers' Association is located at Mullica Hill.

Ocean County

Some few farmers in the northern part of the county are members of the Burlington County Farmers' Exchange. It will be difficult for the few scattered farmers in the southern section to secure the advantages of cooperation. An attempt has been made to locate a farmers' market in Toms River. The poultry associations in Toms River and Lakewood have done good work in feed buying, and some serious efforts have been made by the Lakewood raisers to improve their selling methods.

Salem County

In this county the headquarters of the South Jersey Farmers' Exchange are located. At least half of the members of the Swedesboro Growers' Association reside in Salem County. A very simple form of a milk marketing association to sell through the Inter-State Association ought to furnish several advantages to the dairymen in this county. The Exchange is admirably able to supply feeds as well as fertilizers, seeds, etc. Two branches of the Inter-State Milk Producers' Association are doing good work.

Cumberland County

The Vineland Poultry Association is interested in many activities and during the winter was successful in buying coal by the carload for brooding purposes. With a development of the cooperative spirit this association should be able to do a great deal for its members in feed buying. The Millville Poultry Association is another progressive organization which has taken up market transportation problems and other matters. The onion growers in the Fairton section need a cooperative selling organization and certain standards for grading as much as or more than farmers in any other section of the state. The strawberry growers of Cedarville also could hardly fail to realize certain advantages from an organization. Many of the potato growers in the northern part of this county belong to the South Jersey Farmers' Exchange and there is one branch of the Inter-State Milk Producers' Association.

Cape May County

Almost no cooperative business has been done in this county. At Goshen and South Dennis some acid phosphate was purchased two years ago, and at some other points small items have been bought by several farmers together. It is a county where small quantities of feed, fertilizers and seed are used, and dealers and farmers alike are not so experienced and careful in buying high-quality goods. A cooperative buying association could save to farmers at least 10 per cent in the purchase of their supplies on the quality alone. Two or three of the larger cities could with profit open up public market-places. Most of the produce is hauled to the

seashore cities and either sold at wholesale to the storekeepers or peddled out to housewives. Some of the first roadside markets in the state were opened in this county and now a number of them are found along the main highways.

Atlantic County

The Italian farmers around Hammonton have a buying and selling organization. In the Egg Harbor and Cologne section a good farmers' buying society has been in operation for several years. It is known as the Germania Fruit Growers' Association. Considerable buying of poultry feeds has been effected by some of the local poultry associations. All of these local endeavors and the scattered farmers in all parts of the county need the aid of a cooperative buying association. An excellent farmers' market was opened in Atlantic City in 1917. Many wayside markets have been opened in Atlantic County and have met with much favor.

Union County

If the dairy, poultry and truck-growing interests of this county would combine, a splendid buying association could be formed. In Elizabeth, Westfield and Plainfield, excellent farmers' markets have become established.

Urban Counties

Poultry feed buying has been accomplished by poultry associations in some cities. In Bayonne a good farmers' market was opened in 1918. In Caldwell and in other cities near Newark similar markets were opened in 1917. Just what can be done in a place like Jersey City is problematical. One unsuccessful effort was made about three years ago to open a public market. Farmers come long distances and consequently haul large loads. Frequently these loads consist of only one or two products and are not suited to retail selling. At the same time, we have believed that there is an opportunity for a farmers' market there. Many thousands of dollars' worth of products are hauled across the Hudson into New York, sold to hucksters there and hauled back to Jersey City in the same day.

Other Agencies

Besides the farmers' business associations mentioned many granges and other farmers' societies do some buying and selling. The Columbus Grange, for instance, several years ago developed a splendid feed business which still maintains its service.

About thirty cities now have farmers' market places. We believe that many of the small one-crop organizations should affiliate with each other or with one of the larger organizations. Small groups with a single purpose make ideal business societies but they can secure even greater benefits through the strength of greater numbers and larger activities. This is being accomplished in several instances. Standard grades and packages and cooperative selling organizations are bound to effect a more economical distribution system, and consumers in our cities must recognize their obligations and eliminate all unnecessary services from the retail business.

FARMERS' BUSINESS ORGANIZATIONS IN NEW JERSEY

Sussex County Fruit Growers' Association

W. W. Titsworth, Sussex, N. J.....President
K. W. Adamson, Newton, N. J.....Secretary

Members sold 5,000 barrels at an average price of \$4.50 per barrel, 1917.

Morris County Farm Service Exchange

Seth E. Thomas, Jr., Morristown, N. J.....President
A. R. Quimby, Morristown, N. J.....Secretary

Stock corporation; started business June 1, 1918. In the first month \$4,000 worth of farm supplies were purchased for its members. Stock for sale to new members, \$10 per share. Each stockholder limited to ten shares and one vote. Dividends limited to 6 per cent. Savings to be distributed annually pro rata to members in proportion to value of supplies purchased.

North Haledon Farmers' Exchange

Emil Miller, Paterson, R. F. D. 3, N. J.....President
Frank A. Thomley, Paterson, R. F. D. 3, N. J.....Secretary

Stock corporation; purchases feed.

Belle Mead Farmers' Club

P. A. Garretson, Belle Mead, N. J.....President
Huston Labaw, Harlingen, N. J.....Secretary

Non-stock corporation; purchased \$37,548.69 worth of farm supplies in 1917.

Warren County Grain Growers' Association

Frank H. Castner, Stewartsville, N. J.....President
Harry Apgar, Phillipsburg, R. D., N. J.....Secretary

Temporary organization.

Farmers' Cooperative Association of Mercer County

Wm. M. Mount, Princeton, N. J.....President
Frank C. Danser, Trenton, N. J.....Manager

Non-stock corporation. Bought \$152,361.51 worth of supplies in 1917. Handles selling business for Mercer County Potato Growers' Association.

Mercer County Potato Growers' Association

Robert M. Dilatush, Robbinsville, N. J.....President
Walter S. Haines, Robbinsville, N. J.....Secretary

Non-stock corporation. Sold \$55,000 worth of potatoes in 1917.

Central Jersey Produce Growers

Spencer W. Perrine, Cranbury, N. J.....President
T. Mount Applegate, Dayton, N. J.....Secretary

Non-stock corporation. Considering ways and means of grading hay and grain and improving market methods.

Monmouth County Farmers' Exchange

H. V. M. Dennis, Freehold, N. J.....President
O. J. Walker, Freehold, N. J.....Secretary

Sold \$1,782,833.43 worth of produce, mostly potatoes, in 1917. Bought \$580,597.83 worth of farm supplies in 1917.

Monmouth County Shippers' Association

Chas. Young, Hazlet, N. J.....Secretary

An experimental fruit and vegetable selling organization. Sold \$60,000 worth of truck crops in 1917.

Burlington County Farmers' Exchange

E. E. Logan, Mt. Holly, N. J.....President
J. A. Jones, Mt. Holly, N. J.....Manager

Stock corporation. Value of farm products sold in 1917, \$257,000.
Value of farm supplies purchased in 1917, \$300,000.

Burlington County Tomato Growers' Association

Fred Lippincott, Moorestown, N. J.....President
Harry Brick, Medford, N. J.....Secretary

Promotes interests of members.

Tomato Growers' Association of Camden County

Thos. Beiderman, Marlton, N. J.....President
John Baumgartel, Berlin, N. J.....Secretary

Promotes interests of members.

Gloucester County Tomato Growers' Association

A. R. Kohler, Westville, R. F. D., N. J.....President
A. C. Clement, Westville, R. F. D., N. J.....Secretary

Promotes interests of members.

Swedesboro Growers' Association

Edw. L. Whittaker, Auburn, N. J.....President
Howard Rode, Swedesboro, R. F. D., N. J.....Secretary

Non-stock selling organization. Organized June, 1917, to sell graded tomatoes.

South Jersey Farmers' Exchange

Asa Moore, Mullica Hill, N. J.....President
Frank Davis, Woodstown, N. J.....Manager

Stock corporation. Sold \$565,371.52 worth of products, mostly potatoes, in 1917. Bought \$579,396.61 worth of farm supplies in 1917.

Vineland Shippers' Association

R. C. May, Vineland, N. J.....President
Warren Mitchell, Vineland, N. J.....Secretary

Value of products sold, peaches \$50,000. Supplies purchased in 1917, worth \$8,000.

Germania Fruit Growers' Association

J. L. Purzner, Egg Harbor City, N. J.....Secretary

Landisville Fruit Growers' Association

Phelix Donato.....President
Frank Dandrea.....Secretary

The Farmer's Supply Company

James Farrish, Linwood, N. J.....President

Atlantic County Growers' Association

W. Hauenstein, Atlantic City, N. J.....President
A. E. Wilkinson, Mays Landing, N. J.....Secretary

Local Branches of the Interstate Milk Producers' Association

Camden-Gloucester Local.....Leslie M. Armstrong, Sec'y, Mullica Hill, N. J.

Chesterfield Local.....B. R. Kirby, Sec'y, Columbus, N. J.
I. E. Harrison, Pres., Wrightstown, N. J.

Deerfield Street Local.....A. D. Ackley, Sec'y, Deerfield St., N. J.

Ewing Local.....Henry Schmidt, Sec'y, Trenton, N. J.,
R. F. D. 1.

Hopewell Local.....V. Leroy Skillman, Sec'y, Blawenburg,
N. J.

Mt. Holly Local.....F. M. Hargrove, Sec'y, Vincenttown, N. J.

Mt. Pleasant Local.....Sylvanus Appgar, Sec'y, Milford, N. J.

Pennington Local.....Simon Hanson, Sec'y, Pennington, N. J.

Ringoes Local.....Fred H. Totten, Sec'y, Ringoes, N. J.

Shiloh Local.....Walter W. Shute, Sec'y, Bridgeton, N. J.

West Windsor Local.....Jas. C. Ewart, Sec'y, Cranbury, N. J.,
R. F. D. 1.

Woodstown Local.....Wm. Moore, Sec'y, Woodstown, N. J.

Pemberton Local.....J. M. Evans, Sec'y, Pemberton, N. J.

Jobstown & Columbus Local...Maurice Lippincott, Jobstown, N. J.

Bustleton Local.....Chas. Stout, Sec'y, Burlington, N. J.

Jacksonville Local.....Albert S. Haines, Sec'y, Burlington, N. J.

Vincenttown Local.....F. M. Hargrove, Sec'y, Vincenttown, N. J.

Wrightstown Local.....Rosha Thompson, Sec'y, Wrightstown,
N. J.

New Jersey State Poultry Association

Chas. N. Warner, Toms River, N. J. President
 W. L. Hundertmark, Passaic, N. J. Secretary

Local Organizations Affiliated with the State Poultry Association

Palisade Poultry Association.. Walter Spink, Sec'y, Coytesville, N. J.
 Paterson Poultry Association.. R. H. Stallings, Sec'y, Paterson, N. J.
 Passaic Poultry Association... W. D. Scott, Sec'y, Passaic, N. J.
 Westwood Poultry Association. A. J. Rosemond, Agent, Park Ridge, N. J.
 Blairstown Poultry Association. J. D. Jacobus, Agent & Sec'y, Blairstown, N. J.
 Lakewood Poultry Association. H. D. Rhodes, Agent; G. J. Keiser, Sec'y, Laurelton, N. J.
 Atlantic County Mutual..... Ernest Norman, Sec'y, Egg Harbor, N. J.
 Poultry Raisers' Association of Hammonton Harry M. Carrol, Sec'y, Hammonton, N. J.
 Millville Poultry Association... H. W. Shaw, Sec'y, Millville, N. J.
 Vineland Poultry Pet Stock Association H. E. White, Sec'y, Vineland, N. J.
 South Jersey Poultry Association P. G. Springer, Sec'y, Bridgeton, N. J.
 Glassboro Poultry Association. E. C. Detweiler, Sec'y, Pitman, N. J.
 Hunterdon County Association. T. R. Hunt, Sec'y, Lambertville, N. J.
 Mercer County Poultry Association W. A. Cray, Sec'y, Trenton, N. J.
 Middlesex County Poultry Association I. L. Owen, Sec'y, New Brunswick, N. J.
 Manasquan Poultry Association T. J. Woodfield, Sec'y, Manasquan, N. J.
 Monmouth County Poultry Association H. G. Denise, Sec'y, Freehold, N. J.
 Ocean County Poultry Association H. B. Scammel, Sec'y, Toms River, N. J.

Most of these local groups of poultry raisers are buying feed cooperatively under a state-wide plan.

Local Branches of the Dairymen's League

Montgomery F. C. Young, Sec'y, Neshanic, N. J.
 Neshanic H. F. Bannister, Sec'y, Neshanic, N. J.
 North Branch F. M. Vanderveer, Sec'y, North Branch, N. J.
 Pottersville Wm. J. LaFourette, Sec'y, Pottersville, N. J.
 South Branch John Studdiford, Sec'y, So. Branch, N. J.
 German Valley Stewart Neighbor, Sec'y, German Valley, N. J.
 Annandale Frank V. Snyder, Sec'y, Annandale, N. J.
 Califon Eli Sutton, Sec'y, Califon, N. J.
 Clinton John S. Ramsey, Sec'y, Annandale, N. J.
 Clover Hill J. B. Higgins, Sec'y, Ringoes, N. J.

Flemington Martin Smith, Sec'y, Flemington, N. J.
 Hampton Harry A. Lewis, Sec'y, Hampton, N. J.
 Jutland J. S. Taylor, Sec'y, Jutland, N. J.
 Lebanon Gifford Hoffman, Sec'y, Lebanon, N. J.
 New Germantown J. Van Dorn, Sec'y, New Germantown, N. J.
 Readington F. N. Cole, Sec'y, Readington, N. J.
 Sunnyside B. T. Cole, Sec'y, Three Bridges, N. J.
 Three Bridges Chas. Brokaw, Sec'y, Neshanic Station, N. J.
 Whitehouse Station Alvah L. Pickell, Sec'y, Whitehouse, N. J.
 Allamuchy W. S. Barber, Sec'y, Allamuchy, N. J.
 Asbury Walter Godfrey, Sec'y, Bloomsbury, N. J.
 Belvidere L. C. Mackey, Sec'y, Belvidere, N. J.
 Changewater John Monder, Sec'y, Changewater, N. J.
 Blairstown Raymond M. Vass, Sec'y, Blairstown, N. J.
 Delaware W. B. Dutt, Sec'y, Delaware, N. J.
 Hackettstown E. J. Bilby, Sec'y, Hackettstown, N. J.
 Hainesburg M. S. Chamberlain, Sec'y, Columbia, N. J.
 Stewartville J. E. Incho, Sec'y, Stewartville, N. J.
 Vail Elmer E. Walker, Sec'y, Delaware, N. J.
 Washington John H. Wyckoff, Sec'y, Port Colden, N. J.
 Johnsonburg S. S. Coleman, Sec'y, Johnsonburg, N. J.
 Beemerville Dolson Ayers, Sec'y, Sussex, N. J.
 Branchville John D. Wyker, Sec'y, Branchville, N. J.
 Greendell Clarence Cook, Sec'y, Newton, N. J.
 Halsey O. S. Ackerman, Sec'y, Newton, N. J.
 Hardyston Thos. D. Edsall, Sec'y, Hamburg, N. J.
 La Fayette Ed. Ackerson, Sec'y, La Fayette, N. J.
 Layton Ross Major, Sec'y, Layton, N. J.
 Monroe L. R. Wickham, Sec'y, Augusta, N. J.
 Montague Harry Cortright, Sec'y, Port Jervis, N. Y.
 Newton Harry G. Wilson, Sec'y, Newton, N. J.
 Papakating R. V. Armstrong, Sec'y, Augusta, N. J.
 Sparta Aaron Mills, Sec'y, Andover, N. J.
 Stillwater J. C. Roy, Sec'y, Newton, N. J., R. D. 2.
 Sussex James Doty, Jr., Sec'y, Sussex, N. J.
 Vernon Thos. W. DeKay, Sec'y, New Milford, N. Y.

REPORT OF THE BUREAU OF STATISTICS AND INSPECTION

FRANKLIN DYE, *Chief*

The field of activities covered by this bureau is much broader and the work more varied than is suggested by its name. The inspection service, which includes growing stock in nurseries, stock shipped into New Jersey from other states, and stock shipped into New Jersey from foreign countries, is an inspection for the insect pests of various kinds already existing in this and other states, and possible infestations by new pests brought to our shores in shipments of stock from foreign countries. Some of our most destructive and persistent pests have been imported in this way; hence the importance of rigid inspection of all imported stock and constant watchfulness for new pests from whatever source.

Disease inspection is growing in importance and value, as pests of some sort affect nearly all field crops, orchard trees, some forest trees and most plants and shrubs. Some of these have been fatal, for example, the chestnut tree blight. The necessity for and the value of this service is apparent.

The production of honey has been a profitless industry in the state for generations. In order to improve conditions and make the business pay, the Legislature created the office of bee inspector. Inspection for detecting disease and creating healthful conditions in the apiaries of the state, and the additional work of teaching beekeepers, by both lectures and the printed page, the best known methods in bee management for profitable honey production, are the essentials in this work. The report following shows that encouraging progress has been made.

The statistical work of the bureau covers a large field which has not yet been fully explored. Up to this date statistics covering the main farm crops of the state, the acreage of each, and the conditions, are collected month by month. The total yield and value for the year, with the number and value of farm animals, is made up and published at the close of the year, for record and reference.

This work is conducted by Mr. H. B. Weiss, whose report follows.

Another and somewhat perplexing service devolving upon the bureau, is collecting and advertising farms that are for sale in various sections of the state. That this service is beneficial to the state is not questioned; for if we have, as we claim, a state of unusual attractions and variety of productions, it would seem that the state, in some way, should make these facts known to worthy persons who are seeking a desirable place in which to live. In a very limited way this has been done by some of the state departments. We believe this subject is of sufficient importance to justify the preparation and publication of a special volume devoted to it, for general distribution. For the immediate future, our circular advertising farms for sale must suffice. No extra expense has been incurred in collecting this list, as a result of the voluntary assistance of the county boards of agriculture, the granges, the county farm demonstrators, and the crop correspondents connected with the bureau. This list does not include all farms for sale throughout the state. To secure such a list would require paid agents, and the Department of Agriculture is not in a position at this time to assume work requiring extra expense of this character. Our forthcoming circular will contain advertisements of approximately 100 farms. It is now in the printer's hands.

It is my belief that the several divisions comprised in the bureau are meeting their requirements as efficiently as the help at their disposal and the appropriation to each will allow.

REPORT OF THE STATISTICAL SERVICE

HARRY B. WEISS, *Chief Inspector*

The origin, organization and methods of our crop reporting service were treated in our last report (New Jersey State Department of Agriculture Bulletin 9) and need not be gone into here. From November 1, 1917, to June 30, 1918, seven monthly crop reports were issued, none of which appeared later than the seventh of the month. The November report covered preliminary estimated acreages, yields per acre and total production of New Jersey's leading crops. The December report, in addition to final estimates, dealt with average prices and total valuations. The number and value of the farm animals in the state, together with average prices per head, were covered in the January report, and the wages of male farm labor and average value of farm lands in the March report. The April issue dealt with the condition and mortality of livestock, poultry on farms and commercial establishments, while honey-bees and the condition of grain and hay were treated in the report for May. The June report covered the condition of all important crops and forecasts of 1918 crop yields based on this condition.

In addition to the above subjects, all reports covered monthly egg production on commercial plants, and timely items of state-wide interest.

NUMBER AND LOCATION OF REPORTERS

During the past eight months our force of voluntary correspondents has been increased from 250 to 462. Seventy-two per cent of this number report on general crops, while the remaining cover poultry on commercial plants and honey-bees.

The accompanying maps show the distribution of these correspondents by counties.

DISTRIBUTION OF THE REPORTS

In addition to our regular mailing list, our reports are sent regularly to the newspapers of the state, secretaries of granges, secretaries of county boards of agriculture and our correspondents. Through the cooperation of the State Department of Public Instruc-

tion and the county superintendents of schools, we are also placing 473 reports each month in the rural schools where they can be used in connection with agricultural or other studies.



Distribution, by Counties, of
General Crop Reporters.



Distribution, by Counties, of
Poultry and Bee Reporters.

VALUE OF CROP ESTIMATES

Various interests are benefited by crop estimates which are carefully gathered, compiled and disseminated. Crop reports regularly issued convey to the farmer information on crop prospects outside of his own immediate district. Inasmuch as the reports issued by the state governments are disinterested, they tend to prevent the issuance of misleading reports by parties who are interested in manipulating prices, and prices in local markets are influenced more by conditions throughout the state, the United States or the world, than they are by local conditions. Transportation companies, which move crops to the markets, obtain from crop reports advance information as to the probable size of the crops in different parts of the country and are therefore able to provide necessary cars to handle them without delays, which would otherwise occur.

Manufacturers of agricultural machinery are better able to distribute their wares by keeping in close touch with crop conditions

and intelligent distribution often results in lower prices for the consumer. In a like manner, other commercial industries benefit by such reports and there is no doubt that farmers, merchants, manufacturers and distributors can, by a study of crop conditions, solve with more intelligence and foresight the problems in their respective fields.

ACCURACY OF CROP REPORTS

It is frequently stated that crop estimates are not reliable on account of the many individual errors which occur. In such estimates, however, we seldom need the results to be accurate within one per thousand or even one per cent. In dealing with large numbers of items an accurate count is a physical impossibility; and as absolute accuracy is not possible under such circumstances, attempts to gain it are frequently a waste of time. Relative or practical accuracy is sufficient for crop estimate work.

The accuracy of any average depends on the number of reports on which the average is based, the absence of bias or tendency to make each estimate too high or too low, and the accuracy of the individual estimates. The larger the number of reports, the more reliable is the average, because the better is the chance that an error in one direction will be canceled by a similar error in the opposite direction.

In the case of under- and over-estimates there are, fortunately, about an equal number of reporters who do either one or the other. These over- and under-estimates, in the absence of bias, also cancel each other, and their effect on the resulting average is reduced.

In census returns, if the women reported their ages as less than they really were, this would cause a biased error in the average age of the population. If all persons reported their ages at the nearest round number, this would cause an unbiased error, and, on the whole, affect the average very little.

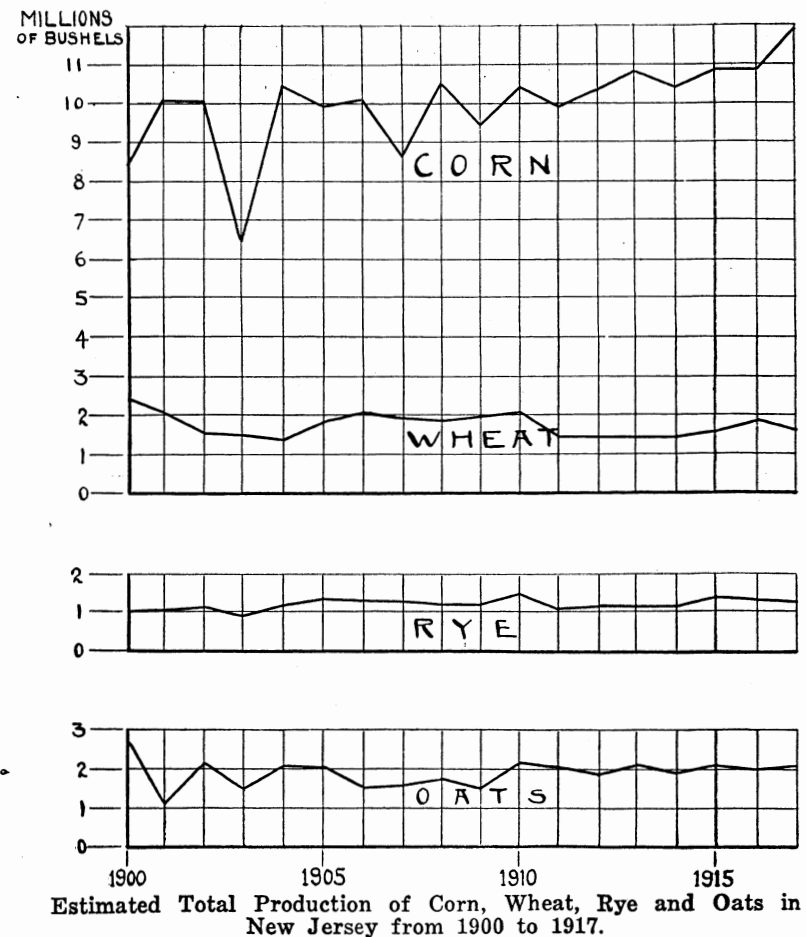
Unbiased errors are of little importance compared with biased errors. There is no counterbalancing tendency in the biased errors.

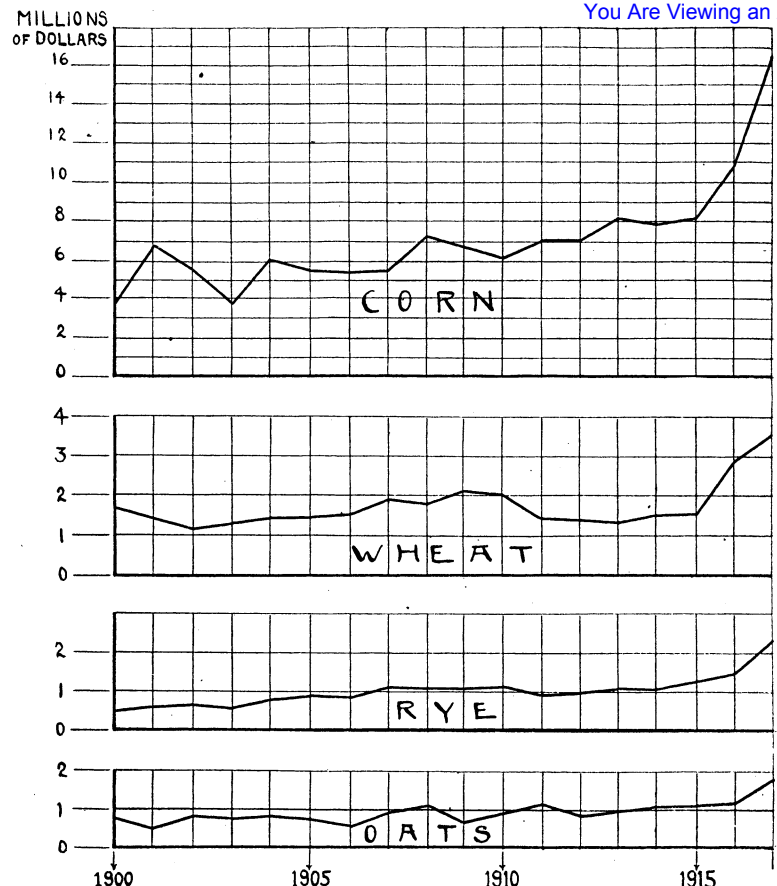
As to the accuracy of individual estimates, a high degree can be secured by obtaining the cooperation of men who have good judgment and experience in their field. It has been found that in matters in which farmers have extended experience their estimates are so reliable that when a large number is averaged, the result shows a very satisfactory degree of accuracy. This is especially true when

the questions asked conform to the terms in which the farmers' knowledge exists.

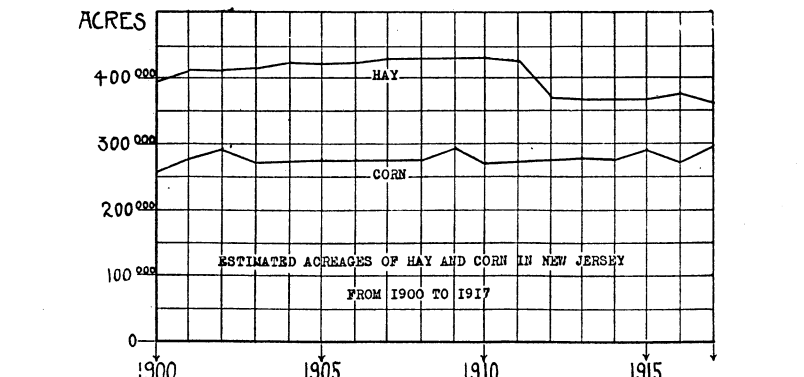
Accuracy to the point attainable is our aim, and crop reports from reliable sources, carefully gathered, compiled and averaged, result in final figures which are relatively accurate and sufficient for the purpose. As more refined methods are used, absolute accuracy is more closely approached but never attained.

The following charts illustrate graphically certain activities in New Jersey agriculture from 1900 to 1917. The curves from 1900 to 1916 in all of the figures have been plotted from estimates in the United States Department of Agriculture Yearbooks.

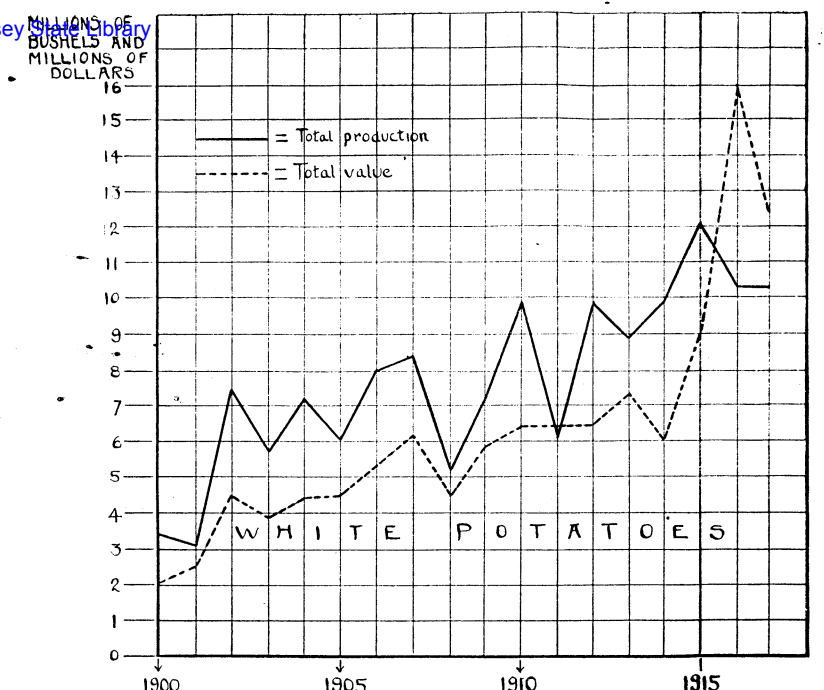




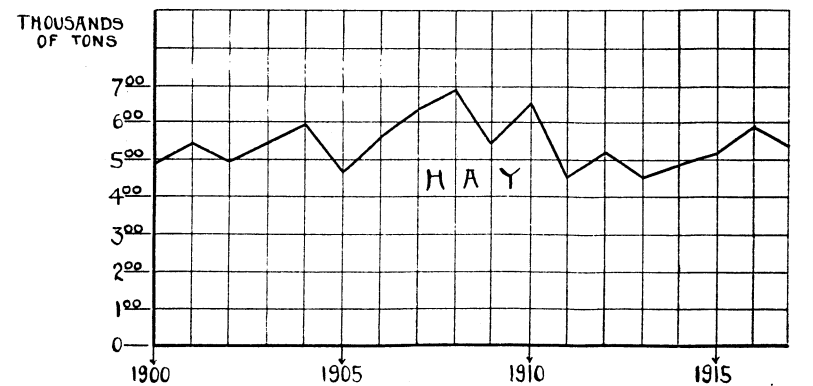
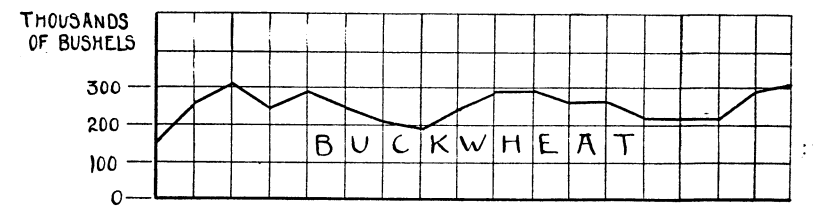
Estimated Total Value of Corn, Wheat, Rye and Oats in New Jersey from 1900 to 1917.



Estimated Acreages of Hay and Corn in New Jersey from 1900 to 1917.



Estimated Total Production and Total Value of the Potato Crop in New Jersey from 1900 to 1917.



Estimated Total Production of Buckwheat and Hay in New Jersey from 1900 to 1917.

REPORT OF THE INSPECTION SERVICE

Plant Inspection

THOMAS J. HEADLEE, Ph. D., *State Entomologist.*
 MEL. T. COOK, Ph. D., *State Plant Pathologist*
 HARRY B. WEISS, *Chief Inspector*

During the past eight months, the inspection work has been carried on as usual and the following report is a summary of the Bureau's activities along such lines.

FOREIGN NURSERY STOCK

Foreign nursery stock imported into New Jersey and inspected, from November 1, 1917, to June 30, 1918:

Country	Shipments	Cases
Australia	1	22
Bermuda	4	9
Brazil	12	67
Canada	1	2
U. S. Colombia.....	10	101
England	72	712
France	18	127
Holland	135	1367
India	1	1
Ireland	10	63
Japan	12	43
Scotland	2	4
Trinidad	5	32
	<hr/>	<hr/>
	283	2550

All of the above stock was inspected and the following pests intercepted:

FROM JAPAN

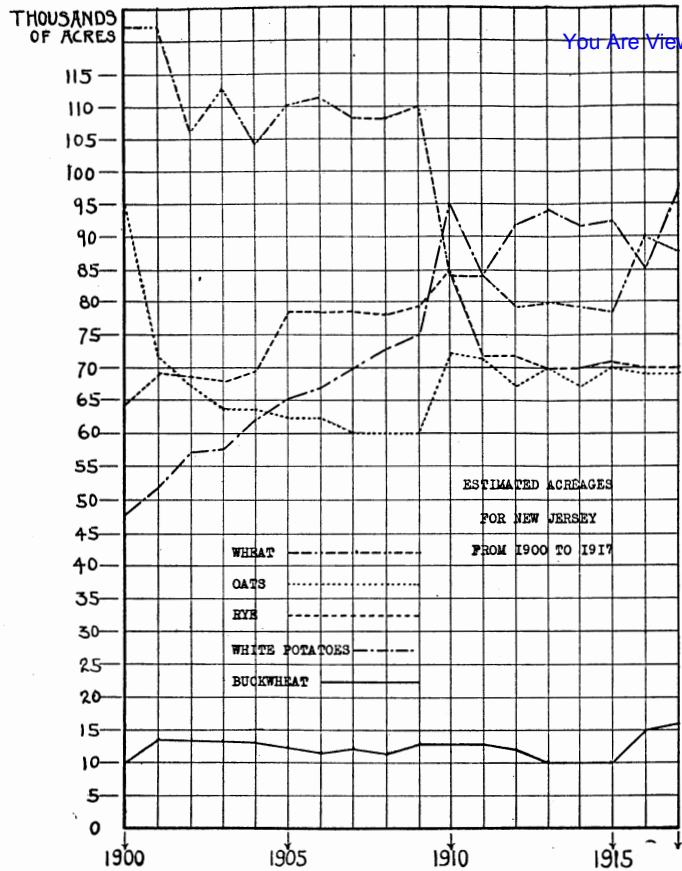
Mantid egg mass on azaleas
Gracilaria zachrysa (leaf roller) on azaleas
Mogastigmus aculeatus (parasite) in rose seeds

FROM SCOTLAND

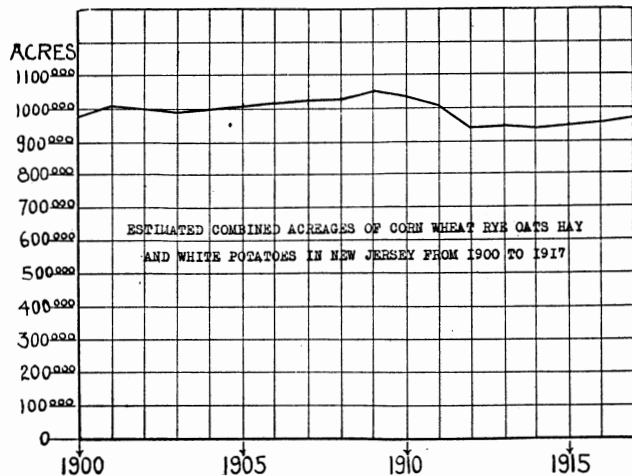
Aspidiotus hederæ (scale insect) on palms

FROM FRANCE

Plant lice on hydrangeas



Estimated Acreages of Wheat, Oats, Rye, White Potatoes and Buckwheat in New Jersey from 1900 to 1917.



Estimated Combined Acreages of Corn, Wheat, Rye, Oats, Hay and White Potatoes in New Jersey from 1900 to 1917.

FROM U. S. OF COLOMBIA

Cattleya midge galls on orchid roots

FROM BRAZIL

Cattleya midge galls on orchid roots

FROM BERMUDA

Homichionaspis aspidistrae (scale insect) on aspidistra

FROM ENGLAND

Aspidiotus hederae (scale insect) on palms
Leptobyrsa rhododendri (lace bug) eggs on rhododendrons
 Boxwood leaf miner on boxwood
Septoria leaf spot on kalmia
 Woolly aphid on crataegus

FROM HOLLAND

Gracilaria zachrysa (leaf roller) on azaleas
Psyllia buxi (jumping plant louse) on boxwood
 Oyster-shell scale on boxwood
Leptobyrsa rhododendri (lace bug) eggs on rhododendrons
Aspidiotus hederae (scale insect) on palms
Pseudococcus sp. (mealy bugs) on palms
Hemichionaspis aspidistrae (scale insect) on aspidistra
 Black rot canker on apples
Botrytis cinerea (gray mold) on rose and Scotch broom
 Azalea root gall on azalea
Volutella buxi on boxwood

STOCK FROM OTHER STATES

Stock shipped into New Jersey from other states during the eight months from November 1, 1917, to June 30, 1918 (according to notices received from transportation companies):

	Express Shipments	Freight Shipments	Parcel Post	Car-loads
Alabama	1	3	..	..
Connecticut	16	82	..	1
Delaware	4	11	..	..
Indiana	..	1	..	..
Illinois	1	..	..	1
Iowa	1	..	..	..
Kansas	1	..	..	..
Maryland	17	70	..	1
Massachusetts	2	10	..	..
Michigan	1	1	..	..
Missouri	19	17	181	1
New Hampshire	..	1	..	..
Nebraska	..	2	..	..
Minnesota	..	1	..	..
Maine	..	1	..	..

New York	278	295	3	3
Ohio	7	28	..	1
Pennsylvania	38	108	1	3
North Carolina	..	12	..	..
Rhode Island	1	13	..	..
Tennessee	..	4	..	1
Virginia	..	2	..	..
South Dakota	1	..	..	..
Totals	388	662	185	12

Domestic stock inspected from November 1, 1917, to June 30, 1918:

State	No. Cases	No. Carloads
Pennsylvania	60	3
Connecticut	64	1
Maine	1	..
Indiana	1	..
California	6	..
Rhode Island	13	..
Delaware	3	..
Massachusetts	10	..
Missouri	9	1
Ohio	25	2
Maryland	47	..
New York	176	3
North Carolina	12	..
Minnesota	1	..
Alabama	3	..
Illinois	..	1
Virginia	2	..
Nebraska	2	..
Tennessee	4	1
Totals	439	12

Pests Found on Domestic Stock

Crown gall in 7 shipments of fruit stock from Pennsylvania
 " " " 5 " " " " " Connecticut
 " " " 2 " " " " " Missouri
 " " " 3 " " " " " Maryland
 " " " 7 " " " " " New York
 " " " 1 " " " " " Ohio
 Oyster shell scale on 1 shipment from Pennsylvania and New York
Xanthorhiza apiifolia (leaf spot) on yellow root from Massachusetts
Peridermium cerebrum (rust) on pine from Minnesota
 Canker on *Cronus* from Illinois
 Pear twig canker on pears from New York
 Woolly lice on apples from New York
Psyllia buxi (jumping plant lice) on boxwood from Maryland
 Red spider on hemlock from Tennessee
 Rhododendron lace bug eggs on rhododendrons from Rhode Island and North Carolina

All fruit trees infected by crown gall were destroyed and the offending nurseries notified. Numerous requests from fruit growers for inspection of their stock before planting indicate that this phase of the bureau work is understood and appreciated.

OTHER BUREAU ACTIVITIES

Gipsy Moth Scouting

During 1917, 2,046 shipments of stone were consigned to various parts of New Jersey from the moth quarantine area of the New England States. As such material is likely to carry eggs of the Gipsy Moth, our inspectors scouted 54 towns and their surroundings during the winter months but found nothing.

These towns were the ones which had received most of the New England quarry products.

Other areas reported in the past to be infested by the Gipsy Moth and the Rutherford area from which the Gipsy Moth was eradicated were also scouted and found clean. We therefore have reason to believe that New Jersey is free from this pest.

Blister Rust of the White Pine

This disease continues to threaten the destruction of the white pine and other 5-leafed pines of the country and has been the cause of the placing of many quarantines by Federal and state governments. In 1916, scouting work in New Jersey revealed a total of 67 infested pines. In 1917, this number was reduced to 15 and up to the present time in 1918 only 3 infested pines have been found.

Following their usual custom, the United States Department of Agriculture has sent a scout, Mr. George W. Bassett, into the state to cooperate with us in our campaign for the eradication of the disease during 1918. Under present conditions it appears to be inadvisable to lift the quarantines placed by the bureau in 1916. All 5-leafed pines in nurseries have been gone over carefully several times with negative results.

Wheat and Barberry Rust

A very strenuous effort is being made in many of the western grain-growing states to eradicate the common barberry (*Berberis*

vulgaris) which is a carrier of the wheat rust. This problem is of little importance in New Jersey. However, in order to cooperate with the western states, our nurserymen have been asked to make no shipments of this species of barberry into grain-growing states. Literature dealing with this disease was obtained from several western states and distributed among New Jersey nurserymen.

Special Certificates

Twenty special certificates have been issued during the past eight months. These have enabled private citizens and nurseries to ship stock in compliance with the regulations of other states.

Publications

Circular No. 14 of the Department has been printed and distributed. This contained statements relative to new pests, white pine blister rust quarantines and a list of New Jersey nurseries. A circular dealing with the rules and regulations covering the interstate shipment of nursery stock is in the hands of the printer.

"Agricultural Week" Work

A series of eight charts calling attention to the activities of the bureau was prepared and exhibited during "Agricultural Week." In addition, various specimens illustrating the more important crop diseases were shown and one of our inspectors placed in charge to instruct interested visitors.

Inspection of Dealers' Establishments

During May and June all dealers holding nursery certificates of the bureau were visited for the purpose of inspecting their left-over stock and determining if such stock were fit to be sold. In view of the fact that most of the dealers have adopted the plan of destroying left-over stock, conditions were found extremely satisfactory.

Inspection of Nurseries

As this important phase of the Bureau's duties is carried on during July, August and September, it can not be reported upon at this time.

NEW PESTS

Lunate Onion Fly

During the course of his inspection work, Mr. Nicolay discovered the lunate onion fly (*Eumerus strigatus*) to be fairly abundant at Riverton, South Orange and Rutherford. This insect has been noted in a few other eastern states and is well known in Holland as a pest of narcissus and onion, the maggots being very destructive to the bulbs of these plants. It was evidently imported into New Jersey in Holland bulbs. Up to the present time, it has done no apparent damage in the state but as it is a potential onion pest it is being watched, and the attention of the United States Bureau of Entomology has been called to the infestations.

The Oriental Peach Moth in Nurseries

During the winter an important new enemy of the peach was found in several nurseries. Twigs and fruit are mined by the caterpillar of this moth (*Laspeyresia molesta*) and efforts are being made to prevent its distribution on nursery stock. All of the fruit stock in nurseries was inspected during the spring and the few nurseries in which it was found are cooperating with us by cutting and burning infested twigs.

A further statement by Dr. I. J. Headlee concerning this insect's activities outside of nurseries follows:

At the beginning of the present season, Dr. A. L. Quaintance, entomologist in charge of deciduous-fruit insect investigations, called a number of the state entomologists and entomologists of the experiment stations to a conference at Washington, D. C., on the subject of the Oriental Peach Moth. The conclusions reached at that conference were that the first step against this insect, which had become established in New Jersey, Delaware, Pennsylvania, Maryland and Virginia, was to find out the area of distribution. It has already been shown by studies made at Washington, D. C., and at College Park, Maryland, that the insect was capable of doing a tremendous amount of harm to peach culture, and that thus far nothing practicable for its control had been found. It is an insect which bores out the terminal shoots of the peach and attacks the fruit.

It was proposed by Doctor Quaintance that the state entomologist select an inspector for the New Jersey territory and that he arrange the itinerary of that inspector and keep an oversight of the work which he did. It was proposed that the inspector's salary and expenses be paid by the United States Department of Agriculture. Accordingly, the state entomologist nominated Mr. William Robinson, who was promptly employed by the United States Department of Agriculture, and he began his work April 16, 1918.

Already infestations have been determined at Springfield, Rutherford and Middletown. The existence of the infestations at Springfield and Rutherford had been discovered by the chief plant inspector, Mr. Weiss, some time before. Mr. Robinson is now examining the peach-growing sections of the state for the presence of this injurious insect.

The department of entomology of the New Jersey Agricultural Experiment Station has undertaken a study of methods of controlling this insect.

ERADICATION WORK AGAINST THE JAPANESE BEETLE

Popilia Japonica

Early last summer (1917) it was definitely determined that there existed an infestation of the Japanese Scarab *Popilia Japonica* at the Henry A. Dreer farm, about 2½ miles east of Riverton, N. J. This determination was made by the chief plant inspector of the Department, Mr. Harry B. Weiss. The potential danger of this insect was quickly realized, for its record in Japan is that of a seriously injurious insect.

The Bureau of Entomology of the United States Department of Agriculture at once became interested, and proposed to assist in the conduct of the study of the insect's habits and life history and of measures of control under New Jersey conditions. The Government's interest in this matter was the result of the fact that this was not only a seriously injurious insect, but that it was known to have become established at only one point in the United States. Accordingly, a study of this insect was undertaken from different angles by Mr. W. O. Ellis, of the United States Department of Agriculture, working under the direction of Dr. A. L. Quaintance, ento-

mologist in charge of deciduous-fruit insect investigations; Mr. Harry B. Weiss, chief plant inspector of the New Jersey State Department of Agriculture; and Dr. Thomas J. Headlee, state entomologist. The following facts represent the data collected:

1. This beetle is recognized in Japan as a serious pest to cherry, grape, yams, beans and various other plants. It is listed in Japanese textbooks among the species injurious to agriculture.

2. This beetle is now established at Riverton, New Jersey, and is not known to exist anywhere else in the United States.

3. This beetle probably came into this country with soil about the roots of Japanese iris.

4. This beetle is now densely present over an area of about 600 acres and is scatteringly present over an area of about 1000 acres more.

5. A study of its habits shows that in New Jersey it attacks grape, cherry, sweet potato, buckwheat, sweet corn silks, cantaloupes, roses, Virginia creeper, tamarick, smart weed, tear thumb, tare-weed, evening primrose, milk-weed, Indian mallow, sassafras, dock (*Rumex*), button bush, elderberry, wild grape, Althea bloom and jewel-weed. It was found to feed sparingly on tritis, flowering cherry, crataegus, spirea, *Vitex agnus castus*, staphyllea, scrub rambler rose and Japanese iris.

6. A study of its habits and of the Japanese literature relating thereto, show that the adult beetle began emerging about the middle of June and that specimens remained on the wing until cold weather, feeding throughout this period. The eggs are laid abundantly on the soil of grassy and weedy places and very scatteringly or not at all in cultivated fields. The winter is passed in the larval state and maturity is reached during the following warm season.

With these facts in hand it seemed highly desirable that some strong effort should be made to eradicate the insect before it had a chance to spread farther. Accordingly, a budget covering the probable needs of eradication work for the season of 1918 was prepared and the total amount figured necessary was \$15,000.

The Secretary of Agriculture, David F. Houston, was induced to set aside the sum of \$5,000 to be available during the period ending June 30, 1918, and to place in his request for appropriations for the following fiscal year an additional sum of \$5,000 to become available July 1, 1918. The Appropriations Committee of the New

Jersey State Legislature was induced to appropriate the sum of \$5,000 to become available July 1, 1918. It was agreed that the work should be carried out under the direction of a committee composed of Dr. A. L. Quaintance and Dr. Thomas J. Headlee. Mr. W. H. Goodwin was secured to take immediate charge of this work, and in order that the investigations necessary to the conduct of the eradication work might go forward Dr. Quaintance arranged to station Mr. W. O. Ellis on the ground.

After Mr. Goodwin had been on the ground for two months the following plan of procedure was prepared.

Plan

It is proposed to limit the spread of this insect during the present summer by constructing a circular band of all non-economic plants along roadsides, fences and streams for a distance of $\frac{1}{4}$ of a mile around the heavily infested area, leaving here and there patches of grass-land suitable for egg laying. It is proposed that, if emergency shows such procedure to be necessary, to draw a similar band of about the same width about the entire slightly infested area. It may be that the studies of distribution will show the necessity for placing the entire infested area or parts thereof under strict quarantine. If such proves to be the case, quarantines will be instituted and carried out.

It is proposed first to attack the immature stages (larvae and pupae) by treating the heavily infested sod land before the beetles emerge, with sodium cyanide dissolved in water.

It is proposed to attack the adult beetle by attracting it to trap lights, utilizing 12 stations distributed throughout the heavily-infested area for this purpose. The lights are 400 candle power, gasoline lanterns, placed upon towers of various heights, fitted with collecting pans in such a way that all beetles which fly to them will fall into the pans containing kerosene. It is proposed to attack the adult beetles by dusting throughout the season during which the beetles are active, with powdered arsenate of lead mixed with a dilutant, all foliage within the infested area on which the beetles feed, with the exception of certain trap areas here and there which are left untreated for this purpose. It is proposed to attack the adult beetles by hand-picking them wherever they may be found.

It is proposed to limit the places upon which the beetles feed and among which they lay their eggs by securing clean culture of all cultivated lands within the area and by reducing the areas of sod land, especially along the roadsides, to the least possible amount. The reduction along roadsides will be carried out by stripping the sod from them with a road scraper.

It is proposed to attack the larvae in the early fall while they are still actively feeding by treating thoroughly all infested sod land with sodium cyanide. In instances where for any reason the use of the poison proves impracticable, it is proposed to treat with carbon bisulfide.

BEE DISEASE CONTROL

THOMAS J. HEADLEE, Ph. D., *State Entomologist*
ELMER G. CARR, *Deputy to the State Entomologist*
in Bee Inspection

The period covered by this report extends from November 1, 1917, to June 30, 1918, and the force by which it was carried on is the same as that of last year. The active agent was Elmer G. Carr, deputy to the state entomologist in bee inspection.

At the close of the last fiscal year during the months of September and October, three temporary bee inspectors were employed and a rapid survey of beekeeping conditions was made in the counties of Sussex, Hunterdon and Warren as a basis of intelligent and effective bee disease control work for this present year. The results of this survey were in hand too late to include them in the report of the last fiscal year and they are therefore included in the report of this year.

The attention of the state entomologist and his deputy has been devoted to regular inspection work, inspection on request, management of demonstration yards, formation of queen-rearing plans, arrangements for meetings and the delivery of lectures, and the preparation and publication of scientific papers.

SURVEY OF BEEKEEPING CONDITIONS IN SUSSEX, HUNTERDON AND
WARREN COUNTIES

Mr. Herman Greenwald, of Lumberton, New Jersey, was employed as temporary inspector for the survey in Sussex County. The results of this survey show that this county has the second largest number of colonies of bees of any county in the state, that the average profits per colony per beekeeper are lower than in any other county, that the natural advantages in the way of nectar-producing plants is second only to Hunterdon, and that the failure to realize reasonable profits is chargeable to a lack of knowledge of proper bee husbandry, including bee-disease control. This survey shows that there are 1819 colonies of bees held by 203 beekeepers and that the average surplus produced was 12.3 pounds per colony. It shows that there are no professional beekeepers and that all the bees are in the hands of persons engaged in other lines of business and being run purely as a side issue. This survey shows that there is an ex-

cellent foundation for the building up of extensive and successful beekeeping in Sussex County, and that the greatest factor in bringing about this desirable result is the education of the individual beekeeper.

Mr. Harry N. Connor, of Stockton, was employed to make the survey of Hunterdon County. The results of his work show that Hunterdon County has the best natural advantages in the way of nectar-producing plants of any county in the state, that it has the largest number of colonies and the largest number of beekeepers but that the average yield per colony is lower than in Sussex. This survey shows that there are 3144 colonies held by 305 beekeepers, producing an average surplus of 11 pounds per colony. It was shown that the principal factor in the failure to obtain reasonable returns from the bees is the lack of proper bee husbandry. The same condition with regard to professional beekeeping which was found to obtain in Sussex occurs also in Hunterdon. All colonies of bees are held by persons who manage them as a side issue to other business. Like the survey in Sussex, this survey shows that the principal factor in developing extensive and successful beekeeping in Hunterdon is the education of the individual beekeeper.

Mr. J. M. Petty, of Washington, was employed as a temporary inspector to make the survey of Warren County. Unfortunately Mr. Petty's work at the outset proved to be of such a character that the results obtained were unsatisfactory, and his services were promptly discontinued. The survey started in Warren County produced nothing worth reporting.

REGULAR INSPECTION

During the past several years an effort was made to see whether foulbrood could be brought under control in a limited area by the practice of complete every-other-year inspection and treatment. The counties of Cape May, Cumberland, Salem and Atlantic were chosen and the work carried out. The plan was a complete inspection every other year and a reinspection of all diseased apiaries as often as necessary to eliminate the disease. The results showed that the brood diseases could be diminished but not eradicated, because there were too many opportunities for new infection. They also showed that with a good beekeeper the control of disease was perfectly practicable.

It thus having become clear that the greatest factor in bee disease control was the beekeeper and that under our present statute and funds disease could be satisfactorily controlled only through the activity of intelligent beekeepers, it was decided to switch the inspection work to regions of the state not yet served. This plan was adopted because experience had shown that a decided betterment in beekeeping followed the inspector's visits, and because it was anticipated that similar results would follow his work in those portions of the state not hitherto covered.

Accordingly, the inspection work of the present year has gone forward in Hunterdon County. Thus far, 59 apiaries have been examined and 24 found to be infected with American foulbrood, 8 with European and 27 free from disease. This has involved the examination of 628 colonies, of which 55 were infected with American and 39 with European foulbrood.

In addition to the work covering a block of new territory, the inspector has attacked the problem of cleaning up the American foulbrood infected area in the vicinity of Moorestown and made many inspections on special requests. Roughly, this area extends from Lenola on the west to Stanwick on the east, and from Bridgeboro on the north to Mt. Laurel on the south, involving about twenty square miles. Within this area there were about 75 colonies of bees in 15 yards. Seven yards and 42 colonies were found to be infected. This area has been thoroughly covered twice since March 5, 1918. There are now 125 colonies in 14 yards of which 5 yards and 14 colonies are still infected.

Inspections were made for the following beekeepers on request: (1) Allison Ludlam, Swain; (2) F. C. Borton, Tenaflly; (3) Joseph Horn, Westwood; (4) John Vandon Berg, Mahwah; (5) Minch Bros., Bridgeton; (6) E. R. Price, Brookside; (7) J. B. Darlington, Penns Grove; (8) Mrs. Anna Helman, Pattenburg; (9) C. A. Menickhein, Toms River.

The queen-rearing apiary of Mr. Robert B. Spicer, of Wharton, was examined on May 21, found to be clean and promptly certificated.

DEMONSTRATION YARDS

Three demonstration yards—one at Daretown, Salem County, one at Egg Harbor, Atlantic County, and one at Plainsboro, Mid-

dlesex County—are being maintained. All these yards are this year devoted to honey production. Persons in the neighborhood who are thought to be interested are notified each time that a manipulation is carried out and invited to be present. The fourth demonstration yard of last year, located at New Brunswick, has been discontinued and the stock used for developing a queen-rearing apiary at New Lisbon. An account of this matter will be found under "Queen-Rearing Plans".

BEEKEEPERS' MEETINGS

The overwhelming importance of the individual beekeeper in the solution of the problem of bee-disease control led the inspector to organize and hold meetings of beekeepers for the purpose of spreading the gospel of better bee husbandry. Meetings were held at Somerville, Martinsville, Bound Brook and Bernardsville, in Somerset County; Pattenburg, Lambertville, Glen Gardner, Flemington, Ringoes and Whitehouse, in Hunterdon County; Lakewood and Toms River, in Ocean County; Cape May Court House, in Cape May County; Dover and Morristown, in Morris County.

The winter meeting of the New Jersey Beekeepers' Association was held at Trenton and the summer meeting at Flemington. The membership this year has increased from 175 to 210.

Lectures were delivered at the farmers' institute at Haddonfield, at the pomona grange meeting at New Egypt, at the Princeton High School and to students in the course in General Entomology in the University of New Jersey.

A resume of the bee-disease control work in New Jersey was presented to the Pennsylvania State Beekeepers' Association at Lancaster.

QUEEN-REARING PLANS

During the meeting of the State Beekeepers' Association at Trenton, the problem of obtaining a sufficient number of satisfactory queens was strongly brought out and the chair was authorized to appoint a committee to see what could be done toward starting a state-controlled yard for this purpose. The president appointed Dr. Thomas J. Headlee, of New Brunswick, Irving Wayne Clark, of Moorestown, and Harold Hornor, of Mount Holly.

This committee met at Harold Hornor's home, at Mount Holly, in company with the president, Mr. Richard Barclay, of Riverton,

and the secretary, Mr. Elmer G. Carr, of New Egypt. It was decided to utilize the stock of the demonstration yard at New Brunswick as the basis of such a yard, to locate it at New Lisbon, and so to increase and improve the stock during the present summer as to fit it for that purpose. It was decided to attempt the pure mating necessary on the plains region of the pine barrens at a point northeast of Chatsworth. The necessity of providing pure mating led to the location of the basic yard at New Lisbon.

At present there are 16 colonies in this yard and it is hoped by fall to have 25, all of which will be furnished with queens of good breeding.

Next summer the breeding of queens for sale to the beekeepers will be taken up.

SCIENTIFIC PAPERS

For the purpose of stimulating honey production among New Jersey beekeepers and of promoting bee-disease control, a series of timely circulars was prepared, all except three of which have been mailed. The circulars are as follows: (1) Bees are Profitable; (2) Hives and Apparatus; (3) Spring Management; (4) Uniting; (5) Feeding Bees; (6) Transferring Bees; (7) Swarm Control; (8) Supering. Marketing the Crop, Requeening and Wintering are still to go forward.

An article on the nature and possibilities of New Jersey beekeeping was published in the "Voorhees Farmer" for April, 1918.

A paper covering the new bee disease described in last year's report has been prepared and will soon be published in the "Journal of Economic Entomology".

CONCLUSIONS AND OUTLOOK

Slowly but surely the gospel of better beekeeping is making headway among our people and the interference due to bee diseases is growing less important. But the field is immense and merely a beginning has been made. The average number of pounds of surplus honey per colony should be fully four times what it now is. This will not come to pass, however, until professional beekeepers become more numerous, and our efforts should be strongly centered in the task of producing and multiplying them. A short course of apiculture should be instituted at the University of New Jersey in order that young men may be given the proper start in this direction.

COMMISSION